

JOINT FAO/ECE/ILO COMMITTEE ON FOREST TECHNOLOGY, MANAGEMENT AND TRAINING

SEMINAR PROCEEDINGS

# HARVESTING OF NON-WOOD FOREST PRODUCTS

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Menemen–İzmir, Turkey  
2–8 October 2000





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Hosted by the Ministry of Forestry in Turkey  
in the International Agro-Hydrology Research and Training Center

INTERNATIONAL LABOUR ORGANIZATION  
UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE  
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

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## TABLE OF CONTENTS / TABLE DES MATIÈRES

	Page
Foreword / Préface .....	vii
Report of the seminar .....	1
Rapport du séminaire .....	11
Report of the seminar ( <i>in Russian</i> ) .....	21
 <b>Papers contributed to the seminar / Documents présentés au séminaire</b>	
Medicinal and aromatic commercial native plants in the Eastern Black Sea region of Turkey / Plantes médicinales et aromatiques d'intérêt commercial indigènes de la région orientale de la mer Noire de la Turquie - ( <i>Messrs. M. Küçük, S. Çetiner &amp; F. Ulu, Turkey</i> ) .....	33
Prospects for the exploitation of non-wood forest products in Ukraine / Perspectives de l'exploitation des produits forestiers autres que le bois en Ukraine - ( <i>Messrs. A. Sabadyr &amp; S. Zibtsev, Ukraine</i> ) .....	45
Current trends of changes in the utilisation of non-wood forest goods and benefits in Poland (accompanied by a poster) / Tendances actuelles de l'évolution de l'utilisation des produits forestiers autres que le bois et leurs avantages pour la Pologne (accompagné d'un poster) - ( <i>Messrs. P. Staniszewski &amp; J. Oktaba, Poland</i> ) .....	61
Some indicators of the status and possibilities to improve the collection, purchase and processing of medicinal and aromatic plants in the region of Herzegovina Neretva Canton in the Federation of Bosnia & Herzegovina / Cueillette et traitement des plantes médicinales dans la région du canton de Neretva de l'Herzégovine (Fédération de Bosnie-Herzégovine) - ( <i>Ms. N. Kosović &amp; Ms L. Dunjić, Bosnia &amp; Herzegovina</i> ) .....	71
Prospects of utilization of non-wood forest products in Armenia / Perspectives de l'utilisation des produits forestiers autres que le bois en Arménie - ( <i>Mr. A. Nalbandyan, Armenia</i> ) .....	75
The situation of non-wood forest products in Morocco / Situation des produits forestiers autres que le bois au Maroc - ( <i>Mr. M. Ellatifi, Morocco</i> ) .....	79
Experiences on non-wood forest products (NWFP) based on enterprise development in Nepal / Expériences en matière de produits forestiers autres que le bois fondées sur le développement des entreprises au Népal - ( <i>Mr. M. Jayaswal, Nepal</i> ) .....	91
Policies to promote sustainable forest operations & utilization of non-wood forest products / Politiques visant à promouvoir l'exploitation forestière et l'utilisation durables des produits forestiers autres que le bois - ( <i>Mr. M. Kızmaz, Turkey</i> ) .....	97
Policies to promote sustainable operations and utilization of non-wood forest products in Turkey / Politiques visant à promouvoir l'exploitation forestière et l'utilisation durables des produits forestiers autres que le bois - ( <i>Messrs. E. Özügürü &amp; M. Düzgün, Turkey</i> ) .....	113
Considerations on the national policies, some management strategies and sustainable production NWFP / Considérations sur la politique nationale, certaines stratégies de gestion et de la production durable des produits forestiers autres que le bois - ( <i>Messrs. Ö. Barlı &amp; H. Serin, Turkey</i> ) .....	127
Harvesting of non-wood forest products in Poland and their resources - An overview / Récolte des produits forestiers autres que le bois en Pologne et leurs ressources - Aperçu général - ( <i>Messrs. S. Rzadkowski &amp; M. Kalinowski, Poland</i> ) .....	133

## Contents

---

Page

Policy guidelines for the promotion of a sustainable utilization of non-wood forest products / Directives de politique générale pour la promotion d'une utilisation durable des produits forestiers autres que le bois - (Ms. L. Russo, & Messrs. P. Vantomme & S. Walter, FAO) .....	139
Study on the development of non-wood forest products / Etude sur le développement des produits forestiers non ligneux - (Messrs. M. Bouzid & S. Helal, Tunisia) .....	149
Non-wood forest products (NWFP) as a component of the total economic value (TEV) of mediterranean forests / Part des produits forestiers autres que le bois dans la valeur économique totale des forêts méditerranéennes - (Ms. L. Croitoru, Ms. P. Gatto & Mr. M. Merlo, Italy).....	163
Involving local peoples: reviewing participatory approaches for inventorying the resource base, harvesting and utilization of non-wood forest products / Assurer la participation des populations locales : modes d'approche participatifs pour l'inventaire de la base de ressources, la récolte et l'utilisation des produits forestiers autres que le bois - (Messrs. D. B. Dovie, Ed Witkowski & C. Shackleton, South Africa).....	175
Needs and constraints for improved inventory and harvesting techniques for NWFP/ Amélioration de l'inventaire et des techniques de récolte de produits forestiers autres que le bois : besoins et contraintes - (Mr. J. Lorbach, Ms. L. Russo & Mr. P. Vantomme, FAO) .....	191
Conditions in collecting and production of medicinal herbs in the Republic of Srpska / Conditions de collecte et de production des plantes médicinales dans la Republika Srpska - (Ms. B. Gligorić, Bosnia and Herzegovina) .....	203
Miombo woodland utilisation by small-scale farmers in Handeni, Tanzania: bark harvesting as an example of ethnic and gender oriented work / Utilisation des forêts claires de Miombo par les petits agriculteurs à Handeni (Tanzanie) la récolte de l'écorce, exemple illustrant les différences selon que l'activité est menée par les membres de certaines ethnies, et par des hommes ou des femmes - (Ms. M. Karmann, Germany) .....	211
Who counts most? - Managing non-wood forest products operations through the "Community conservation interface" model / Qu'est-ce qui compte le plus ? Exploitation des produits forestiers autres que le bois au moyen du modèle dit "interface communautaire pour la conservation" - (Mr. D. B. Dovie, South Africa).....	225
Towards sustainable harvesting of non-wood forest products in India: the role of gender / Vers une récolte durable des produits forestiers autres que le bois en Inde : les rôles respectifs des femmes et des hommes - (Ms. R. Singhal, India) .....	229
Effects on erosion control & cultivation of sweet marjoram ( <i>Origanum onites</i> ), sage ( <i>Salvia officinalis</i> ), balm ( <i>Melissa officinalis</i> ) on the marginal agricultural lands / Importance pour la lutte contre l'érosion de la culture de la marjolaine ( <i>origanum onites</i> ), de la sauge ( <i>salvia officinalis</i> ) et de la mélisse ( <i>melissa officinalis</i> ) sur les terres agricoles marginales - (Messrs. A. Gül & C. Acar, Turkey) .....	237
Barefoot silviculture in Oaxaca, Mexico: the adaptation of standard silvicultural systems for non-timber forest products and the integration of indigenous knowledge / La sylviculture rurale traditionnelle à Oaxaca (Mexique) : l'adaptation des systèmes courants de sylviculture aux produits forestiers autres que le bois et l'intégration du savoir autochtone - (Mr. D. Ganz, Thailand) .....	245
Production, transport and storage of chestnuts in Turkey / Production, transport et mise en magasin des châtaignes en Turquie - (Messrs. Z. C. Özkan & H. Acar, Turkey).....	261
The effect of harvesting, transportation and stockpiling activities in the resin tapping on the resin productivity and quality / Incidences des méthodes de récolte, de transport et d'entreposage utilisées dans le gemmage sur la productivité et la qualité de la résine - (Messrs. H. Acar, Ö. Barlı, Turkey & T. Yoshimura, Japan).....	271

## Contents

---

	Page
Gall production strategy that is interfering with life cycles of two important gall-maker species, <i>Andricus gallaetinctoriae</i> (Oliv.) and <i>A. kollari</i> Htg. (Hymenoptera: Cynipidae) in Turkey / Stratégie de production de galles interférant avec le cycle évolutif de deux importantes espèces galligènes, <i>andricus gallaetinctoriae</i> (oliv.) et <i>andricus kollari</i> htg. (Hymenoptera : cynipidae), en Turquie - (Mr. M. Eroğlu, Turkey).....	279
Sustainable utilization of gum and resin by improved tapping technique in some species / Utilisation durable des gommés et des résines par une technique améliorée de gemmage pratiquée sur certaines espèces - (Mr. B. Nair, India).....	293
The review of non-wood forest products management in the five year development plans and forest main plans / Evaluation de la gestion des produits forestiers autres que le bois dans les plans de développement quinquennaux et dans les plans d'aménagement forestier - (Messrs. M. Türker, M. Pak & A. Öztürk, Turkey).....	307
Conservation of medicinal plants in Idukki District of Kerala by community management / Conservation des plantes médicinales à Idukki, Etat du Kérole, dans le cadre d'une gestion communautaire - (Messrs. J. Mathew, S. Abraham & M. Nair, India).....	319
Harvesting of <i>Irvingia gabonensis</i> and <i>Irvingia wombulu</i> in Nigerian forests: potentials for the development of sustainable systems / Récolte de <i>Irvingia gabonensis</i> et de <i>Irvingia wombulu</i> dans les forêts nigérianes : potentiels de développement de systèmes durables - (Mr. D.O. Ladipo, Nigeria).....	325
Harvesting practices and management of two critically endangered medicinal plants in the natural forests of central India / Méthodes de récolte et gestion de deux plantes médicinales sérieusement menacées dans les forêts naturelles du centre de l'Inde - (Mr. M. Mishra, India).....	335
The essential oil fade of aromatic <i>Laurus Nobilis</i> in the Mediterranean region / Déclin de l'huile essentielle de <i>Laurus nobilis</i> , dans la région méditerranéenne - (Messrs. C. Hassiotis & P. Eflhymniou, Greece).....	343
Sustainable wild harvesting of medicinal and aromatic plants: an educational approach / Récolte sauvage durable des plantes médicinales et aromatiques : éduquer la population - (Messrs. K. Hüsnü & C. Başer, Turkey).....	349
Turkey's foreign trade in non-wood forest products / Commerce extérieur de la Turquie en ce qui concerne les produits forestiers autres que le bois - (Messrs. D. H. Koç, B. Aksu & A. Kurtoğlu, Turkey).....	361
Certification of NWFP, approaches in the Russian Federation / Certification des produits forestiers autres que le bois : modes d'approches appliqués en Fédération de Russie - (Ms. N. Demidova, Russian Federation & Mr. P. Alhojärvi, World Bank).....	373
The present state and possibilities of collection and subsequent utilization of non-wood forest products in the Czech Republic / Collecte et utilisation des produits forestiers autres que le bois dans la République tchèque : état actuel et possibilités - (Mr. J. Kadlec, Czech Republic).....	397
Improved tapping of almaciga tree for sustainable resin yield / Production durable de résine grâce à une technique améliorée de gemmage de l' <i>Almaciga</i> - (Mr. A.B. Ella, Philippines).....	405
The role of research in NTFP management / Rôle de la recherche dans la gestion des produits forestiers autres que le bois - (Mr. J. Maas, The Netherlands).....	407
Sustainable use of medicinal plants : A multi-sectoral challenge & opportunity / Utilisation durable des plantes médicinales : défis et perspectives plurisectoriels - (Ms. T. Mulliken (TRAFFIC), United Kingdom).....	411
Non-wood forest products programme / Programme concernant les produits forestiers autres que le bois - (Mr. P. Vantomme, FAO Forestry Department, Rome).....	415

**Papers established by authors who could not attend the seminar:**

Trade in wild medicinal plants and bulbous plants of Turkey and the involvement of local people / Commerce des plantes médicinales et des plantes bulbeuses sauvages de Turquie et participation de la population locale - (*Ms. S. Atay, Turkey*)..... 417

Harvesting of non-wood forest products in the Tropics - Nigeria as a case study / La récolte des produits forestiers autres que le bois dans les Tropiques - Le Nigeria, étude de cas - (*Mr. I. Balogrun, Nigeria*)..... 423

**List of participants / Liste des participants**

(*one list*)..... 427

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## Foreword

The papers in this publication were presented at the Seminar on *Harvesting of Non-Wood Forest Products*, which was held from 2 to 8 October 2000 at the International Agro-Hydrology Research and Training Center in Menemen-Izmir (Turkey) at the invitation of the Ministry of Forestry and under the auspices of the Joint FAO/ECE/ILO Committee on Forest Technology, Management and Training. More than 80 participants from 32 countries attended the seminar.

This publication contains the papers submitted at the seminar, preceded by the report on the seminar adopted at its conclusion. This seminar report in English was translated into French and Russian. These translations are also included. The papers are presented in the language provided by their authors (mostly English) with summaries in the other two languages for most of the papers.

All opinions expressed in these papers are those of the authors. The organizers and the secretariat of the Joint Committee cannot accept responsibility for the accuracy of any statistics or statements included in the papers. These papers appear as presented by the authors with the exception of later corrections and editorial revisions.

The seminar covered a wide range of topics, from inventory to marketing. The participants expressed a widely felt need for more information and training on sustainably managing for Non-Wood Forest Products.

Several specific conclusions and recommendations were made in the seminar report. The recommendations are addressed specifically to the:

- Joint FAO/ECE/ILO Committee on Forest Technology, Management and Training, the
- Member countries,
- Forest Research Institutes and the
- International Union of Forest Research Organizations (IUFRO).

Support and funding for the seminar and this publication were provided by the Forestry Administration of Turkey, the Joint FAO/ECE/ILO Committee and FAO.

Joachim Lorbach  
Forest Harvesting, Trade & Marketing Branch (FOPH)  
Food and Agriculture Organization (FAO)



**REPORT**  
(as approved by the seminar)

**INTRODUCTION** (Item 1 of the agenda)

1. The seminar on “**Harvesting of non-wood forest products**” was held from 2 to 8 October at the International Agro-Hydrology Research and Training Center in Menemen-İzmir (Turkey) at the invitation of the Ministry of Forestry and under the auspices of the Joint FAO/ECE/ILO Committee on Forest Technology, Management and Training. Participants from the following countries attended: Albania, Armenia, Austria, Azerbaijan, Bosnia & Herzegovina, Czech Republic, Finland, Germany, Greece, India, Italy, Kazakhstan, Kyrgyzstan, Lebanon, Moldova, Morocco, Nepal, the Netherlands, Nigeria, Philippines, Poland, Romania, Russian Federation, South Africa, Spain, Thailand, Tunisia, Turkey, Ukraine, United Kingdom, Uzbekistan and among international organisations the World Bank.

2. On behalf of the Turkish organizing Committee, Mr. K. **Gürses** welcomed the participants. On behalf of the Joint Committee, Mr. J. **Lorbach** (FAO) set the context of the discussions of Non-wood Forest Products (NWFP) for this seminar. The next speaker, Mr. T. **Eren** (Turkey) , Deputy Governor of İzmir, underlined the importance of NWFP for the rural development in the country. Dr. M.K. **Muthoo**, FAO Representative in Turkey, highlighted the important contribution of NWFP to food security and recalled participants on the need for sustainability, and on the important role of NWFP for poverty alleviation. His Excellency, the Minister of Forestry, Professor N. **Çağan**, made a well-documented, exhaustive presentation on the NWFP sector in Turkey. He focussed on the social needs of disadvantaged groups of society and for which NWFP may contribute to food security and income generating activities. He further emphasized the need for a sustainable development of NWFP according to the principles laid down in the Rio de Janeiro Summit and the Convention on Biological Diversity. Furthermore, he underlined Turkey’s position as an important hotspot of biological diversity with more than 10 000 plant species identified so far which further emphasized the role of NWFP to the forestry sector in Turkey.

3. Mr. E. **İspirli**, Head of External Relations and EU Department of the Ministry of Forest, and Mr. **Lorbach** introduced the objectives and expected outcomes of the seminar and the procedures of the seminar.

**ADOPTION OF THE AGENDA** (Item 2 )

4. The provisional agenda as set out in TIM/EFC/WP.1/SEM.49/1 was adopted.

**ELECTION OF OFFICERS** (Item 3)

5. The following chairpersons were elected as per the five half day sessions :

Mr. J. **Yüksel** (Turkey)  
Mr. H. C. **Başer** (Turkey)  
Mr. R. **Heinrich** (Austria)  
Mr. P. **Vantomme** (FAO)  
Ms. N. **Demidova** (Russian Federation).

**POLICIES TO PROMOTE SUSTAINABLE FOREST OPERATIONS AND UTILIZATION OF NWFP** (Item 4)

6. Under this item, the following papers were presented:

Messrs. M. <b>Küçük</b> , S. <b>Çetiner</b> & F. <b>Ulu</b> (Turkey)	<i>Medicinal and aromatic commercial native plants in the Eastern Black Sea region of Turkey</i>
Messrs. A. <b>Sabadyr</b> & S. <b>Zibtsev</b> (Ukraine)	<i>Prospects for the exploitation of non-wood forest products in Ukraine</i>
Messrs. P. <b>Staniszewski</b> & J. <b>Oktała</b> (Poland)	<i>Current trends of changes in the utilisation of non-wood forest goods and benefits in Poland (accompanied by a poster)</i>
Ms. N. <b>Kosović</b> & Ms L. <b>Dunjić</b> (Bosnia & Herzegovina)	<i>Some indicators of the status and possibilities to improve the collection, purchase and processing of medicinal and aromatic plants in the region of Herzegovina Neretva Canton in the Federation of Bosnia &amp; Herzegovina</i>
Mr. A. <b>Nalbandyan</b> (Armenia)	<i>Prospects of utilization of non-wood forest products in Armenia</i>
Mr. M. <b>Ellatifi</b> (Morocco)	<i>The situation of non-wood forest products in Morocco</i>
Mr. M. <b>Jayaswal</b> (Nepal)	<i>Experiences on non-wood forest products (NWFP) based on enterprise development in Nepal</i>
Mr. M. <b>Kızmaz</b> (Turkey)	<i>Policies to promote sustainable forest operations &amp; utilization of non-wood forest products</i>
Messrs. E. <b>Özğürü</b> & M. <b>Düzgün</b> (Turkey)	<i>Policies to promote sustainable operations and utilization of non-wood forest products in Turkey</i>
Messrs. Ö. <b>Barlı</b> & H. <b>Serin</b> (Turkey)	<i>Considerations on the national policies, some management strategies and sustainable production NWFP</i>
Messrs. S. <b>Rzadkowski</b> & M. <b>Kalinowski</b> (Poland)	<i>Harvesting of non-wood forest products in Poland and their resources - An overview</i>
Ms. L. <b>Russo</b> , Messrs P. <b>Vantomme</b> & S <b>Walter</b> (FAO)	<i>Policy guidelines for the promotion of a sustainable utilization of non-wood forest products</i>
Messrs. M. <b>Bouzi</b> & S. <b>Helal</b> (Tunisia)	<i>Study on the development of non-wood forest products</i>

7. In the discussion that followed the presentations under item 4, Mr. U. **Geray** (Turkey) reiterated the importance of NWFP for the rural development in Turkey. Mr. D. **Ladipo** (Nigeria) raised the issue about transborder trade on endangered NWFP species, to which Ms. T. **Mulliken** (TRAFFIC) explained the Convention on International Trade of Endangered Species (CITES). Mr. N.B. **Nair** (India) proposed to elaborate a listing of species according to subsistence and/or commercial use. Mr. M. **Ellatifi** (Morocco) and other participants mentioned the many functions of the forest in addition to NWFP, such as water management, recreation, hunting, etc.

8. Ms. S. **Talhok** (Lebanon) raised the issue of the need for a better access to and exchange on information on NWFP in the region; on that point, Mr. **Başer**, among other participants, further elaborated on the need for region specific networking, i.e. Eastern Mediterranean region. Ms. **Talhok** also raised the issue of *in situ* versus *ex situ* conservation of NWFP resources. Ms. F. **Ertuğ** (Turkey) drew the attention of the participants to the need to further develop practical methodologies for inventory of NWFP resources and for socio-economic assessment tools.

9. Several participants expressed their concern on intellectual property rights on the commercial development of local knowledge on NWFP and for the development of appropriate benefit sharing arrangements.

## INVENTORY METHODS AND MAPPING OF NON-WOOD FOREST PRODUCTS (Item 5)

10. Under this item, the Chairman made an introductory remark to highlight that the term 'Harvesting' should be preferred to 'Exploitation' because it includes the sustainability concept

11. Under this item the following papers were presented:

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| Ms. L. <b>Croitoru</b> , Ms. P. <b>Gatto</b><br>& Mr. M. <b>Merlo</b> , (Italy)              | <i>Non-wood forest products (NWFP) as a component of the total economic value (TEV) of mediterranean forests</i>  |
| Messrs. D. B. <b>Dovie</b> , Ed<br><b>Witkowski</b> & C. <b>Shackleton</b><br>(South Africa) | <i>Involving local peoples: reviewing participatory approaches for inventorying the resource base, harvesting and utilization of non-wood forest products</i> |
| Mr. J. <b>Lorbach</b> , Ms. L. <b>Russo</b><br>& P. <b>Vantomme</b> (FAO)                    | <i>Needs and constraints for improved inventory and harvesting techniques for NWFP</i>  |

12. Ms. F. **Ertuğ** (Turkey), supported by other participants, asked for further clarification on inventory methodologies used in NWFP assessments. Mr. **Ellatifi**, emphasised the need to integrate the assessment of non-wood forest products within existing forest inventories. Ms. **Talhok** stressed the need for a multi-disciplinary approach for NWFP inventories. She also raised the issue of how to motivate local people for the participatory assessment of their forest resources.

## INVOLVEMENT OF THE PRIVATE SECTOR AND NON-GOVERNMENTAL ORGANIZATIONS IN THE HARVESTING, PROCESSING AND MARKETING OF NWFP ENHANCING EMPLOYMENT AND INCOME GENERATION OF LOCAL POPULATIONS (Item 6)

13. Under this item the following papers were presented:

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| Ms. B. <b>Gligorić</b> (Bosnia and Herzegovina) | <i>Conditions in collecting and production of medicinal herbs in the Republic of Srpska</i>  |
| Ms. M. <b>Karmann</b> (Germany)                 | <i>Miombo woodland utilisation by small-scale farmers in Handeni, Tanzania: bark harvesting as an example of ethnic and gender oriented work</i> |
| Mr. D. B. <b>Dovie</b> (South Africa)           | <i>Who counts most? - Managing non-wood forest products operations through the "Community conservation interface" model</i>                      |
| Ms. R. <b>Singhal</b> (India)                   | <i>Towards sustainable harvesting of non-wood forest products in India: the role of gender</i>   |

14. A question was raised about the paper of Ms. **Singhal** to clarify the issue of nationalised or non-nationalised NWFP. Some speakers further supported the gender issues related to harvesting practices raised in her paper.

## PLANNING AND MANAGEMENT OF SUSTAINABLE FOREST HARVESTING OPERATIONS FOR NON-WOOD FOREST PRODUCTS. ESTABLISHMENT OF STANDARDS FOR APPROPRIATE HARVESTING SYSTEMS AND TECHNIQUES, REDUCING ENVIRONMENTAL IMPACTS AND WASTES (Item 7)

15. Under this item the following papers were presented:

Messrs. A. <b>Gül</b> & C. <b>Acar</b> (Turkey)	<i>Effects on erosion control &amp; cultivation of sweet marjoram, sage, balm on the marginal agricultural lands</i>
Mr. D. <b>Ganz</b> (Thailand)	<i>Barefoot silviculture in Oaxaca, Mexico: the adaptation of standard silvicultural systems for non-timber forest products and the integration of indigenous knowledge</i>
Messrs. Z. C. <b>Özkan</b> & H. <b>Acar</b> (Turkey)	<i>Production, transport and storage of chestnuts in Turkey</i>
Messrs. H. <b>Acar</b> , Ö. <b>Barlı</b> (Turkey) & T. <b>Yoshimura</b> (Japan)	<i>The effect of harvesting, transportation and stockpiling activities in the resin tapping on the resin productivity and quality</i>
Mr. M. <b>Eroğlu</b> (Turkey)	<i>Gall production strategy that is interfering with life cycles of two important gall-maker species</i>
Mr. B. <b>Nair</b> (India)	<i>Sustainable utilization of gum and resin by improved tapping technique in some species</i>
Messrs. M. <b>Türker</b> , M. <b>Pak</b> & A. <b>Öztürk</b> (Turkey)	<i>The review of non-wood forest products management in the five year development plans and forest main plans</i>

16. Concerning the paper presented by Mr. **Gül**, Ms. F. **Ertuğ** (Turkey) asked for further clarification on the methodology used for the measurement of the impact of erosion.

17. There were several questions raised on the presentation by Mr. **Nair** about more detailed information on the tapping method and on the recent market developments.

18. On the paper introduced by Mr. **Pak**, clarification was requested on the value and the high share of export of NWFP in Turkey. Information was also requested on the type of NWFP imported in Turkey.

19. Under the **continuation of this item**, the following papers were presented:

Messrs. J. <b>Mathew</b> , S. <b>Abraham</b> & M. <b>Nair</b> (India)	<i>Conservation of medicinal plants in Idukki District of Kerala by community management</i>
Mr. D.O. <b>Ladipo</b> (Nigeria)	<i>Harvesting of <i>Irvingia gabonensis</i> and <i>Irvingia wombulu</i> in Nigerian forests: potentials for the development of sustainable systems</i>
Mr. M. <b>Mishra</b> (India)	<i>Harvesting practices and management of two critically endangered medicinal plants in the natural forests of central India</i>
Messrs. C. <b>Hassiotis</b> & P. <b>Efthymiou</b> (Greece)	<i>The essential oil fade of aromatic <i>Laurus Nobilis</i> in the Mediterranean region</i>

20. Concerning the paper presented by Mr. **Nair**, Mr. **Dovie** raised the issue of property rights in view of medicinal plants; he pointed out that there was a risk of losing intellectual property rights related to medicinal plants of local communities.

21. Ms. **Mulliken**, on the paper presented by Mr. **Mishra**, raised the question on how and in which way the industry could play a role in the process towards a more sustainable utilisation of NWFP, especially in view of endangered species.

22. Ms. **Talhok** made a comment on the paper presented by Mr. **Hassiotis** stating that any harvesting

operation would have an impact on the environment, including on soils and their micro-organisms. The author replied that no human intervention would take place without some kind of environmental impact on the nature resources. This aspect was also supported by some of the participants.

### **EXTENSION, TRAINING AND EDUCATION TO IMPROVE FOREST HARVESTING PRACTICES, PRODUCTIVITY AND AVAILABILITY OF NON-WOOD FOREST PRODUCTS (Item 8)**

23. Under this item, the following speaker presented a paper:

Messrs. K. **Hüsnü & C. Başer** (Turkey) *Sustainable wild harvesting of medicinal and aromatic plants: an educational approach*

The speaker gave an extensive overview of the NWFP sector in Turkey with particular emphasis on medicinal and aromatic plants.

24. His presentation raised a number of interventions from several participants on the following issues: control of medicinal plant harvesting practices; training and extension needs on improved tools for farmers who collect NWFP; lack of accuracy in medicinal plants export statistics (species/quantity). There was no consensus as regards to the perceived lower quality of cultivated medicinal plants compared to those gathered in the forest.

### **ORGANIZATIONS AND INSTITUTIONS DEALING WITH THE COLLECTION OF STATISTICAL DATA AND EVALUATION OF NON-WOOD FOREST PRODUCTS (Item 9)**

25. The delegate from Kazakhstan, Mr. V. **Poddubnyy**, reported on the new developments in the use of NWFP in his country as a result of the collapse of the former USSR and its structures on the ongoing privatisation of the forest sector. He underlined the need for support to create small-scale enterprises based on NWFP and called for assistance on training and marketing.

26. Under this item, the following papers were presented:

Messrs. D. Hüseyin **Koç**, Baki **Aksu & Ahmet Kurtoğlu** (Turkey) *Turkey's foreign trade in non-wood forest products*

Ms. N. **Demidova** (Russian Federation) & Mr. P. **Alhojärvi** (World Bank) *Certification of NWFP, approaches in the Russian Federation*

27. About the questions raised on the paper on Certification of NWFP, the authors stated that certification would be desirable; however, this depends very much on the targeted markets in countries and regions. They also expressed that the existing forest certification schemes are related to timber products only and therefore not suitable for NWFP without major modifications.

### **POSTER SESSION**

28. Mr. Y. **Yüksel** (Turkey) made a power-point presentation on "Establishment of the organization: Rights to forest village communities". Questions were raised to clarify pricing methodology for NWFP, on the impact of grazing in the forest on the availability of NWFP, and the forest ownership/user rights for village people.

29. The other presentations were as follows:

Mr. J. **Kadlec** (Czech Republic) *The present state and possibilities of collection and subsequent utilization of non-wood forest products in the Czech Republic*

Mr. A.B. <b>Ella</b> (Philippines)	<i>Improved tapping of almaciga tree for sustainable resin yield</i>
Mr. J. <b>Maas</b> (The Netherlands)	<i>The role of research in NTFP management</i>
Ms. T. <b>Mulliken</b> (TRAFFIC, United Kingdom)	<i>Sustainable use of medicinal plants : A multi-sectoral challenge &amp; opportunity</i>
Mr. P. <b>Vantomme</b> , FAO Forestry Department, Rome	<i>Non-wood forest products programme</i>

30. The poster session gave the participants the chance to exchange and share information on the basis of the posters presented due to the informal approach of that session.

### **OTHER MATTERS (Item 10)**

31. Two full day's excursions (see Annex) were organised during the seminar and included a visit of *Pinus pinea* forest stands, organization of harvesting and processing of pinus cone seeds, demonstration of processing equipment and machines (Kozak); *Pinus brutia* stands with demonstration of different pilot research trials of resin utilisation (Kemal Pasa); processing plant for *Laurus* and *Thymus*; and a visit to Dilek Yarimadasi National Park, rich in Mediterranean flora.

### **CONCLUSIONS & RECOMMENDATIONS (Item 11)**

#### **Conclusions**

1. A wide range of topics covering inventory, harvesting, processing, utilisation and trade of non-wood forest products were presented, showing that many species of NWFP are being harvested unsustainably and furthermore, in many cases, management practices are insufficiently known or implemented.
2. The importance of managing NWFP in the context of sustainable forest management and its contribution to rural development and agriculture was underlined, specifically for women and economic disadvantaged groups of the society living in the vicinity of the forest resources for food, income, employment and medicinal plants, etc.
3. The sustainable utilisation of NWFP requires the involvement of experts in a wide range of disciplines, including indigenous knowledge.
4. A great need was felt by the participants for more information and training, on the management and valorisation of NWFP. In this way, participants suggested the need for follow-up seminars and/or workshops focussed on specific technical topics and with more time for group discussions.
5. There is a tremendous wealth of knowledge held by those living in and near forests. This knowledge is also in danger of being lost and is not well taken into account in efforts to manage forests.

#### **Recommendations**

##### *To the JOINT COMMITTEE*

1. Facilitate and support the development of databases, networking amongst countries and regions and follow-up workshops as well as facilitate easy access to available information sources (Websites and publications) on all aspects of NWFP development such as inventory and resources assessment, harvesting, processing, marketing, trade and policies affecting NWFP.

2. Support the compilation of Sound Forest Practices for NWFP and facilitate the wide dissemination of successful case studies such as those presented in the meeting, amongst interested groups and countries.
3. Assist in the further development on appropriate forest management, planning and practical certification systems for different groups of NWFP including all stakeholders and/or social groups involved.
4. Stimulate more participation in future seminars and/or workshops of representatives of NGOs, private sector and research institutes.

***To MEMBER COUNTRIES***

1. Include and provide adequate support to the conservation, management and utilisation of NWFP into national forest policies on a multidisciplinary and participatory basis with interested stakeholders and with particular attention to facilitate the active involvement of rural people, especially women, depending on these resources.
2. Elaborate and make available, improved statistics at national levels on NWFP covering: resources, harvesting levels and trade data (at the species level).
3. Make available appropriate financial and institutional support mechanisms to facilitate the start up of local, small-scale NWFP based enterprises.
4. Review and improve national legislation related to NWFP such as forest regulations, taxes, access and users intellectual and other property rights.
5. Promote bilateral collaboration to share information and expertise on NWFP.
6. Increase efforts to involve other sectors dependent on NWFP, including the health, education and commercial sectors, in ensuring their sustainable management, conservation and utilisation.

***To FOREST RESEARCH INSTITUTES AND IUFRO***

1. Accelerate and co-ordinate further curriculum development and research on NWFP issues related to:
  - Clarifications of definitions, concepts and classifications,
  - methodologies for the elaboration of practical tool kits for:
    - inventory and harvesting impact assessments;
    - domestication, in-situ and ex-situ conservation practices;
    - ethno-biological studies;
    - marketing and trade analysis;
    - insertion of NWFP for sustainable forest management and criteria and indicators/certification schemes;
    - criteria extension for non-wood forest products;
    - elaboration of benefit sharing arrangements.
2. Support and facilitate further research on/and the application of appropriate economic and social valuation to assess all benefits derived from NWFP and forest services.

**ADOPTION OF THE REPORT (Item 12)**

32. The draft report, prepared by the Secretariat, and the conclusions and recommendations were adopted with some modifications, which have been incorporated in the present document.

33. For the host country, Mr. Y. **Yüksel**, Ministry of Forestry, thanked the participants for attending the seminar, preparing papers and posters, for the lively discussions during the different sessions and for the conclusions and recommendations. On behalf of the participants, Mr. T. **Musuraliev** (Kyrgyzstan), Mr. A. **Ella** (Philippines) and Mr. D. **Ladipo** (Nigeria) expressed their gratitude to the host country and the organisers, who offered them to work, exchange opinions and discuss NWFP issues on an international level. Finally, on behalf of the Joint Committee, Mr. **Lorbach** underpinned the views of the previous speakers and thanked the participants, the host country and all support staff for their active contribution to the successful outcome of the seminar. All speakers expressed the hope that the recommendations formulated by the seminar could be followed up for the benefit of the people depending on a sustainable utilisation of NWFP.

## Annex

### STUDY VISITS

#### Field Visit - Friday, 6 October 2000

During the whole day excursion, the following were observed:

- (i) Ancient Pergamon city;
- (ii) Stone pine (*Pinus pineaster*) seed production and processing facilities in Kozak, Bergama;
- (iii) Resin production research plot area in Çiçekli;
- (iv) KÜTAŞ, aromatic and medicinal processing and packing factory.

#### 1. Ancient Pergamon City

The Ancient Pergamon City was on the way to the Kozak, pine seed production area. Since participants were very interested in the place, they were given a chance to view some historical ruins during a short time visit to the area. It was located near the Bergama District, İzmir, which is one of the finest historical and cultural sites in Turkey. The ancient city has numerous remains among which are a number of temples (Trajan and Dionyos, the Altar of Zeus etc.), an amphitheatre, one of the second oldest libraries in the world, the first Christian church and the stone city walls.

#### 2. Stone Pine (*Pinus pineaster*) Seed Production and Processing Facilities in Kozak

The Kozak Plain is a famous area of stone pine plantations and seed production covering 15,150 hectares of stone pine farmland, privately owned by villagers living in the surrounding 13 villages. Ms. Z. K. Ay, Forest Researcher, gave brief information on ecological, geographical and socio-economic characteristics of the area, explaining that it was a very successful and promising example for planting, management, harvesting and trading of NWFP by local people and their co-operatives, providing an important source of income for them in Turkey.

A privately owned small scale pine seed extraction and storage factory was visited. Mr. Ö. Önder, Director of the factory, explained how the cones were harvested and processed, as well as storage and marketing of the seeds of stone pine, emphasising the 500 ton/year capacity of the factory and that 50 kilograms of seeds were produced from one tonne of pine cones. He also underlined that the quality and quantity of the seeds was highly affected by the harvesting time of the pinecones. The best time was from January to April.

There was also another pine seed processing facility, which was shown to the participants, being constructed by a forest village co-operative, with financial and technical assistance from the Forest Village Development Fund of the Ministry of Forestry.

#### 3. Research Plot Area for Resin Production from Red Pine in Çiçekli

Mr. F. Bilgin, Forest Researcher, explained that the sample area had been established for a six year period, 2000-2006, aiming to find out the effects on volume increment of red pine (*Pinus brutia*) trees used for resin production applying the acid-paste method. The Aegean Forest Research Directorate was implementing the research at 165 compartments in that area. He stated that although three years have passed since the establishment of the plots, they could not identify any significant result. Some questions were raised by the participants, such as ages of the trees, factors taken into account, other resin production methods, dimensions of the tapping surfaces and so on, which were answered by Mr. Bilgin.

#### 4. KÜTAŞ, Aromatic and Medicinal Plants Processing and Packing Factory

This was a quite well established small factory near İzmir for the processing and marketing of some medicinal and aromatic plants. The main processed plant species were Anise, Cummin, *Salvia* sp,

Rosemary, Thyme, Origanum (kekik), which mostly had been collected from forested areas in Turkey. Ms. G. **Türker**, Operation Manager, gave brief information on the factory's processing activities explaining that the products were in accordance with ISO 9000, USA and British Standards and all products were being tested through chemical, physical and micro-biological analyses. She also informed that the annual capacity of the factory was 2,000 tonnes and that it employed 100-200 labourers in all processing activities. Furthermore, the participants were informed that most of the factory's products were exported, mainly to the USA.

#### **Field Visit - Saturday, 7 October 2000**

##### **5. Dilek Peninsula National Park**

On the second day of the field study programme participants visited the Dilek Peninsula National Park which was located nearby Kuşadası District, İzmir. It was first established in 1966 as a national park, covering some 16,000 hectares of land. It was a well-protected, species-rich forest area. Dilek Peninsula as a protected forest area typically represents the Mediterranean vegetation types with 77 families and more than 700 species including trees, shrubs and other plants. Ms. N. **Özel** provided some further information about the National Park, in which participants were very interested.

After visiting the Dilek Peninsula National Park, participants also had a chance to visit the Kuşadası District on the way to İzmir, which is an attractive town visited by tourists. They had the opportunity for sightseeing and then to see landscape diversity, land use patterns, etc., around the İzmir Province.

Finally the participants visited the ancient city of Ephesus and the House of St. Mary.

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## **RAPPORT**

**(tel qu'il a été approuvé par le séminaire)**

### **INTRODUCTION** (point 1 de l'ordre du jour)

1. Le séminaire sur la “**Récolte des produits forestiers autres que le bois**” s'est tenu du 2 au 8 octobre au Centre international de formation et de recherche en agrohydrologie de Menemen-İzmir (Turquie), à l'invitation du Ministère des forêts et sous les auspices du Comité mixte FAO/CEE/OIT de la technologie, de la gestion et de la formation forestières. Des représentants des pays suivants y ont participé : Afrique du Sud, Albanie, Allemagne, Arménie, Autriche, Azerbaïdjan, Bosnie-Herzégovine, Espagne, Fédération de Russie, Finlande, Grèce, Inde, Italie, Kazakhstan, Kirghizistan, Liban, Maroc, Moldova, Népal, Nigéria, Ouzbékistan, Pays-Bas, Philippines, Pologne, République tchèque, Roumanie, Royaume-Uni, Thaïlande, Tunisie, Turquie et Ukraine. Parmi les organisations internationales, la Banque mondiale y a participé.

2. Au nom du Comité d'organisation turc, M. K. Gürses a souhaité la bienvenue aux participants. S'exprimant au nom du Comité mixte, M. J. Lorbach (FAO) a situé le contexte des discussions sur les produits forestiers autres que le bois pour le présent séminaire. L'orateur suivant, M. T. Eren (Turquie), Vice-Gouverneur d'İzmir, a souligné l'importance des produits forestiers autres que le bois pour le développement rural de son pays. M. M. K. Muthoo, représentant de la FAO en Turquie, a mis en évidence l'importante contribution de ces produits à la sécurité alimentaire; il a rappelé aux participants la nécessité d'en assurer la durabilité et a relevé l'importance de leur rôle dans l'atténuation de la pauvreté. M. N. Çağan, Ministre des forêts, a fait un exposé complet et bien documenté sur le secteur des produits forestiers autres que le bois de la Turquie. Il a mis l'accent sur les besoins sociaux des couches défavorisées de la société, qui peuvent trouver dans ces produits un moyen d'assurer leur sécurité alimentaire et de se procurer des revenus. Il a par ailleurs souligné la nécessité d'assurer le développement durable des produits forestiers, autres que le bois, conformément aux principes fixés au Sommet de Rio de Janeiro et dans la Convention sur la diversité biologique. D'autre part, le Ministre a souligné que la Turquie était un haut lieu de la diversité biologique, avec plus de 10 000 espèces de plantes recensées à ce jour, ce qui augmentait encore l'importance des produits forestiers autres que le bois pour le secteur forestier du pays.

3. M. E. İspirli, chef du Département des relations extérieures et de l'UE du Ministère des forêts, et M. Lorbach ont présenté les objectifs et les résultats escomptés du séminaire, ainsi que les moyens d'y parvenir.

### **ADOPTION DE L'ORDRE DU JOUR** (point 2)

4. L'ordre du jour provisoire publié sous la cote TIM/EFC/WP.1/SEM.49/1 a été adopté.

### **ÉLECTION DU BUREAU** (point 3)

5. Les cinq présidents ci-après ont été élus chacun pour une demi-journée :

M. J. Yüksel (Turquie)  
M. H. C. Başer (Turquie)  
M. R. Heinrich (Autriche)  
M. P. Vantomme (FAO)  
Mme N. Demidova (Fédération de Russie)

### **POLITIQUES VISANT À PROMOUVOIR UNE EXPLOITATION FORESTIÈRE ET UNE UTILISATION DURABLES DES PRODUITS FORESTIERS AUTRES QUE LE BOIS** (point 4)

6. Au titre de ce point, les documents suivants ont été présentés :

MM. M. Küçük, S. Çetiner et F. Ulu (Turquie)	Plantes médicinales et aromatiques d'intérêt commercial indigènes de la région orientale de la mer Noire de la Turquie
MM. A. Sabadyr et S. Zibtsev (Ukraine)	Perspectives de l'exploitation des produits forestiers autres que le bois en Ukraine

MM. P. Staniszewski et J. Oktaba (Pologne)	Tendances actuelles de l'évolution de l'utilisation des produits forestiers autres que le bois et leurs avantages pour la Pologne (accompagné d'un poster)
Mmes. N. Kosovi_ et L. Dunji_ (Bosnie-Herzégovine)	Cueillette et traitement des plantes médicinales et aromatiques dans la région du canton de Neretva de l'Herzégovine (Fédération de Bosnie-Herzégovine)
M. A. Nalbandyan (Arménie)	Perspectives de l'utilisation des produits forestiers autres que le bois en Arménie
M. M. Ellatifi (Maroc)	Situation des produits forestiers autres que le bois au Maroc
M. M. Jayaswal (Népal)	Expériences en matière de produits forestiers autres que le bois fondées sur le développement des entreprises au Népal
M. Kızmaz (Turquie)	Politiques visant à promouvoir l'exploitation forestière et l'utilisation durables des produits forestiers autres que le bois
MM. E. Özüğurlu et M. Düzgün (Turquie)	Politiques visant à promouvoir l'exploitation et l'utilisation durables des produits forestiers autres que le bois en Turquie
MM. Ö. Barlı et H. Serin (Turquie)	Considérations sur la politique nationale, certaines stratégies de gestion et la production durable des produits forestiers autres que le bois
MM: S. Rzadkowski et M. Kalinowski (Pologne)	Récolte des produits forestiers autres que le bois en Pologne et leurs ressources – Aperçu général
MM. L. Russo, S. Walter et P. Vantomme (FAO)	Directives de politique générale pour la promotion d'une utilisation durable des produits forestiers autres que le bois
MM. M. Bouzid et S. Helal (Tunisie)	Étude sur le développement des produits forestiers non ligneux

7. Au cours du débat qui a suivi les exposés présentés au titre du point 4, M. U. Geray (Turquie) a réitéré l'importance des produits forestiers autres que le bois pour le développement rural en Turquie. M. D. Ladipo (Nigéria) a soulevé la question du commerce transfrontières des espèces de produits forestiers autres que le bois menacées d'extinction, après quoi Mme T. Mulliken (TRAFFIC) a commenté la Convention sur le commerce international des espèces de faune et de flore sauvages menacées d'extinction (CITES). M. N. B. Nair (Inde) a proposé de dresser une liste des espèces et de les classer comme moyens de subsistance et/ou biens présentant un intérêt commercial. M. Ellatifi (Maroc) et d'autres participants ont mentionné les nombreuses fonctions de la forêt outre la production de produits forestiers autres que le bois, à savoir la gestion de l'eau, les loisirs, la chasse, etc.

8. Mme S. Talhouk (Liban) a soulevé la question de la nécessité de faciliter l'accès aux informations et les échanges de données sur les produits forestiers autres que le bois dans la région; sur ce point, M. Başer, parmi d'autres participants, a poursuivi sur la nécessité d'établir des réseaux propres aux régions, par exemple la région de la Méditerranée orientale. Mme Talhouk a également soulevé la question de la conservation des ressources en produits forestiers autres que le bois *in situ* par opposition à leur conservation *ex situ*. Mme F. Ertuğ (Turquie) a signalé aux participants qu'il importait de perfectionner les méthodes pratiques pour l'établissement d'inventaires de ces ressources et la création d'outils d'évaluation socio-économique.

9. Plusieurs participants se sont déclarés préoccupés par les droits de propriété intellectuelle, l'exploitation commerciale des connaissances locales en matière de produits forestiers autres que le bois et l'élaboration de dispositions appropriées concernant la répartition des avantages.

## **MÉTHODES D'INVENTAIRE ET CARTOGRAPHIE DES PRODUITS FORESTIERS AUTRES QUE LE BOIS (point 5)**

10. Au titre de ce point, le Président a fait une observation liminaire pour souligner qu'il vaudrait mieux utiliser le mot "récolte" plutôt que le mot "exploitation" parce que le premier comprend la notion de durabilité.

11. Au titre du même point, les documents suivants ont été présentés :

- |   |  |
|---|--|
| M. M. Merlo (Italie)  | Part des produits forestiers autres que le bois dans la valeur économique totale des forêts méditerranéennes : premiers résultats d'une étude lancée par le centre régional des projets de l'EFI à Solsona |
| MM. D. B. Dovie, Ed Witkowski et C. Shackleton (Afrique du Sud) | Assurer la participation des populations locales : modes d'approche participatifs pour l'inventaire de la base de ressources, la récolte et l'utilisation des produits forestiers autres que le bois       |
| MM. J. Lorbach, L. Russo et P. Vantomme (FAO)                   | Amélioration de l'inventaire et des techniques de récolte de produits forestiers autres que le bois : besoins et contraintes   |

12. Mme F. Ertuğ (Turquie), appuyée par d'autres participants, a demandé un supplément de précisions sur les méthodes d'inventaire utilisées pour évaluer les produits forestiers autres que le bois. M. Ellatifi a souligné la nécessité d'intégrer l'évaluation de ces produits aux inventaires forestiers actuels. Mme Talhouk a dit qu'il importait d'adopter une conception pluridisciplinaire aux fins des inventaires des produits forestiers autres que le bois. Elle a également soulevé la question de savoir comment inciter les populations locales à participer à l'évaluation de leurs ressources forestières.

**PARTICIPATION DU SECTEUR PRIVÉ ET D'ORGANISATIONS NON GOUVERNEMENTALES À LA RÉCOLTE, À LA TRANSFORMATION ET À LA COMMERCIALISATION DES PRODUITS FORESTIERS AUTRES QUE LE BOIS AFIN DE DÉVELOPPER L'EMPLOI ET LES ACTIVITÉS RÉMUNÉRATRICES POUR LES POPULATIONS LOCALES (point 6 de l'ordre du jour)**

13. Au titre de ce point, les documents ci-après ont été présentés :

- |                                      |  |
|--------------------------------------|--|
| Mme B. Gligori_ (Bosnie-Herzégovine) | Conditions de collecte et de production des plantes médicinales dans la Republika Srpska   |
| Mme M. Karmann (Allemagne)           | Utilisation des forêts claires de Miombo par les petits agriculteurs à Handeni (Tanzanie) : la récolte de l'écorce , exemple illustrant les différences selon que l'activité est menée par les membres de certaines ethnies, et par des hommes ou des femmes |
| M. D. B. Dovie (Afrique du Sud)      | Qu'est-ce qui compte le plus ? Exploitation des produits forestiers autres que le bois au moyen du modèle dit "interface communautaire pour la conservation"   |
| Mme R. Singhal (Inde)                | Vers une récolte durable des produits forestiers autres que le bois en Inde : les rôles respectifs des femmes et des hommes  |

14. Une question a été posée au sujet du document de Mme Singhal pour mieux cerner, au sujet des produits forestiers autres que le bois, la comparaison entre ceux qui sont nationalisés et ceux qui ne le sont pas. Les considérations sur les rôles respectifs des hommes et des femmes dans la récolte, présentées dans son document, ont reçu l'appui de quelques orateurs.

**PLANIFICATION ET GESTION D'UNE EXPLOITATION DURABLE DES FORÊTS POUR LES PRODUITS FORESTIERS AUTRES QUE LE BOIS. ÉLABORATION DE NORMES EN VUE DE L'ADOPTION DE SYSTÈMES ET TECHNIQUES DE RÉCOLTE APPROPRIÉS PERMETTANT DE RÉDUIRE LES EFFETS SUR L'ENVIRONNEMENT ET LES DÉCHETS (point 7)**

15. Au titre de ce point, les documents suivants ont été présentés :

MM. A. Gül et C. Acar (Turquie)	Importance pour la lutte contre l'érosion de la culture de la marjolaine ( <i>origanum onites</i> ), de la sauge ( <i>salvia officinalis</i> ) et de la mélisse ( <i>melissa officinalis</i> ) sur les terres agricoles marginales
M. D. Ganz (Thaïlande)	La sylviculture rurale traditionnelle à Oaxaca (Mexique) : l'adaptation des systèmes courants de sylviculture aux produits forestiers autres que le bois et l'intégration du savoir autochtone
MM. Z. C. Özkan et H. Acar (Turquie)	Production, transport et mise en magasin des châtaignes en Turquie
MM. H. Acar, Ö. Barlı (Turquie) & T. Yoshimura (Japon)	Incidences des méthodes de récolte, de transport et d'entreposage utilisées dans le gemmage sur le productivité et la qualité de la résine
M. M. Eroğlu (Turquie)	Stratégie de production de galls interférant avec le cycle évolutif de deux importantes espèces galligènes, andricus gallaetinctoriae ( <i>oliv.</i> ) et andricus kollari htg. ( <i>Hyumenoptera : cynipidae</i> ), en Turquie
M. B. Nair (Inde)	Utilisation durable des gommés et des résines par une technique améliorée de gemmage pratiqués sur certaines espèces
MM. M. Türker, M. Pak et A. Öztürk (Turquie)	Evaluation de la gestion des produits forestiers autres que le bois dans les plans de développement quinquennaux et dans les plans d'aménagement forestier

16. À propos du document présenté par M. Gül, Mme F. Ertuğ (Turquie) a demandé d'autres précisions sur les méthodes utilisées pour mesurer les effets de l'érosion.

17. Plusieurs questions ont été posées au sujet de l'exposé de M. Nair en vue d'obtenir des informations plus détaillées sur la méthode d'incision et sur l'évolution récente des marchés.

18. À propos du document présenté par M. Pak, des précisions ont été demandées sur la valeur et l'importance de la part dans les exportations des produits forestiers autres que le bois en Turquie. Des renseignements ont aussi été demandés sur le type des produits forestiers autres que le bois importés par la Turquie.

19. Au titre de la **suite de ce point de l'ordre du jour**, les documents ci-après ont été présentés :

MM. J. Mathew, S. Abraham et M. Nair (Inde)	Conservation des plantes médicinales à Idukki, État du Kerala, dans le cadre d'une gestion communautaire
M. D.O. Ladipo (Nigéria)	Récolte de <i>Irvingia gabonensis</i> et de <i>Irvingia wombulu</i> dans les forêts nigérianes : potentiels de développement de systèmes durables
M. M. Mishra (Inde)	Méthodes de récolte et gestion de deux plantes médicinales sérieusement menacées dans les forêts naturelles du centre de l'Inde
MM. C. Hassiotis et P. Efthymiou (Grèce)	Déclin de l'huile essentielle de <i>Laurus nobilis</i> , dans la région méditerranéenne

20. À propos du document présenté par M. Nair, M. Dovie a soulevé la question des droits de propriété relatifs aux plantes médicinales; il a précisé qu'il y avait un risque de perdre les droits de propriété intellectuelle en ce qui concerne les plantes médicinales des communautés locales.

21. À propos du document présenté par M. Mishra, Mme Mulliken s'est demandée comment l'industrie pourrait contribuer à une utilisation plus durable des produits forestiers autres que le bois, notamment les espèces menacées.

22. Commentant le document présenté par M. Hassiotis, Mme Talhouk a dit que toute opération de récolte avait une incidence sur l'environnement, notamment sur les sols et leurs micro-organismes. L'auteur du document a ajouté que toute intervention de l'homme se répercutait nécessairement sur l'environnement et sur les ressources de la nature. Plusieurs participants ont dit partager ce point de vue.

### **VULGARISATION, FORMATION ET ÉDUCATION VISANT À AMÉLIORER LES PRATIQUES DE RÉCOLTE, LA PRODUCTIVITÉ ET L'OFFRE DE PRODUITS FORESTIERS AUTRES QUE LE BOIS (point 8)**

23. Au titre de ce point, l'orateur ci-après a présenté un document :

MM. K. Hüsnü & C. Başer (Turquie)	Récolte sauvage durable des plantes médicinales et aromatiques : éduquer la population
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Il a donné un aperçu général du secteur des produits forestiers autres que le bois de la Turquie, en mettant l'accent en particulier sur les plantes médicinales et aromatiques.

24. Son exposé a suscité plusieurs interventions sur les points suivants : limitation de la récolte des plantes médicinales; nécessité de cours de formation et de vulgarisation pour apprendre aux agriculteurs qui récoltent des produits forestiers autres que le bois à se servir de meilleurs outils; imprécision des statistiques des exportations de plantes médicinales, aussi bien en ce qui concerne les espèces que les quantités. Aucun consensus ne s'est dégagé au sujet de la prétendue moindre qualité des plantes médicinales de culture par rapport à celles cueillies en forêt.

25.

### **ORGANISATIONS ET INSTITUTIONS S'OCCUPANT DE RASSEMBLER DES DONNÉES STATISTIQUES ET D'ÉVALUER LES PRODUITS FORESTIERS AUTRES QUE LE BOIS (point 9)**

25. M. V. Poddubnyy (Kazakhstan) a rendu compte de la façon dont l'utilisation des produits forestiers autres que le bois avait évolué dans son pays, suite à l'effondrement de l'ex-URSS et de ses structures, et de la privatisation du secteur forestier en cours. Il a souligné qu'il était nécessaire d'apporter une aide à la création de petites entreprises dans le domaine des produits forestiers autres que le bois et a demandé une assistance en matière de formation et de commercialisation.

26. Au titre de ce point de l'ordre du jour, les documents suivants ont été présentés :

MM. D. H. Koç, B. Aksu et A. Kurtoğlu (Turquie)	Commerce extérieur de la Turquie en ce qui concerne les produits forestiers autres que le bois
Mme N. Demidova (Fédération de Russie) et MM. P. Alhojärvi (Banque mondiale)	Certification des produits forestiers autres que le bois : méthodes utilisées en Fédération de Russie

27. À propos des points soulevés dans le document sur la certification des produits forestiers autres que le bois, les auteurs ont indiqué qu'un tel système était souhaitable de sensibles modifications.

## SÉANCE DE PRÉSENTATION D'AFFICHES

28. M. Y. Yüksel (Turquie) a fait une présentation avec "Power Point" sur la création d'une structure permettant de préserver les droits des communautés en matière de forêt. Des questions ont été posées concernant les méthodes d'établissement des prix des produits forestiers autres que le bois, l'incidence du pâturage dans les forêts sur l'offre de produits forestiers autres que le bois et les droits de propriété/droits d'usager des villageois en matière de forêts.

29. Les autres présentations ont été les suivantes :

M. J. Kadlec (République tchèque)	Cueillette et utilisation des produits forestiers autres que le bois dans la République tchèque : état actuel et possibilités
M. A.B. Ella (Philippines)	Production durable de résine grâce à une technique améliorée de gemmage de l' <i>Almaciga</i>
M. J. Mass (Pays-Bas)	Rôle de la recherche dans la gestion des produits forestiers autres que le bois
Mme T. Mulliken (TRAFFIC)	Utilisation durable des plantes médicinales : défis et perspectives plurisectoriels
M. P. Vantomme, Département des forêts de la FAO, Rome	Programme concernant les produits forestiers autres que le bois

30. La séance de présentation d'affiches a donné aux participants la possibilité d'échanger des informations sur celles-ci grâce au caractère non protocolaire de la réunion et de donner leurs points de vue sur les principaux aspects des thèmes examinés pendant le séminaire.

## QUESTIONS DIVERSES (point 10)

31. Deux excursions d'une journée complète chacune (voir annexe) ont été organisées pendant le séminaire, avec au programme la visite de peuplements forestiers de pins parasols (*Pinus pinea*), l'organisation de la récolte et de la transformation des graines de pommes de pin, la démonstration de matériels et de machines de traitement (Kozak), la visite de peuplements de pins rouges avec démonstration de différents essais de recherche pilote d'utilisation de la résine (Kemal Pasa), la visite d'une installation de traitement de laurier (*Laurus*) et de thym (*Thymus*) et enfin la visite du parc national de Dilek Yarimadası, riche en espèces de la flore méditerranéenne.

## CONCLUSIONS ET RECOMMANDATIONS (point 11)

### Conclusions

1. Une large gamme de thèmes a été présentée (inventaire, récolte, transformation, utilisation et commercialisation des produits forestiers autres que le bois), montrant que de nombreuses espèces de produits forestiers autres que le bois sont récoltées de façon non durable et en outre que, dans bien des cas, les techniques de gestion sont mal connues ou mal appliquées.
2. On a souligné l'importance d'une gestion rationnelle des produits forestiers autres que le bois pour la durabilité des forêts, et pour la contribution qu'elle pouvait apporter au développement rural et à l'agriculture, en particulier dans l'intérêt des femmes et des groupes de la société économiquement défavorisés vivant à proximité des ressources forestières et qui comptaient sur celles-ci pour s'assurer des denrées alimentaires, des revenus, des emplois, des plantes médicinales, etc.
3. La durabilité des produits forestiers autres que le bois exige la participation d'experts spécialisés dans une large gamme de disciplines, et notamment la connaissance des populations locales.
4. Les participants ont dit ressentir la vive nécessité de voir augmenter l'information et la formation en matière de gestion et de mise en valeur des produits forestiers autres que le bois. À cette fin, ils ont proposé que soient organisés des séminaires et/ou des ateliers de suivi sur des sujets techniques bien définis, offrant plus de temps pour les discussions de groupe.
5. Les gens qui vivent dans les forêts ou à proximité possèdent des trésors de connaissances. Celles-ci risquent aussi de se perdre et ne sont pas bien prises en considération dans les efforts faits pour gérer les forêts.

## **Recommandations**

### *Au COMITÉ MIXTE*

- 1) Faciliter et soutenir l'élaboration de bases de données, la création de réseaux entre pays et régions, et l'organisation d'ateliers de suivi, et faciliter l'accès aux sources d'information disponibles (sites Web et publications) sur tous les aspects de la mise en valeur des produits forestiers autres que le bois (inventaire et évaluation des ressources, récolte, transformation, commercialisation, commerce, politiques ayant une incidence sur ces produits, etc.).
- 2) Dresser la liste des pratiques forestières rationnelles pour les produits forestiers autres que le bois, et faciliter la large diffusion des bons exemples, tels que ceux présentés pendant la réunion, auprès des groupes et pays intéressés.
- 3) Aider à perfectionner des systèmes appropriés de certification pratique de la gestion des forêts et de la planification pour différents groupes de produits forestiers autres que le bois, avec la participation de toutes les parties prenantes et/ou de tous les groupes sociaux intéressés.
- 4) Stimuler la participation aux séminaires et/ou ateliers futurs rassemblant des représentants d'ONG, du secteur privé et d'instituts de recherche.

### *Aux PAYS MEMBRES*

- 1) Inclure et soutenir comme il convient la conservation, la gestion et l'utilisation des produits forestiers autres que le bois dans le cadre des politiques forestières nationales, sur un plan pluridisciplinaire et avec le concours des parties intéressées, en veillant en particulier à faciliter la participation active des populations rurales, notamment des femmes, qui ont besoins de ces ressources.
- 2) Élaborer et diffuser des statistiques plus précises au niveau national sur les produits forestiers autres que le bois, comprenant des données sur les ressources, les quantités récoltées et la commercialisation (espèce par espèce).
- 3) Mettre en place des mécanismes d'appui financiers et institutionnels appropriés pour faciliter le démarrage de petites entreprises locales exploitant les produits forestiers autres que le bois.
- 4) Examiner et améliorer la législation nationale relative aux produits forestiers autres que le bois (réglementation forestière, impôts, accès, utilisateurs, droits de propriété, etc.).
- 5) Promouvoir la collaboration bilatérale en vue de partager l'information et les connaissances techniques concernant les produits forestiers autres que le bois.
- 6) Intensifier les efforts en vue de faire participer d'autres secteurs tributaires des produits forestiers autres que le bois, notamment les secteurs de la santé, de l'éducation et du commerce, à la gestion, la conservation et l'utilisation durables de ces produits.

### *Aux INSTITUTS NATIONAUX DE RECHERCHE FORESTIÈRE ET À L'IUFRO*

1. Accélérer et mieux coordonner l'établissement de programmes de formation et les recherches sur les questions relatives aux produits forestiers autres que le bois concernant :
  - L'explication des définitions, des idées et des classifications,
  - La méthode d'élaboration d'outils pratiques pour :
    - l'établissement d'inventaires et l'évaluation des effets des récoltes;
    - l'adoption progressive, sur place et ailleurs, de pratiques de conservation;
    - **des études ethnobiologiques;**
    - la commercialisation et l'analyse des échanges;
    - l'insertion des produits forestiers autres que le bois dans les critères de gestion forestière et les systèmes d'indicateurs et/ou de certification;

- la vulgarisation de ces produits;
- l'élaboration de dispositions de répartition des avantages.

2. Soutenir les recherches futures sur l'application des instruments d'évaluation économique appropriés pour évaluer et chiffrer tous les avantages que procurent les produits forestiers autres que le bois et les services forestiers, et appuyer cette application.

#### **ADOPTION DU RAPPORT** (point 12)

32. Le projet de rapport, qui avait été établi par le secrétariat, de même que les conclusions et les recommandations ont été adoptés avec quelques modifications, qui ont été incluses dans le présent document.

33. Au nom du pays hôte, le Ministre des forêts, M. Y. Yüksel, a remercié les participants d'avoir suivi le séminaire, d'avoir rédigé des documents et préparé des affiches, d'avoir animé les débats des différentes séances et d'avoir mis au point des conclusions et des recommandations. Parlant au nom des participants, M. T. Musuraliev (Kirghizistan), M. A. Ella (Philippines) et M. D. Ladipo (Nigéria) ont exprimé leur gratitude au pays hôte et aux organisateurs qui leur ont donné la possibilité de travailler, d'échanger des idées et d'examiner les questions relatives aux produits forestiers autres que le bois à un niveau international. Enfin, au nom du Comité mixte, M. Lorbach, dans le droit fil des interventions précédentes, a remercié les participants, le pays hôte et tout le personnel de soutien de leur contribution active à la réussite du séminaire. Tous les orateurs ont exprimé l'espoir que les recommandations formulées par le séminaire seraient suivies d'effet dans l'intérêt des peuples qui comptent sur une utilisation durable des produits forestiers autres que le bois.

## Annexe

### VISITES D'ÉTUDE

#### Excursion - Vendredi 6 octobre 2000

Lors de cette excursion qui a duré une journée entière, les participants ont pu visiter les sites suivants :

- i) L'ancienne ville de Bergama;
- ii) Les installations de production et de traitement de graines de pin pignon de Kozak, à proximité de la ville de Bergama;
- iii) Le terrain de recherche pour la production de résine à Çiçekli; et
- iv) L'usine de traitement et d'emballage de plantes aromatiques et médicinales (Kütaş).

#### 1. Pergame

Sur la route menant au site de production de graines de pin de Kozak, les participants ont demandé à s'arrêter à l'ancienne ville de Bergama afin d'en visiter brièvement les ruines. Elle est située à proximité du District de Bergama (Province d'İzmir), qui fait partie des sites historiques et culturels les plus riches de la Turquie. La vieille ville compte de nombreux vestiges parmi lesquels figurent notamment un certain nombre de temples (Trajan et Dionyos, l'hôtel de Zeus, etc.), un amphithéâtre, une des plus anciennes bibliothèques du monde, la première église chrétienne et les remparts en pierre de la ville.

#### 2. Installations de production et de traitement de graines de pin pignon de Kozak

La plaine de Kozak, fameuse pour ses plantations de pin pignon et la production de graines, s'étend sur 15 150 hectares de plantations de cette essence, qui appartiennent aux habitants des 13 villages environnants. Mme Z. K. Ay, spécialiste en recherche forestière, a fait un bref exposé sur les caractéristiques écologiques, géographiques et socioéconomiques de la zone en expliquant qu'elles représentaient un exemple très réussi et prometteur de plantations, de gestion, de récolte et de commercialisation de produits forestiers autres que le bois par des gens de la région regroupés en coopératives et qui en tirent une importante source de revenus.

Les participants ont visité une petite usine privée d'extraction et de stockage de graines de pommes de pin. M. Ö. Önder, directeur de l'usine, a expliqué aux participants comment les graines de pommes de pin pignon étaient récoltées, traitées, stockées et finalement commercialisées, en précisant que l'usine en produisait 500 tonnes par an et qu'il fallait une tonne de pommes de pin pour produire 50 kg de graines. En outre, il a souligné que la qualité et la quantité des graines dépendaient étroitement du moment de la récolte, qui devait idéalement se situer entre janvier et avril.

Les participants ont aussi pu visiter une autre installation de traitement des graines de pommes de pin, actuellement construite par une coopérative villageoise forestière, moyennant une assistance financière et technique du Fonds de développement des villages forestiers, qui relève du Ministère des forêts.

#### 3. Terrain de recherche pour la production de résine à partir de pin rouge à Çiçekli

M. F. Bilgin, spécialiste en recherche forestière, a expliqué que ce terrain avait été établi pour une période de six ans (2000-2006) afin de mettre en évidence les effets du gemmage selon la méthode dite de la pâte acide sur la croissance en volume des pins rouges. Les recherches étaient menées par la Direction de la recherche des forêts de la mer Égée, dans 165 secteurs de la région. Il a expliqué que malgré les trois années déjà écoulées depuis la création du terrain, aucune évolution significative n'avait été constatée. Les participants ont posé plusieurs questions, concernant par exemple l'âge des arbres, les facteurs pris en considération, les autres méthodes de production de résine, les surfaces de gemmage, etc., auxquelles M. Bilgin a répondu.

#### 4. Usine de traitement et d'emballage de plantes aromatiques et médicinales KÜTAŞ

L'usine Kütaş, implantée à proximité d'İzmir, travaille déjà depuis longtemps dans la transformation et la commercialisation de plantes médicinales et aromatiques. Les principales essences

transformées sont l'anis, le cumin, la sauge éclatante, le romarin, le thym et l'origan (kekik) dont les plants sont essentiellement cueillis dans les zones boisées de la Turquie. Mme G. Türker, chargée d'exploitation, a fait un bref exposé sur les activités de traitement de l'usine en précisant que les produits qui en sortaient étaient conformes à la norme ISO 9000 ainsi qu'aux normes des États-Unis et de la Grande-Bretagne et que tous les produits étaient soumis à des essais chimiques, physiques et microbiologiques. Elle a en outre précisé que l'usine produisait 2 000 tonnes par an et qu'elle employait entre 100 et 200 personnes dans les activités de transformation. La majorité de la production de l'usine était exportée, principalement vers les États-Unis d'Amérique.

## **Excursion – Samedi 7 octobre 2000**

### **5. Parc national de la péninsule de Dilek**

Le deuxième jour, les participants ont visité le parc national de la péninsule de Dilek, situé à proximité du district de Kuşadası (province d'İzmir). Créé en 1966, ce parc national s'étend sur quelque 16 000 hectares et se compose d'une zone forestière bien protégée, riche en espèces végétales. Il est parfaitement représentatif de la flore méditerranéenne puisqu'on y trouve 77 familles de plantes et plus de 700 espèces, qu'il s'agisse d'arbres, de buissons ou autres. Mme N. Özel a donné encore d'autres renseignements concernant le parc national, qui ont retenu toute l'attention des participants.

Après le parc, les participants ont pu, sur la route d'İzmir, visiter le District de Kuşadası, ville très intéressante prisée des touristes. Ils ont pu ainsi visiter les environs pour admirer la diversité du paysage, les modes d'aménagement du territoire, etc., de la province d'İzmir.

Pour finir, les participants ont visité l'ancienne ville d'Éphèse et la maison de la Vierge Marie.

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**ДОКЛАД**  
**(утвержденный участниками семинара)**

**ВВЕДЕНИЕ** (Пункт 1 повестки дня)

1. Семинар на тему "**Заготовка недревесных лесных товаров**" состоялся 2-8 октября в Международном центре агрогидрологических исследований и подготовки в Менемене, Измир (Турция), по приглашению министерства лесного хозяйства и под эгидой Объединенного комитета ФАО/ЕЭК/МОТ по технологии, управлению и подготовке работников в лесном секторе. В нем приняли участие эксперты следующих стран: Австрии, Азербайджана, Албании, Армении, Боснии и Герцеговины, Германии, Греции, Индии, Испании, Италии, Казахстана, Кыргызстана, Ливана, Марокко, Молдовы, Непала, Нидерландов, Нигерии, Польши, Российской Федерации, Румынии, Соединенного Королевства, Таиланда, Туниса, Турции, Узбекистана, Украины, Филиппин, Финляндии, Чешской Республики, Южной Африки, а также представители Всемирного банка.

2. От имени организационного комитета Турции участников приветствовал г-н К. Гюрсес. Г-н Й. Лорбах (ФАО), выступая от имени Объединенного комитета, остановился на контексте для обсуждения вопросов, касающихся недревесных лесных товаров на данном семинаре. Затем выступил г-н Т. Эрен (Турция), заместитель губернатора Измира, который подчеркнул важность недревесных лесных товаров для развития сельских районов его страны. Д-р М.К. Мулу, представитель ФАО в Турции, рассказал о важном вкладе недревесных лесных товаров в обеспечение продовольственной безопасности и напомнил участникам о необходимости достижения устойчивости и о важной роли, которую играют недревесные лесные товары в деле ликвидации нищеты. Его Превосходительство министр лесного хозяйства профессор Н. Чаган представил хорошо документированное и исчерпывающее описание сектора НДЛТ Турции. Он заострил внимание на социальных потребностях находящихся в неблагоприятном положении групп общества и отметил, что недревесные лесные товары могут содействовать обеспечению продовольственной безопасности и развитию деятельности, приносящей доход. Он также подчеркнул необходимость устойчивого развития сектора НДЛТ в соответствии с принципами, определенными на Встрече на высшем уровне в Рио-де-Жанейро и Конвенции о биологическом разнообразии. Кроме того, Его Превосходительство указал, что Турция является одним из крупнейших центров биологического разнообразия, поскольку в стране произрастает, согласно оценкам, более 10 000 видов растений, что еще раз свидетельствует о важном значении НДЛТ для развития лесного сектора Турции.

3. Г-н Е. Испирли, руководитель департамента внешних сношений и связей с ЕС министерства лесного хозяйства, и г-н Лорбах рассказали о целях и ожидаемых результатах семинара, а также о процедурах его работы.

**УТВЕРЖДЕНИЕ ПОВЕСТКИ ДНЯ** (Пункт 2)

4. Была утверждена предварительная повестка дня, содержащаяся в документе ТИМ/ЕЭК/УР.1/СЕМ.49/1.

**ВЫБОРЫ ДОЛЖНОСТНЫХ ЛИЦ** (Пункт 3)

5. Председателями пяти заседаний продолжительностью в полдня каждое были избраны:

г-н И. Юксель (Турция)  
г-н К. С. Басер (Турция)  
г-н Р. Хейнрих (Австрия)  
г-н П. Вантомм (ФАО)  
г-жа Н. Демидова (Российская Федерация)

## ПОЛИТИКА В ОБЛАСТИ СТИМУЛИРОВАНИЯ УСТОЙЧИВОГО РАЗВИТИЯ ЛЕСНОГО ХОЗЯЙСТВА И ИСПОЛЬЗОВАНИЯ НЕДРЕВЕСНЫХ ЛЕСНЫХ ТОВАРОВ (Пункт 4)

6. В рамках этого пункта повестки дня были представлены следующие доклады:

гг. Кючюк, Ш.Четинер и Ф. Улу (Турция)	Местные лекарственные и ароматические растения в восточночерноморском районе Турции, имеющие коммерческое значение
А. Забадыр и С. Жибцев (Украина)	Перспективы заготовки недревесных лесных товаров в Украине
П. Станишевский и Я. Окгаба (Польша)	Современные тенденции в использовании недревесных лесных товаров в Польше
Н. Косович и Л. Дунджич (Босния и Герцеговина)	Сбор, транспортировка и обработка лекарственных и ароматических растений в регионе кантона Герцеговина-Неретва Федерации Боснии и Герцеговины
г-н А. Налбандян (Армения)	Перспективы использования недревесных лесных товаров в Армении
г-н М. Эллатифи (Марокко)	Недревесные лесные товары в Марокко
г-н М. Джавасвал (Непал)	Использование недревесных лесных товаров (НДЛТ) на основе опыта развития предпринимательства в Непале
г-н М. Кизмаз (Турция)	Внедрение отвечающих критериям устойчивости методов ведения лесного хозяйства и использования недревесных лесных товаров
гг. Э. Озуйрлу и М. Дюзгюн (Турция)	Внедрение отвечающих критериям устойчивости методов заготовки и видов использования недревесных лесных товаров в Турции
гг. О. Барли и Х. Серин (Турция)	Соображения, касающиеся национальной политики, некоторых стратегий управления и устойчивого производства НДЛТ
гг. С. Жадковский и Михаил Калиновский (Польша)	Заготовка недревесных лесных товаров в Польше и их ресурсы: общий обзор
гг. Л. Руссо, С. Уолтер и П. Вантомм (ФАО)	Важнейшие направления политики стимулирования устойчивого использования недревесных лесных товаров
гг. М. Бузид и С. Хелал (Тунис)	Исследование в области использования недревесных лесных товаров

7. В ходе дискуссии, состоявшейся после представления докладов в рамках пункта 4, г-н У. Герей (Турция) еще раз подчеркнул важность НДЛТ для развития сельских районов Турции. Г-н Д. Ладипо (Нигерия) поднял вопрос о торговле находящимися под угрозой исчезновения видами, относящимися к категории НДЛТ, в связи с чем г-жа Т. Малликен (ТРАФФИК) рассказала о Конвенции о международной торговле находящимися под угрозой исчезновения видами

(СИТЕС). Г-н Н.Б. Наир (Индия) предложил разработать перечень видов с учетом их использования в качестве средств существования и/или коммерческого использования. Г-н М. Эллатифи (Марокко) и другие участники упомянули о многих других функциях леса в дополнение к НДЛТ, таких, как водоснабжение, рекреационная деятельность, охота и т.д.

8. Г-жа С.Талхук (Ливан) подняла вопрос о необходимости расширения доступа к информации о НДЛТ в регионе и обмена ею. В ходе обсуждения этого вопроса г-н Базер в числе других участников указал на необходимость создания региональных сетей, например сети района восточного Средиземноморья. Г-жа Талхук также подняла вопрос о преимуществах и недостатках сохранения ресурсов НДЛТ *in situ* в сравнении с сохранением *ex situ*. Г-жа Ф. Эртуг (Турция) обратила внимание участников на необходимость дальнейшей разработки практических методов инвентаризации ресурсов НДЛТ и инструментов социально-экономической оценки.

9. Ряд участников выразили свою озабоченность по поводу прав интеллектуальной собственности на коммерческое использование местных знаний, касающихся НДЛТ, и указали на необходимость разработки надлежащих соглашений об участии в прибылях.

#### **МЕТОДЫ УЧЕТА НЕДРЕВЕСНЫХ ЛЕСНЫХ РЕСУРСОВ И ИХ КАРТИРОВАНИЕ (Пункт 5)**

10. Открывая обсуждение данного пункта повестки дня, Председатель сделал вступительное замечание, касающееся предпочтительности термина "заготовка" по сравнению с термином "эксплуатация", поскольку первый термин включает концепцию устойчивости.

11. В рамках этого пункта повестки дня были представлены следующие доклады:

г-н М. Мерло (Италия)	НДЛТ как компонент общей экономической ценности лесов Средиземноморья: первые результаты текущего исследования регионального центра ЕЛИ в Солсоне
гг. Делали Б. Дови, Эд Витковски и Чарли Шаклетон (Южная Африка)	Вовлечение местных жителей: обзор методов инвентаризации ресурсной базы, заготовки и использования недревесных лесных товаров
гг. Ж. Лорбах, Л. Руссо и П. Вантомм (ФАО)	Потребности и трудности в совершенствовании методов инвентаризации и заготовки НДЛТ

12. Г-жа Ф. Эртуг (Турция), которую поддержали другие участники, обратилась с просьбой представить дополнительные разъяснения по методам инвентаризации, используемым для оценки НДЛТ. Г-н Эллатифи подчеркнул необходимость увязки оценки недревесных лесных ресурсов с существующими методами таксации лесов. Г-жа Талхук подчеркнула необходимость разработки многодисциплинарного подхода для инвентаризации НДЛТ. Она также подняла вопрос о методах стимулирования местного населения к участию в оценке их лесных ресурсов.

#### **ПРИВЛЕЧЕНИЕ ЧАСТНОГО СЕКТОРА И НЕПРАВИТЕЛЬСТВЕННЫХ ОРГАНИЗАЦИЙ К ЗАГОТОВКЕ, ПЕРЕРАБОТКЕ И СБЫТУ НЕДРЕВЕСНЫХ ЛЕСНЫХ ТОВАРОВ В ЦЕЛЯХ РАСШИРЕНИЯ ВОЗМОЖНОСТЕЙ В ОБЛАСТИ ОБЕСПЕЧЕНИЯ ЗАНЯТОСТИ И ПОЛУЧЕНИЯ ДОХОДОВ ДЛЯ МЕСТНОГО НАСЕЛЕНИЯ (Пункт 6)**

13. В рамках этого пункта повестки дня были представлены следующие доклады:

г-жа Б. Глигорич (Босния и Герцеговина)	Условия сбора и производства лекарственных трав в Республике Сербской
г-жа М. Карманн (Германия)	Использование сухого листопадного редколесья (миомбо) мелкими фермерами в округе Хандени (Танзания): заготовка коры как пример этнически и гендерно ориентированной деятельности

г-н Д. Б. Дови (Южная Африка)	Чье мнение важнее? – Рациональное управление операциями по заготовке недревесных лесных товаров с помощью модели "Общинное взаимодействие в целях сохранения ресурсов"
г-жа Р. Сингхал (Индия)	Устойчивые заготовки недревесных лесных товаров в Индии: роль гендерного аспекта
гг. М. Бузид и С. Хелал (Тунис) лесных продуктов	Исследование по разработке недревесных

14. В связи с докладом г-жи Сингхал была высказана просьба представить разъяснения по вопросу, касающемуся национализированных или ненационализированных НДЛТ. Поднятые в ее документе гендерные вопросы, связанные с практикой заготовки, были дополнительно развиты рядом выступавших.

**ПЛАНИРОВАНИЕ И ПРОВЕДЕНИЕ УСТОЙЧИВЫХ ОПЕРАЦИЙ ПО ЗАГОТОВКЕ НЕДРЕВЕСНЫХ ЛЕСНЫХ ТОВАРОВ. РАЗРАБОТКА СТАНДАРТОВ ДЛЯ НАДЛЕЖАЩИХ СИСТЕМ И МЕТОДОВ ЗАГОТОВКИ, ОБЕСПЕЧИВАЮЩИХ СНИЖЕНИЕ ВОЗДЕЙСТВИЯ НА ОКРУЖАЮЩУЮ СРЕДУ И СОКРАЩЕНИЕ ОТХОДОВ (Пункт 7)**

15. представлены следующие доклады:	В рамках этого пункта повестки дня были
гг. Атила Гюл и Кан Акар (Турция)	Борьба с эрозией почвы посредством выращивания душицы сладкой, шалфея аптечного и Melissa на малопродуктивных сельскохозяйственных землях
г-н Д. Ганц (Таиланд)	Традиционное лесоводство в Оахака (Мексика): адаптация стандартных лесоводческих систем применительно к недревесным лесным товарам и интеграция знаний коренных народов
гг. З. К Озкан и Х. Акар (Турция)	Заготовка, транспортировка и складирование каштанов в Турции
гг. Х. Акар, О. Барли (Турция)	Влияние заготовки, транспортировки и хранения продуктов осмолородочки на выход и качество смолы
г-н М.Эролу (Турция)	Стратегия заготовки галлов, препятствующая жизненным циклам двух важных галлообразующих видов
г-н Б. Наир (Индия)	Устойчивое использование живицы и смолы некоторых видов деревьев благодаря более совершенным методам подсочки
гг. М. Тюркер, М. Пак и А. Остюрк (Турция)	Обзор положений, касающихся рациональной заготовки недревесных лесных товаров, в пятилетних планах развития и основных планах развития лесного хозяйства

16. В связи с докладом г-на Гюла г-жа Ф. Эртуг (Турция) попросила дать дополнительные разъяснения по поводу методологии, используемой для измерения воздействия эрозии.

17. При обсуждении доклада г-на Наира некоторые участники попросили представить более подробную информацию о методе подсочки и последних изменениях на рынке.

18. В связи с докладом г-на Пака была высказана просьба представить разъяснения по поводу стоимостного объема и высокого удельного веса экспорта НДЛТ в Турции. Была также запрошена информация о видах НДЛТ, импортируемых в Турцию.

19. В рамках продолжения рассмотрения данного пункта повестки дня были представлены следующие доклады:

гг. Дж. Мэтью, С. Абрахам и М. Наир Охрана лекарственных растений в округе Индуки штата Керала посредством методов общинного управления (Индия)

г-н Д.О. Ладипо (Нигерия) Заготовка *irvingia gabonensis* и *irvingia wombulu* в нигерийских лесах: потенциал развития устойчивых систем

г-н М. Мишра (Индия) Практика заготовки и рационального использования двух находящихся под угрозой исчезновения лекарственных растений в естественных лесах центральной Индии

гг. К. Хасиотис и П. Эфtimiу (Греция) Торговля эфирными маслами *aromatic laurus nobilis* в регионе Средиземноморья

20. В связи с докладом г-на Наира г-н Дови поднял вопрос о правах собственности применительно к лекарственным растениям; он отметил риск утраты местными общинами прав интеллектуальной собственности на лекарственные растения.

21. Г-жа Малликен при обсуждении доклада, представленного г-ном Мишра, подняла вопрос о том, каким образом промышленность могла бы сыграть определенную роль в процессе обеспечения более устойчивого использования НДЛТ, в особенности применительно к находящимся под угрозой исчезновения видам.

22. Г-жа Талхук в ходе обсуждения доклада, представленного г-ном Хасиотисом, заявила, что любые заготовительные операции воздействуют на окружающую среду, в том числе на почву и почвенные микроорганизмы. В своем ответном слове автор отметил, что любое вмешательство человека оказывает экологическое влияние на природные ресурсы. Этот аспект был также подчеркнут рядом других участников.

#### **КОНСУЛЬТАЦИОННОЕ ОБСЛУЖИВАНИЕ, ПОДГОТОВКА И ОБУЧЕНИЕ В ЦЕЛЯХ ПОВЫШЕНИЯ ЭФФЕКТИВНОСТИ И ПРОИЗВОДИТЕЛЬНОСТИ ЗАГОТОВИТЕЛЬНЫХ ОПЕРАЦИЙ И УВЕЛИЧЕНИЯ ПРЕДЛОЖЕНИЯ НЕДРЕВЕСНЫХ ЛЕСНЫХ ТОВАРОВ (Пункт 8)**

23. В рамках этого пункта повестки дня свой документ представил следующий докладчик:

г-н Кан Башер (Турция)

Отвечающие критерию устойчивости неорганизованные заготовки лекарственных и ароматических растений: обучение заготовителей

Докладчик представил всеобъемлющий обзор сектора НДЛТ в Турции, уделив особое внимание лекарственным и ароматическим растениям.

24. Его выступление послужило предметом активного обсуждения, в ходе которого участники затронули следующие вопросы: регламентация практики заготовки лекарственных растений; потребности в обучении фермеров и оказании им консультационной помощи по использованию более совершенного инвентаря для заготовки НДЛТ; отсутствие точности в статистике экспорта лекарственных растений (виды/количество). Мнения участников разделились относительно бытующего мнения о том, что количество культивируемых лекарственных растений является более низким по сравнению с растениями, собираемыми в лесах.

### **ОРГАНИЗАЦИИ И УЧРЕЖДЕНИЯ, ЗАНИМАЮЩИЕСЯ СБОРОМ СТАТИСТИЧЕСКИХ ДАННЫХ И СТОИМОСТНОЙ ОЦЕНКОЙ НЕДРЕВЕСНЫХ ЛЕСНЫХ ТОВАРОВ, А ТАКЖЕ ВОПРОСАМИ СТИМУЛИРОВАНИЯ ИХ ПОСТАВОК НА ЭКСПОРТНЫЕ РЫНКИ (Пункт 9)**

25. Делегат из Казахстана г-н В. Поддубный сообщил о последних изменениях в области использования НДЛТ в его стране, происшедших в результате распада бывшего СССР и его структур, а также текущей приватизации лесного сектора. Он подчеркнул необходимость оказания поддержки в создании малых предприятий по заготовке НДЛТ и обратился с просьбой об оказании помощи в деле подготовки кадров и маркетинга.

26. В рамках этого пункта повестки дня были представлены следующие доклады:

г-жа Д. Хусейн Коч, Баки Аксу  
и Ахмед Куртоюлу (Турция)

Турецкая внешняя торговля недревесными лесными товарами

г-жа Н. Демидова (Российская Федерация)  
и гг. П. Алхоярви (Всемирный банк)  
и З. Косю (Финляндия)

Сертификация недревесных лесных товаров: подходы в Российской Федерации

27. В ответ на вопросы, поднятые в связи с докладом, посвященным сертификации НДЛТ, его авторы отметили целесообразность сертификации; однако это во многом будет зависеть от условий, существующих на целевых национальных и региональных рынках. Они также отметили, что существующие системы сертификации ориентированы только на древесные товары и, таким образом, не подходят для НДЛТ.

### **ЗАСЕДАНИЕ С ПОКАЗОМ ДЕМОНСТРАЦИОННЫХ МАТЕРИАЛОВ**

28. Г-н Ю. Юксел (Турция) представил материалы на тему "Создание организации: права лесным деревенским общинам". Участники обратились с просьбой пояснить методологию установления цен на НДЛТ, а также представить разъяснения по вопросу о выпасе скота в лесах, возможностях заготовки НДЛТ и правах собственности/правах пользования лесом для деревенских жителей.

29. Были также представлены следующие доклады:

г-н И. Кадлек (Чешская Республика)

Нынешнее состояние и возможности заготовки и последующего использования недревесных лесных товаров в Чешской Республике

г-н А. Б. Элла (Филиппины)

Совершенствованные методы подсочки алмасиги в целях устойчивой заготовки смолы

г-н И. Масс (Нидерланды)

Роль исследований в рациональном использовании НДЛТ

г-жа Т. Малликен (ТРАФФИК, Соединенное Королевство)

Устойчивое использование лекарственных растений: многосекторальные задачи и возможности

г-н П. Вантомм (департамент лесного хозяйства ФАО, Рим)

Программа ФАО в области недревесных лесных продуктов

30. Благодаря заседанию с показом демонстрационных материалов, которое проходило в неформальной обстановке, участники имели возможность обменяться друг с другом информацией.

### **ПРОЧИЕ ВОПРОСЫ (Пункт 10 повестки дня)**

31. В ходе семинара были организованы две однодневные экскурсии (см. Приложение), в рамках которых участники посетили насаждения *Pinus pinea*, где они ознакомились с организацией сбора и переработки семян сосны и где им было продемонстрировано технологическое оборудование и машины (Козак); насаждения *Pinus brutia*, где им были продемонстрированы различные экспериментальные испытания, связанные с использованием живицы (Кемальпаша); предприятие по переработке *Laurus* и *Thymus* и национальный парк "Дилек Ярмадаши", в котором хорошо представлена средиземноморская флора.

### **ВЫВОДЫ И РЕКОМЕНДАЦИИ (Пункт 11 повестки дня)**

#### **Выводы**

1. На семинаре был обсужден широкий круг тем, охватывающих инвентаризацию, заготовку, обработку, использование и торговлю недревесными лесными товарами. Состоявшееся обсуждение продемонстрировало, что заготовка многих видов недревесных лесных товаров ведется на неустойчивой основе и что во многих случаях методы рационального использования еще недостаточно хорошо известны или не применяются на практике.
2. Была подчеркнута важность использования НДЛТ в контексте устойчивого управления лесным хозяйством и отмечено значение, которое они имеют для развития сельских районов и сельского хозяйства, в особенности для улучшения положения женщин и социально обездоленных групп общества, проживающих вблизи лесов, будучи источником продовольствия, доходов, занятости, лекарственных растений и т.д.
3. Устойчивое использование НДЛТ требует участия экспертов, представляющих различные дисциплины, включая традиционные знания.
4. Участники отметили настоятельную необходимость в предоставлении большего объема информации и организации подготовки по методам рационального использования и стоимостной оценки НДЛТ. Исходя из этого участники рекомендовали организовывать последующие семинары и/или рабочие совещания по конкретным техническим темам, на которых будет выделяться больше времени для групповых обсуждений.
5. Население, проживающее в лесах или вблизи них, накопило огромный объем полезных знаний. Существует опасность, что эти знания могут быть утрачены или не учитываться надлежащим образом при принятии мер по обеспечению рационального использования лесов.

## **Рекомендации**

### ***Рекомендации для ОБЪЕДИНЕННОГО КОМИТЕТА***

1. Содействовать и оказывать поддержку разработке баз данных, налаживанию контактов между странами и регионами и организации последующих рабочих совещаний, а также обеспечению удобного доступа к имеющимся источникам информации (Web-сайты и публикации) по всем аспектам рационального использования НДЛТ, таким, как инвентаризация и оценка ресурсов, заготовка, обработка, маркетинг, торговля и оказывающая влияние на НДЛТ политика.
2. Оказывать поддержку в составлении кодексов надлежащей лесохозяйственной практики в отношении НДЛТ и содействовать широкому распространению среди заинтересованных групп и стран результатов успешных тематических исследований, как, например, тех, которые были представлены на семинаре.
3. Оказывать помощь в дальнейшей разработке систем лесоустройства, планирования и сертификации для различных групп НДЛТ с участием всех заинтересованных сторон и/или социальных групп.
4. Стимулировать активное участие в будущих семинарах и/или рабочих совещаниях представителей НПО, частного сектора и исследовательских институтов.

### ***Рекомендации для СТРАН-ЧЛЕНОВ***

1. Организовывать и оказывать адекватную поддержку мерам по охране, рациональному управлению и использованию НДЛТ в рамках национальных лесохозяйственных программ на основе многодисциплинарного подхода, предусматривающего участие всех заинтересованных сторон, с уделением особого внимания мерам по содействию активному вовлечению сельского населения, особенно женщин, которое зависит от этих ресурсов.
2. Разрабатывать и распространять на национальном уровне усовершенствованную статистику по НДЛТ, охватывающую данные о ресурсах, уровнях заготовки и торговле (в разбивке по отдельным видам).
3. Обеспечивать надлежащие механизмы финансовой и институциональной поддержки созданию малых предприятий в секторе НДЛТ на местном уровне.
4. Проводить пересмотр и совершенствовать нормы национального законодательства в отношении НДЛТ, в частности норм, касающихся регулирования лесохозяйственной деятельности, налогов, доступа, пользователей, прав интеллектуальной и другой собственности.
5. Содействовать развитию двустороннего сотрудничества с целью обмена информацией и знаниями о НДЛТ.
6. Активизировать усилия по вовлечению других секторов, зависящих от НДЛТ, в том числе таких секторов, как здравоохранение, образование и торговля, в деятельность по обеспечению устойчивой эксплуатации, охраны и использования НДЛТ.

### ***Рекомендация для ЛЕСНЫХ НАУЧНО-ИССЛЕДОВАТЕЛЬСКИХ ИНСТИТУТОВ И МСЛНИО***

1. Активизировать и координировать меры по дальнейшей разработке учебных программ и исследования по таким касающимся НДЛТ вопросам, как:
  - уточнение определений, концепций и классификаций,
  - методологии для разработки наборов практических инструментов для:
    - инвентаризации и оценки воздействия заготовительных операций;
    - развитие практики доместикации, а также сбережения in-situ и ex-situ;
    - проведение этнобиологических исследований;
    - маркетинг и анализ торговли;

## Законодательство

Заготовка НДПЛ регламентируется Лесным кодексом Украины (1994), а также "Правилами заготовки вторичных лесных материалов и осуществления побочного пользования в лесах Украины" (1996), которые установлены Кабинетом Министров. Согласно этим документам, в порядке общего пользования лесными ресурсами граждане имеют право бесплатно собирать для собственного потребления дикорастущие травяные растения, цветы, ягоды, орехи, другие плоды, грибы.

Лесопользователи имеют право осуществлять специальное пользование лесными ресурсами, которое включает: а) заготовку живицы, б) заготовку второстепенных лесных материалов (пень, луб, кора, древесная зелень), в) побочное пользование лесом (выпас скота, размещение пасек, заготовка сена, древесных соков, сбор и заготовка дикорастущих плодов, орехов, грибов, ягод, лекарственных растений и технического сырья, лесной подстилки и камыша). Специальное пользование недревесными лесными ресурсами осуществляется на основании лесного билета, выданного лесопользователем (лесхозом).

В настоящее время, в качестве эксперимента, во Львовской области разработан проект "Положения об использовании ресурсов местного значения", реализация положений которого гарантирует стабильные поступления денежных средств от реализации НДПЛ в местный бюджет. В Положении предусматривается введение платы за пользование лесной территорией для заготовки лекарственного сырья, грибов, коры дуба, ели, пихты, лапки хвойной для производства пихтового масла (\$18,5 за 1 тонну), содержания пасеки (около \$1 за 10 пчелосемей в сезон), выпаса скота (\$1 за голову в сезон).

## Объёмы заготовки НДПЛ в прошлом и в настоящее время

Начало активной заготовки и переработки НДПЛ в Украине было положено в 1967 году по решению руководящих органов власти. Наибольшие объёмы заготовок пришлись на 1983-1985 годы (рис. 1).

Рисунок 1 - Многолетняя динамика объёмов заготовок пищевых и лекарственных продуктов на предприятиях Госкомлесхоза Украины, тонн

В этот период ежегодно заготавливалось 8500 тонн дикорастущих ягод (в 1999 году - 208), 46500 тонн березового сока (1999 год - 1488), 1792 тонн меда, 13860 тонн живицы, что составляло 12-15% от объёмов Госкомлеса СССР. Суммарная стоимость годового объёма недревесной продукции леса в этот период достигала 36,7 млн. рублей. В результате переработки недревесной продукции ежегодно производилось около 590 тонн скипидара, 3500 тонн древесного угля, 59600 тонн хвойно-витаминной муки, 150 тонн хлорофиллокаротиновой пасты, 491 тонна хвойного экстракта.

Одновременно проводились широкие научные и проектные изыскания с целью разработки и усовершенствования методов учета запасов НДПЛ при инвентаризации лесов, стимулирования заготовок на государственных лесных предприятиях, создавались специализированные предприятия по переработке заготавливаемой продукции. Была накоплена информация о запасах различных видов НДПЛ в лесах, способах и сроках его заготовки, переработки, хранения, связи урожайности с погодными условиями. Во второй половине 80-х годов Украина стала лидером в СССР по производству соков из дикорастущих ягодных растений и березы. Совместно с Академией медицинских наук СССР были разработаны уникальные технологии получения специальных экстрактов при низкой температуре и высоком давлении, что позволяло сохранить биологически-активные вещества. Передовые предприятия в области заготовок НДПЛ (лесхозы Ровенской, Волынской, Житомирской, Черниговской областей) для повышения объёма заготовок создавали специальную инфраструктуру, которая включала широкую сеть заготовительных и грибоварных пунктов, оснащенных необходимым оборудованием и расположенных вблизи баз заготовки (один

пункт на 1000 га покрытой лесом площади). В настоящее время в системе лесного хозяйства Украины работают 760 заготовительно-грибоварных пунктов.

### Методы инвентаризации и картирования НДПЛ

Картирование мест распространения НДПЛ и расчет их запасов производится таксаторами в процессе лесоустройства на основании "Методики инвентаризации пищевых и лекарственных растений при лесоустройстве" (Козьяков, 1981). Согласно Методике инвентаризация НДПЛ проводится в 3 этапа: 1) подготовительные работы (анализ имеющейся информации, обучение таксаторов приемам инвентаризации, составление справочных региональных таблиц); 2) полевые работы (тренировка таксаторов по определению процента проективного покрытия кустарничковых растений, среднего числа плодоносящих растений на единице площади, проведение глазомерной и перечислительной таксации, инвентаризация плантаций) 3) камеральные работы (расчет запасов НДПЛ, составление проектировочных ведомостей, создание карт, разработка рекомендаций по рациональному использованию и охране НДПЛ). Разработана методика и выделены дешифровочные признаки для инвентаризации ресурсов НДПЛ по спектральным снимкам масштаба 1:10000.

### Оценка фактического объема заготовок и стоимости НДПЛ

Сведения о запасах и местонахождении основных видов НДПЛ собираются при инвентаризации лесов, обрабатываются в производственном объединении "Леспроект" (ВО "Укрдержліспроект") и передаются в гослесхозы. Однако, необходимо констатировать, что имеющаяся информация о ресурсах недревесной продукции, за исключением живицы, в отличие от древесной продукции не всегда полная, часто находится в различных ведомствах и не позволяет осуществлять точные количественные расчеты. Можно назвать несколько причин такого положения. Во-первых, это связано со сложностью оценки и прогнозирования биологических и эксплуатационных запасов, так как варьирование урожаев различных лет очень большое, невозможно также учесть или спрогнозировать все факторы которые влияют на урожай. Другим важным фактором, является то, что недревесная продукция вследствие целого ряда экономических и экологических причин не рассматривается в настоящий момент как возможный существенный источник денежных поступлений от реализации на внутреннем или внешнем рынке.

На протяжении последних 15 лет, в связи с экономическими и политическими трудностями объёмы заготовки и использования недревесной продукции леса в Украине существенно снизились. Огромное отрицательное влияние на это оказала авария на Чернобыльской атомной электростанции, вследствие которой из пользования выведены большие площади лесов, главным образом в Полесском регионе (Житомирская, Киевская область). После аварии была прекращена заготовка многих видов лекарственного сырья, грибов, хвойной лапки, мяса промысловых видов. В тоже время, следует констатировать, что основной причиной упадка сектора стали социально-экономические реформы в СНГ, развал экономики, разрыв хозяйственных и кооперативных связей, резкое снижение покупательной способности в постсоциалистических государствах.

Заготовка НДПЛ в основном производится населением с последующей сдачей части продукции в заготовительные конторы. Заготовка большей части НДПЛ (кроме живицы, древесных соков, меда) проводится путем ручного сбора растений или их частей, как местным населением, так и приезжими из городов и поселков. Резкое снижение уровня жизни сельского населения вынуждает многих сельских жителей заготавливать недревесную продукцию леса в частном порядке, как для личного потребления, так и с целью последующей её продажи. При этом в первую очередь заготавливаются грибы (белый гриб, маслята, сыроежки, свинушки, лисички, подберезовики, подосиновики), дикорастущие плоды (земляника, рябина, брусника, калина, малина, черника, шиповник), лекарственные травы, а также огромное количество растений для цветочного бизнеса. При этом часто происходит массовое уничтожение редких растений, таких как папоротник, купена лекарственная, ландыш майский и других. Продукция реализуется в свежем, сушеном или консервированном виде на рынках либо через посредников. Основным потребителем её является городское население. Основным недостатком такого способа заготовки и реализации недревесной продукции является низкий контроль со стороны государства за пригодностью продукции к

потреблению по санитарным и пищевым нормам, что приводит к выходу такой деятельности за пределы легального налогового поля.

При среднем урожае ягод один заготовитель за день может собрать вручную около 20 кг брусники, малины, 30-40 кг клюквы, черники, голубики. Согласно оценкам различных авторов, около 27-40% общего количества заготовленной НДПЛ используется населением для своих нужд, а также для продажи на базарах. Среди организаций наибольшими объёмами заготовки характеризуются предприятия потребительской кооперации "Укоопспілка", Госкомлесхоза Украины, пищевой промышленности и аптекоуправления. Суммарные данные по Украине приведены в таблице 3. Как видно из таблицы наиболее существенными в стоимостном выражении являются живица, лекарственное сырьё, дикорастущие плоды и ягоды и мёд. По нашим расчетам, общая стоимость НДПЛ заготовленных в Украине в 1999 году достигнет \$2 млн. При этом необходимо констатировать, что доля использованного эксплуатационного запаса может быть значительно более высокой.

Таблица 3 - Цены и общая стоимость закупленной у населения и организаций недревесной продукции леса в Украине, 1999 год

Охотничье хозяйство не играет пока существенной роли в заготовках мяса и шкур, а в большей степени является источником средств, поступающих в виде платы за организацию охоты. Отстрелянные животные или птицы оставляются у охотников в качестве трофеев. Доля отстрелянных животных и птиц от общей численности в 1999 году составляла 21,2% для пернатых, 15% для пушных и 3% для копытных. При этом получено 132,6 тонн мяса дичи. Кроме приведенных данных, в системе Госкомлесхоза в 1999 году было заготовлено 5770 т сена, 275 тыс. шт. новогодних ёлок, 63 т древесной зелени, 7 т древесной коры.

#### Охрана и воспроизводство ресурсов НДПЛ

Растущая потребность в лекарственном сырье, рост объёмов его неконтролируемых заготовок обуславливает уменьшение распространённости отдельных видов растений или их полное исчезновение. В частности становятся редкими такие виды как астрагал мохнатоцветный, кукушкин лен, солодка, дягиль лекарственный. Улучшение положения в области охраны и воспроизводства лекарственного сырья возможно при институциональной реорганизации порядка заготовок сырья. Важную роль играет внедрение и соблюдение "Правил по организации рационального использования, охраны и восстановления дикорастущих лекарственных растений на территории Украины", "Правил заготовки вторичных лесных материалов и осуществление побочного пользования в лесах Украины" (1996). Приведенные документы регламентируют организационные и технические меры по сохранению этих ресурсов, порядок обучения заготовителей правилам сбора, контроль и ответственность за нарушения.

Рекомендации по рациональному использованию по отдельному хозяйству и каждому растению разрабатывает лесохозяйственное предприятие после инвентаризации запасов НДПЛ. Эти рекомендации включают организационные (планирование заготовок, прогнозирование урожая, запрет выпаса скота, проведения мелиорации и т.д.) и лесохозяйственные мероприятия (проведение рубок, агротехнических приёмов и т.д.). Однако реализация этих рекомендаций, контроль и охрана ресурсов НДПЛ часто находится на недостаточном уровне.

Большое внимание уделяется разработке эколого-щадящих технологий для заготовки НДПЛ. Специалистами лесохозяйственного факультета Национального Аграрного Университета разработаны нормативы для неистощительного пользования недревесной продукцией лесов. Около 30 технологий промышленного возделывания лекарственных и технических растений разработаны в течении последних 7 лет бывшим Всесоюзным институтом лекарственных растений, а ныне станцией лекарственных растений в селе Березотичи (Полтавская область). Созданы специальные сеялки лекарственных растений, ромашко - и календулоуборочные машины, работающие по схеме счесывания соцветий с накоплением в бункеры и оперативной доставкой к точкам сортировки и

переработки. Харьковским СКТБ им. Подгорного (А.Б.Сатаев) создан ряд уникальных машин и технологий безотходной переработки всей гаммы недревесной продукции.

#### Влияние Чернобыльской катастрофы на заготовку НДПЛ

В Украине проведена большая работа по ликвидации последствий аварии на ЧАЭС, в том числе и в лесном секторе. Для контроля радиационной ситуации в лесах проведено картирование всех загрязненных земель (табл. 4). Результаты, приведенные в таблице, показывают, что даже в наиболее загрязненных Житомирской и Ровенской областях заготовка НДПЛ может вестись на преобладающей незагрязненной части, площадь которой составляет 76-65% лесного фонда этих областей. Загрязненные радионуклидами земли сконцентрированы преимущественно в северной части региона, на так называемом северо-западном следе.

Таблица 4 - Площади лесов, загрязненных радионуклидами вследствие аварии на Чернобыльской АЭС в зонах заготовок НДПЛ, тыс. га

Для текущего контроля радиационной обстановки в лесохозяйственных предприятиях проводится радиационный мониторинг. Полученные при этом результаты позволяют прогнозировать переход радионуклидов во все виды продукции леса, делать заключение о соответствии её гигиеническим нормам, возможности реализации и потребления (таблица 5).

Таблица 5 - Предельная плотность загрязнения почвы  $^{137}\text{Cs}$  (Ки/км<sup>2</sup>), при которой недревесная продукция соответствует гигиеническим нормативам (Рекомендации, 1998)

Из таблицы видно, что заготовка некоторых видов НДПЛ может вестись и на загрязненных землях. В частности охота на водоплавающую дичь, заготовка живицы и березового сока может вестись более чем на 95 % лесного фонда при условии проведения радиационного контроля полученной продукции.

Созданные карты радиоактивного загрязнения лесов позволили выделить незагрязненные и слабозагрязненные участки в лесу, в которых возможна заготовка гигиенически чистой недревесной продукции леса. Научные исследования, проведенные на Полесской лесной опытной станции (г. Житомир) и Киевской лесной опытной станции позволили установить закономерности миграции радионуклидов во все виды недревесной продукции (грибы, ягоды, лекарственные травы, хвойная лапка и другие) и выделить предельно допустимые плотности загрязнения почвы радионуклидами, выше которых заготовка продукции не производится.

#### Оценка социальной и экономической роли НДПЛ и перспектив её экспорта

Промышленная заготовка недревесной продукции леса в Украине осуществляется путем организации сети заготовительных пунктов вблизи мест произрастания соответствующего вида продукции. Среди местного населения предварительно распространяется информация об условиях приёма продукции, сроках, местах и правилах её сбора. Заготовительные пункты чаще всего организовываются при лесохозяйственных предприятиях. В настоящее время этим могут заниматься любые заинтересованные организации при получении соответствующего разрешения со стороны ведомства, которое осуществляет пользование лесом.

На сегодняшний день положение дел в области организации заготовок недревесной продукции тесно связано с общей ситуацией в стране. В Украине традиционно значительная часть (до 30-40%, а в Закарпатье до 70%) населения проживает в сельской местности. Экономический кризис, развал государственных сельскохозяйственных предприятий, снижение социальных гарантий обусловил высокий уровень безработицы среди сельского населения. Основным источником существования крестьян в удаленных от крупных городов районах является продукция личного подсобного хозяйства, получаемая с помощью ручного труда на земельных участках площадью до 1 - 1,5 га. Это обуславливают наличие достаточного количества заинтересованной рабочей силы для

проведения заготовок недревесного сырья. Региональные власти также должны быть заинтересованы в развертывании такой работы, так как привлечение населения к заготовкам недревесной продукции способствует повышению занятости, росту доходов, что позволит более успешно решать экономические и социальные проблемы населения в регионе.

В последние 1,5 года наметилось улучшение общей экономической ситуации в стране, что позволяет прогнозировать рост объемов заготовок, переработки и реализации целого ряда недревесных продуктов леса. Начато восстановление ягодных плантаций (клюква, черника, голубика) сортами, которые были интродуцированы из Северной Америки. Все больший интерес производители проявляют к фармакопейному дегтю, древесному углю, сырью для уксусной и кожевенной промышленности. Открытое акционерное общество "Киверцыспецлесмаш", имеющее более чем 50-ти летний опыт расширяет производство оборудования для смолоскипидарного производства и углежжения. Проведена промышленная апробация и зарегистрированы технические условия на несколько десятков различных продуктов (экстракты, масла, пищевые добавки в кондитерские изделия). Восстановление химической промышленности уже сейчас требует увеличения заготовки живицы для обеспечения канифолью и её производными радиоэлектронной промышленности, производства качественных автомобильных шин, сложных резинотехнических изделий. Это сырьё снова приобретает статус стратегического.

В настоящее время целый ряд нерешенных проблем препятствует прогрессу в области развития заготовок недревесного сырья. В первую очередь это отсутствие инвестиций, что не позволяет реализовать потенциальные выгоды от заготовки недревесной продукции. В Украине только начинается формирование внутреннего рынка недревесного сырья, в этой области не работают крупные торгово-посреднические и заготовительные компании. Не проведены маркетинговые исследования, не изучен характер спроса на отдельные виды продукции и на их сезонную динамику. Часть недревесной продукции, в переработанном и готовом к потреблению виде (консервированные грибы, ягоды, орехи, фруктовый чай) импортируется из соседних стран и реализуется через торговую сеть. Требуют своего совершенствования экономические и юридические механизмы взаимодействия заготовителей недревесной продукции с ведомствами-лесодержателями и местной властью, что часто является препятствием для эффективной работы в этой области.

Резюмируя приведенные сведения, необходимо констатировать, что в Украине существует большой потенциал для развития заготовок недревесной продукции леса. Это выражается в наличии значительных ресурсов НДПЛ, исторически сложившихся традициях заготовки продукции, готовности и заинтересованности населения к участию в такой работе. Существует подробная информация о запасах и местонахождении основных видов недревесной продукции в регионах, способах её переработки и хранения. Имеются производственные мощности и нормативная документация для изготовления инструмента, оборудования и технологических линий по переработке сырья. Результаты научных исследований в этой области позволяют прогнозировать урожайность различных видов продукции, её соответствие экологическим и пищевым нормам, биологические и эксплуатационные запасы недревесных ресурсов в Украине. При надлежащем государственном регулировании, но без чрезмерной опеки, этот сектор является исключительно привлекательным для малого и среднего бизнеса, где годовой оборот может достигать \$100 млн. с сезонной занятостью нескольких десятков тысяч населения.

#### Литература

Zibtsev S.V., Kaletnik M.M., Savuschik M.P. Forests and forestry of Ukraine in the transition period. In: Reports of FAO/Austria Expert Meeting on Environmentally Sound Forest Operations for countries in transition to market economies. - Ort/Gmunden, Austria, 20-27 September 1998. - P. 85-93. - FAO, 2000.

Козьяков С.Н. Опыт инвентаризации и рационального использования пищевых дикорастущих растений в лесах Украины: Экспресс-информация. ЦБНТИ. - Госкомлес СССР. - М., 1981 - 21с.

Рекомендації з ведення лісового господарства в умовах радіоактивного забруднення. - Київ: Держкомлісгосп, 1998. - 74 с.

Рябчук В.П. Недеревна продукція лісу. - Львів: Світ, 1996. -312 с.

с.

Фесюк А.В. Шляхи раціонального використання ресурсів харчових та лікарських рослин в лісах Житомирщини: Автореферат дисс. На здобуття наукового ступеню канд.с.-г. наук. - Київ, 1996. - 24 с.

Таблица 1 – Эксплуатационные запасы различных видов НДПЛ в Украине (Терлецкий, 1985, Козьяков, 1991, Рябчук, 1996)

Вид продукции	Общая площадь, Тыс. га	Эксплуатационный запас, тыс. т	Регион, область
Черника ( <i>Vaccinium myrtillus</i> )	575-900	17-30	Полесье(Волинская-29%, Ровенская-40%, Житомирская-21%),Лесостепь
	40		Карпаты
Ежевика ( <i>Rubus caesius</i> )	30-100	23,0	Полесье, Лесостепь, Карпаты
Живица пихты ( <i>Abies alba</i> )	17.1	10.2	Карпаты
Малина ( <i>Rubus idaeus</i> )	65	9,7-10,0	Полесье, Карпаты
Боярышник ( <i>Crataegus orientalis</i> )		8,0-10,0	вся территория
Рябина ( <i>Sorbus aucuparia</i> )	н.д.	6,0-8,0	вся территория
Яблоня ( <i>Malus silvestris</i> )	0,6	6,0	вся территория
Груша ( <i>Pyrus communis</i> )	0,5	5,0	вся территория
Крушина ( <i>Frangula alnus</i> )		4,0	Полесье, Карпаты
Голубика( <i>Vaccinium uliginosum</i> )	30	2,5-3,0	Полесье, Лесостепь
Клюква ( <i>Oxycoccus palustris</i> )	26,6	1,2-2,0	Полесье, Карпаты, Лесостепь
Брусника ( <i>Vaccinium vitis idaea</i> )	45	н.д.	Полесье(70%), Карпаты (30%)
Земляника ( <i>Fragaria vesca</i> )	50	н.д.	Полесье, Лесостепь
Шиповник ( <i>Rosa canina</i> )	н.д.	1,7-2,5	вся территория
Лещина ( <i>Corylus avellana</i> )	0,7	н.д.	Полесье, Карпаты
Орех грецкий ( <i>Juglans regia</i> )	5,7	н.д.	Лесостепь, Степь
Абрикос ( <i>Armenia vulgaris</i> )	1,7	н.д.	Лесостепь, Степь

Таблица 2 - Среднемноголетняя урожайность различных видов НДПЛ, кг/га (Козьяков, 1981 Фесюк, 1996)

Вид продукции	Урожайность		
	низкая	средняя	высокая
Черника ( <i>Vaccinium myrtillus</i> )	50	100	151
Маслята ( <i>Suillus granulatus</i> )	50	250	750
Лисички ( <i>Cantharellus cibarius</i> )	50	100	200
Грузди ( <i>Lactarius resimus</i> )	50	300	600
Рыжики ( <i>Lactarius deliciosus</i> )	10	50	100
Опёнок обыкновенный ( <i>Armillariella mellea</i> )	100	200	300
Шиповник собачий, кг/куст ( <i>Rosa canina</i> )(H=2м)	0,4	0,5	0,7
Цмин песчаный ( <i>Helichrysum arenarium</i> )	5,0	7,7	10,6
Аир тростниковый ( <i>Acorus calamus</i> )	27	62	90

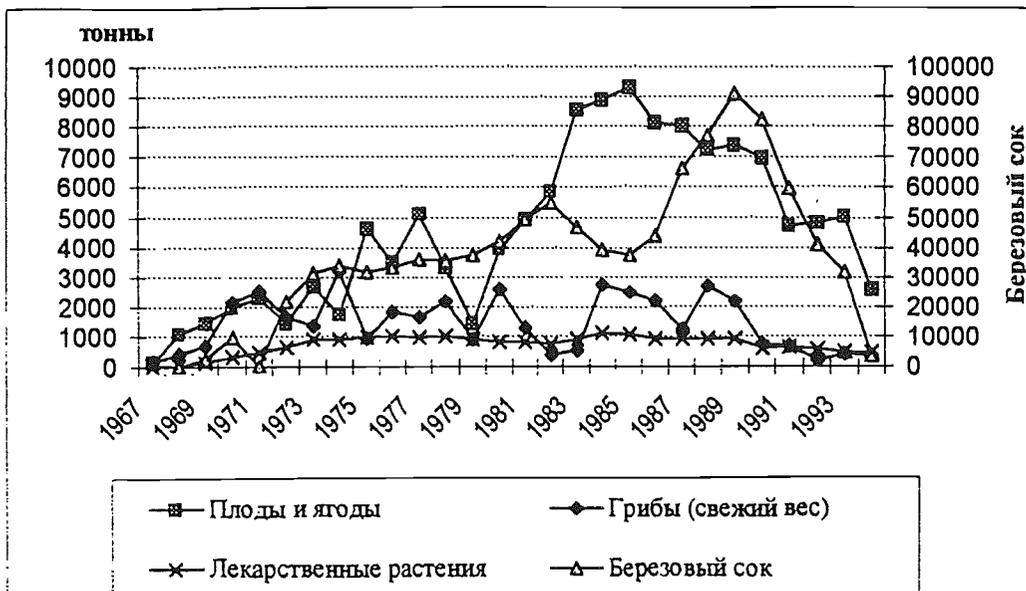


Рис. 1 – Многолетняя динамика объёмов заготовок пищевых и лекарственных продуктов на предприятиях Госкомлесхоза Украины, тонн

Таблица 3 - Цены и общая стоимость закупленной у населения и организаций недревесной продукции леса в Украине, 1999 год

Виды НДПЛ	Цена min-max, USD/т	Цена средняя, USD/т	Фактический объем заготовок, т		Стоимость продукции, тыс. USD
			Всего	в т.ч. Госкомлесхоз	
Живица	-	260,0	4800	4800	1248,0
Лекарственное сырьё	-	-	-	93	410,5
Дикорастущие плоды и ягоды	37-336	202,6	556	208	112,6
Мёд	370-1270	723,0	151	Н.д	109,2
Грибы свежие, соленые, маринованные	468-1995	277,8	224	4	62,2
Березовый сок	-	37,0	1488	1488	55,1
Орехи культурные, дикорастущие	87-393	303,0	113	4	34,2
Клюква	185-273	217,0	22	Н.д	4,8

Таблица 4 - Площади лесов, загрязненных радионуклидами вследствие аварии на Чернобыльской АЭС в зонах заготовок НДЛП, тыс. Га

Лесохозяйственное объединение	Общая площадь лесов	Площадь загрязненных, %	Площадь лесов с различной плотностью загрязнения почвы <sup>137</sup> Cs, Ки/км <sup>2</sup>		
			2-5	5-10	более 10
Житомирлес	732,3	35,1	158,3	50,3	48,7
Ровнолес	671,5	24,2	151,6	10,7	0,3
Киевлес	372,3	17,5	38,2	13,0	13,8
Черниговлес	348,6	7,8	23,1	3,3	0,9
Черкасылес	215,0	3,7	7,3	0,6	0,04
Всего	2339,7	22,2	378,5	77,9	63,74

Таблица 5 - Предельная плотность загрязнения почвы <sup>137</sup>Cs (Ки/км<sup>2</sup>), при которой недревесная продукция соответствует гигиеническим нормативам (Рекомендации, 1998)

Вид НДЛП	Предельная плотность загрязнения почвы	Вид НДЛП	Предельная плотность загрязнения почвы
Водоплавающая дичь	15,0	Цмин песчаный	2,6
Живица	10,0	Кора береста, дуба	2,0
Березовый сок	10,0	Мед	1,0
Тысячелистник	6,9	Голубика (Vaccinium uliginosum)	1,1-1,7
Хвойная лапка на хвойно-витаминную муку	4,0-6,0	Черника (Vaccinium myrtillus)	1,9-2,6
Белые гриб (Boletus edulis) Лисички (Cantharellus cibarius) – свежие	3,0	Брусника (Vaccinium vitis idaea)	1,1-1,4

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# **CURRENT TRENDS OF CHANGES IN THE UTILISATION OF NON-WOOD FOREST GOODS AND BENEFITS IN POLAND**

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## **Summary**

The term minor forest utilisation has been gaining a wider meaning in multifunctional forestry as it covers not only a direct derivation of benefits from the forest (sometimes difficult to measure), but is also connected to protection, recreation or landscape functions of the forest. Minor forest utilisation as a branch of the Polish forest management has a particularly rich tradition and its importance has been growing despite many various modifications.

The Act on Forests, currently in force in Poland, describes (among other things) obligation of non-wood forest products harvesting in such a way which can assure a possibility of its biological restoration. Much more difficult is to create conditions to practically execute this obligation.

Problems of forest ground cover resources utilisation have become particularly significant in recent years. Constant increase in demand especially for some valuable forest fruit and mushrooms is being observed. Mass and uncontrolled harvest has become a serious threat for the forest environment. Disappearance of mycorrhiza fungi has been observed for the last 20 years and it is caused not only by excessive harvesting, but by high level of industrial pollution as well. It is an urgent need to create mechanisms, which would change existing exploitation into rational utilisation. A particularly important problem is conducting a reliable inventory of forest resources to enable rationalisation of their utilisation, as well as an expansion of new areas of non-wood forest products including plantations of medical plants, fruit plants and edible mushrooms.

Current problems and trends of changes in minor forest utilisation in Poland, weight of different disciplines of minor forest utilisation and data concerning the size of harvesting of selected non-wood forest products in recent years are presented in the poster. Moreover, a catalogue of recommendations for the field forestry is given. It should be also stressed the need of research problems in the utilisation of non-wood forest products, e.g.:

- methodology of inventory of non-wood forest products to enable rationalisation of product base usage;
- influence of forest resources utilisation on the natural environment;
- analysis of the market for non-wood forest products;
- studies on verification of principles of non-wood forest products utilisation in sustainable forest management;
- quality of forest products vs. the influence of biotic, abiotic and particularly anthropogenic factors.

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## **Introduction**

Minor forest products utilisation has its particularly rich tradition as a branch of forestry in Poland. The so-called *Polish concept of forest minor production*, being the effect of work and experience of generations of foresters, was developed in the 1940s under the supervision of professor Wiesław Grochowski. The concept's basic assumption has been the idea according to which the whole of forestry production process: both the production of wood and the production of all other forest uses, are oneness (3). Nowadays, in the multifunctional forest management, we observe the constant evaluation of the

meaning of term "minor forest utilisation". It covers not only a direct derivation of benefits from the forest (sometimes difficult to measure), but is also connected to protection, recreation or landscape functions of the forest.

In the 60s and 70s, minor forest utilisation in the State Forests had participated in up to 25% to the total value of forestry production (2). At present it would be extremely difficult to assess the actual value of minor forest production. The most substantial problem is the fact that the importance of minor forestry production has been nowadays underestimated by the forestry administration.

The document, *Assumptions and Principles of Forest Utilisation under the Condition of Sustainable Forest Management* (10), has been elaborated at the Department of Forest Utilisation of WAU. This elaboration has synthesized the state-of-the-art of the modern problems of forest utilisation, including minor forest goods utilisation. It defines the most important research directions and determines in detail recommendations for the practice of forestry.

Below presented is a brief outline of the selected aspects of non-wood forest products utilisation in Poland, the most recent dynamic tendencies, the most urgent research problems and the recommendations for practical forestry.

### Utilisation of forest floor resources

The problems connected with utilisation of forest floor goods are currently becoming especially important in Poland. The Polish concept of minor forest production assumed that the harvest of forest floor economic plants and mushrooms be organized or, at least, supervised by the administration of the State Forests. This idea had found its practical expression in the large network of purchase spots. Those were run following the close cooperation with local foresters. On the other hand, the gathering of plants and mushrooms for the collectors' own use and other than protected species and carried outside the protected areas was unlimited and, actually, out of control. It should be stressed that the Act on Forests, currently in force in Poland, ensures the free access to the forest and to all resources of forest ground cover. Therefore, the control under the exploitation of such resources is very complicated.

The research study conducted mainly by the Forest Research Institute and the Department of Forest Utilisation of the Warsaw Agricultural University and aimed at successive identification of the raw material resource bases of the most important forest floor fruits and accompanied by the information obtained from the purchasing spots of forest fruits, gave reliable data on the utilisation of the resource bases. At present, however, no reliable comprehensive data are available on the actual level of harvest in forests, because of the privatization of the companies dealing with purchasing fruits, herbs and mushrooms. Moreover, recorded has been the continuous growth of demand, especially for some, highly valuable, fruits and mushrooms: bilberry, chanterelle and edible boletus (11). The intensive, non-controlled gathering is still a growing problem and threat. Also, the unprofessional collection of berries leads to the injury of the shrubs, impeding or, in extreme cases, even rendering impossible the regeneration of blueberry patches (2). During the last two decades, rapid extinction of mycorrhizal fungi has been observed, this being caused by the high level industrial pollution, and especially by the combined effect of acidification and increased level of nitrogen in forest soils (6,7). To protect the mushrooms and berry fields it is, thus, an urgent necessity not only from the point of view of their utilisation but also - it is conditioned by the requirements of the protection of forest. The above does not mean the complete resignation from the harvest of the foregoing goods - it is necessary to create such mechanisms that would change the present-day exploitation into rational utilisation.

One of the important aspects of utilisation of edible mushrooms is the actually large disproportion between the number of commonly recognized and collected species (this being 5-10) and that of all edible fungi species in Poland (the latter being well above 1000). An important problem seems to be, thus, the promotion of selected valuable though unknown to the wide public mushroom species. Cultivation of some mushroom species could be an effective element of such promotion. At present, *Pleurotus ostreatus* (Jacq.) Kummer, a dozen years ago absolutely unknown in Poland, has become a commonly cultivated mushroom species. The range of species worth cultivation may be wider even though only

saprophytic species may be practically considered.

The main directions of research study connected with the utilisation of forest floor resources are:

- survey of forest minor goods resource bases in order to enable the rationalization of the resource utilisation;
- study on quality of forest raw materials with particular attention paid to the impacts of a number of factors (both biotic and abiotic factors, with particular emphasis on the anthropogenic influences);
- study on the effect of forest floor resources utilisation on the natural environment;
- the role of cultivation practices and plantations in the minor forest production;
- development and verification of the principles of forest floor resources utilisation in sustainable forestry.

### Resin taping

The role of minor forest utilisation in the forest management of Poland has been recently subjected to significant alteration. In the period after World War II, the leading branch of forest utilisation was - until the end of the 70s, collection of Scots pine (*Pinus sylvestris* L.) resin. Beginning with the early 80s however, a process of continuous decrease and finally complete cessation of resin harvest has been observed (Table 1). Our domestic production of resin was totally supplanted by the imported raw material, first of all from Belarus, the Ukraine, China and Brazil. The raw material resources, estimated in the after war period for some 30 thousand tons a year, are currently assessed to be approximately 24 thousand tons a year. Theoretically it is possible to reactivate resin collection even at a level approaching the maximum one (from the year 1961: 24.5 thousand tons (9)) without any negative influence on the natural environment. In order to accomplish this, an analysis of economic efficiency would be however indispensable and besides, the world market prices level would also be very influential.

It should be stressed the need to research problems connected with resin taping. The most general, but substantial one is the assessment of the possibility to reactivate resin harvest in Poland. To perform it, study on the assessment of the possibility to use environment friendly stimulators of resin leak and the analysis of the market of resin and resin products should be also executed.

**Table 1. Selected non-wood forest products harvested in Poland (1980 – 1997) in tons (8)**

	1980	1985	1990	1992	1994	1996	1997
<b>Resin</b>	9265	8403	6400	806	0	0	0
<b>Forest fruits</b>	2824	8010	3006	1258	252	5683	4566
<b>Edible mushrooms</b>	6078	5151	2792	618	87	940	761

### Utilisation of bark and needles of forest trees

Spruce bark was commonly used in Poland in the tanning industry in the fifties and sixties (reaching the maximum level of more than 16 thousand tons in the year 1952 – (4; Table 2.)). Later, however, its utilisation has been decreased as a result of the import of high quality tannin raw materials and the common use of synthetic tanning agents. Large amounts of pine bark are used in the production of fertilizers. No data are available on the actual size and use value of bark utilized this way. Still important forest raw material is the bark of oak and buckthorn (*Frangula alnus*) harvested for the needs of the pharmaceutical industry (with demand exceeding largely the supply), these are however merely hundreds of tons (5).

Under Poland's condition, the only rational direction of utilisation of forest tree needles is the production of volatile oils: the pine oil and, though to a lesser extent, the fir oil (5). The resource base, estimated in the 60s for some 225 thousand tons, and at present - for about 100 thousand tons (the decrease has been due the worsened health status of forest stands)- is used in just a very small extent: below 1%. The maximum amount of volatile oils ever produced was recorded in the year 1964, 30 tons. At present the yearly output is about one ton (2).

The most important directions of research study connected with this branch of minor forest utilisation are:

- assessing the potential for and economic efficiency of the utilisation of bark and needles of forest trees;
- research on selected indicators of the quality of needle-cuts and needles of forest trees;
- study the impact of a number of factors (site factors, anthropogenic impacts etc.) on quality of needles and concentration of volatile oils;
- influence of the utilisation of bark and needles on the natural environment.

**Table 2. Spruce bark utilisation in Poland (1945 – 1990) in tons (4,5)**

1945	1950	1955	1960	1965	1970	1975	1980	1985	1990
150	11200	13200	7100	1800	1300	100	0	0	0

## Recommendations and conclusion

The profile of the minor forest utilisation as a branch of economy has been continuously changing. Those elements that used to be the most fundamental ones in the minor forest utilisation have been losing their importance while other previously unknown or considered not important elements (e.g., the use of mosses or bark for the ornamental purposes) are becoming more and more important for society.

The rational utilisation of non-wood forest goods needs a reliable survey of the resources. It seems that a close cooperation between forest management and forest utilisation services is a must within this scope.

The meaning of the term: forest utilisation, becomes wider under the condition of multiple-function forestry. This covers not only the widely understood profit gained (sometimes hardly assessable) from the forest but also it is closely connected with the protection, landscape or recreational functions of forest. The assessment of the value of these functions has been a challenge for minor forest utilisation as a science discipline.

The growing public interest in forest fruits and mushrooms forces one to prepare detailed, based on research results, principles and rules of their utilisation, such that would result in the most effective form of their active protection.

The plantation-type cultivation of healing plants, fruit-bearing plants and edible mushrooms is one of the possible forms of broadening the surface area of raw material bases, giving also the potential for a new income source for the State Forests.

A special form of supporting the existing resource bases is accomplishment of semi-plantations under the shelter of forest stand: artificial sowing, underplanting, promotion of natural regeneration. This can be especially vital in the case of some healing plants and fruit bearing plants as well as selected mushroom species.

The binding obligation in the Poland Forest Act, among others, requires that such collection of forest goods ensures their biological restoration. What is necessary is the creation of conditions enabling the practical accomplishment of the regulation.

## References

- 1 Głowacki S. 1999. *Przemysłowe wykorzystanie leśnych surowców ubocznych [Industrial Utilisation of Non-Wood Forest Products]*. Przegląd Techniki Rolniczej i Leśnej nr 5.
- 2 Błowacki S. 2000. *Aktualne problemy ubocznego użytkowania lasu w Polsce [Recent Problems of Minor Forest Utilisation in Poland]*. Stan i perspektywy badań w zakresie użytkowania lasu. Konferencja naukowa IBL, Sikocin, 30-31.03.2000.
- 3 Grochowski W. 1967. *Polska koncepcja ubocznej produkcji leśnej w teorii i w praktyce [Polish Concept of Forest Minor Production – Theory and Practice]*. Sylwan nr 11.
- 4 Grochowski W. 1976. *Uboczna produkcja leśna [Minor Forest Production]*. PWN Warszawa.
- 5 Grochowski W. 1992. *Stan i perspektywy ubocznej produkcji leśnej w Polsce [State and Perspective of Minor Forest Utilisation in Poland]*. Stan i perspektywy trwałego użytkowania lasu w Polsce. Konferencja naukowa KNL PAN i IBL, Warszawa, grudzień 1992.
- 6 Grzywacz A. 1994. *Konsekwencje dla polityki kompleksowej ochrony zasobów leśnych wynikające z eksploatacji i zagrożenia grzybowisk. Polska polityka kompleksowej ochrony zasobów leśnych [Polish Policy of Forest Resources Protection]*. Warszawa, październik 1994.
- 7 Grzywacz A. 1997. *Użytkowanie grzybów leśnych – dawniej i dziś [Utilisation of Forest Mushrooms – Now and in the Past]*. Postępy Techniki w Leśnictwie Nr 63.
- 8 Leśnictwo 1997 [Forestry 1997]. Główny Urząd Statystyczny. Warszawa 1997.
- 9 Ostalski R. 1992. *Możliwości i warunki reaktywowania żywicowania w Polsce [Possibility and Conditions for Reactivate Resin Harvest in Poland]*. Stan i perspektywy trwałego użytkowania lasu w Polsce. Konferencja naukowa KNL PAN i IBL, Warszawa, grudzień 1992.
- 10 Paschalis P. 1997. *Założenia i zasady użytkowania lasu w trwałej i zrównoważonej gospodarce leśnej [Assumption and Principles of Forest Utilisation at Sustainable Forest Management]*. Ministerstwo Ochrony Środowiska i Zasobów Naturalnych. Warszawa, maj 1997.
- 11 Staniszewski P. 1998. *Użytkowanie zasobów runa leśnego w trwałej i zrównoważonej gospodarce leśnej [The Use of Forest Ground Cover Resource at Sustainable Forest Management]*. Sylwan nr 8.



## TENDANCES ACTUELLES ET ÉVOLUTION DE L'UTILISATION DES PRODUITS FORESTIERS AUTRES QUE LE BOIS ET DES AUTRES FONCTIONS DE LA FORÊT EN POLOGNE

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### RÉSUMÉ

L'expression "utilisation mineure des forêts" a pris un sens plus large en foresterie multifonctionnelle et couvre non seulement les avantages directs de la forêt (qui sont parfois difficiles à mesurer) mais aussi les aspects liés aux fonctions de protection, de loisirs ou de paysage de la forêt. En tant que volet de la gestion forestière polonaise, l'utilisation mineure des forêts a une tradition particulièrement riche et a gagné en importance malgré de nombreuses transformations de toutes sortes.

La loi sur les forêts en vigueur en Pologne prévoit (entre autres choses) l'obligation de récolter les produits forestiers autres que le bois selon des méthodes permettant de garantir la régénération biologique. Il est beaucoup plus difficile de créer les conditions permettant d'exécuter cette obligation dans la pratique.

Les problèmes liés à l'utilisation des ressources du couvert végétal forestier ont pris une importance particulière ces dernières années. On observe une augmentation constante de la demande de ces produits, en particulier de certains fruits et champignons forestiers qui ont une valeur marchande. Les récoltes massives et anarchiques représentent maintenant une menace sérieuse pour l'environnement forestier. La disparition des champignons mycorhiziens observée au cours des 20 dernières années est due non seulement à une cueillette excessive mais aussi à un taux élevé de pollution industrielle. Il est urgent de mettre en place des mécanismes permettant d'obtenir que l'exploitation actuelle devienne une utilisation rationnelle. Il est particulièrement important d'établir un inventaire fiable des ressources forestières pour permettre de rationaliser leur utilisation et de développer les zones recelant des produits forestiers autres que le bois, y compris en plantant des plantes médicinales, des espèces fruitières et des champignons comestibles.

Les problèmes actuels et la tendance de l'évolution de l'utilisation dite mineure des forêts en Pologne, la place des différentes disciplines de l'utilisation mineure des forêts et les données relatives aux volumes récoltés de quelques produits forestiers autres que le bois ces dernières années sont présentés dans le dossier. Celui-ci s'accompagne d'une liste de recommandations pour la foresterie pratique. Il faut également insister sur la nécessité de faire des recherches sur certains aspects de l'utilisation des produits forestiers, par exemple :

- méthodologie pour inventorier les produits forestiers autres que le bois, permettant de rationaliser l'utilisation de ces produits;
- influence de l'exploitation des ressources forestières sur l'environnement naturel;
- analyse des marchés des produits forestiers autres que le bois;
- études visant à vérifier le bien-fondé des principes d'utilisation des produits forestiers autres que le bois pour l'aménagement forestier durable;
- qualité des produits forestiers par rapport à l'influence de facteurs biotiques, abiotiques et, tout particulièrement, anthropogéniques.

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## СОВРЕМЕННЫЕ ТЕНДЕНЦИИ В ИСПОЛЬЗОВАНИИ НЕДРЕВЕСНЫХ ЛЕСНЫХ ТОВАРОВ В ПОЛЬШЕ

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### РЕЗЮМЕ

Термин "побочное использование лесов" получает более широкий смысл в многофункциональном лесном хозяйстве, поскольку он подразумевает не только прямое извлечение выгод от лесоводства (которые иногда трудно измерить), но и защитные, рекреационные и ландшафтные функции лесов. Побочное использование лесов как отрасль польского лесоводства имеет исключительно богатую традицию; его значение растет, несмотря на многочисленные различные изменения.

Закон о лесах, ныне действующий в Польше, предусматривает (среди прочего) обязанность заготавливать недревесные лесные товары таким образом, чтобы гарантировать возможность их биологического восстановления. Однако намного труднее создать условия, позволяющие выполнять это обязательство на практике.

Проблемы использования ресурсов напочвенного покрова лесов приобрели особо важное значение в последние годы. В настоящее время наблюдается непрерывное увеличение спроса, особенно на некоторые ценные лесные плоды и грибы. Массовые и неконтролируемые заготовки создают серьезную угрозу для лесной среды. В последние 20 лет наблюдается исчезновение грибной микоризы, что объясняется не только чрезмерными заготовками, но и высоким уровнем промышленного загрязнения. Ощущается острая необходимость создать механизмы, которые изменили бы структуру нынешней эксплуатации и позволили бы обеспечить рациональное использование. Особо важную проблему представляет собой проведение надежной инвентаризации лесных ресурсов, с тем чтобы обеспечить их рациональное использование, а также расширение новых областей применения недревесных лесных товаров, включая выращивание лекарственных растений, плодовых растений и съедобных грибов.

На плакате показаны нынешние проблемы и тенденции в области побочного использования лесов в Польше, удельный вес различных видов побочного использования лесов и данные, касающиеся масштабов заготовок отдельных недревесных лесных товаров в последние годы. Кроме того, приводится перечень рекомендаций в отношении использования лесов. Следует также подчеркнуть необходимость проведения исследований в области использования недревесных лесных товаров, по следующим вопросам:

- методика инвентаризации недревесных лесных товаров, позволяющая рационализировать базу их использования;
- влияние использования лесных ресурсов на природную среду;
- анализ рынка недревесных лесных товаров;
- проведение исследований с целью проверки принципов использования недревесных лесных товаров в рамках системы устойчивого использования;
- качество лесных товаров с учетом влияния биотических, абиотических и особенно антропогенных факторов.

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# **SOME INDICATORS OF THE STATUS AND POSSIBILITIES TO IMPROVE THE COLLECTION, PURCHASE, AND PROCESSING OF MEDICINAL AND AROMATIC PLANTS IN THE REGION OF HERZEGOVINA-NERETVA CANTON IN THE FEDERATION OF BOSNIA AND HERZEGOVINA**

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*(No summary in French & Russian)*

## **Introduction**

In geographic terms Herzegovina often is associated with mild climate, abundance of sun and warmth and the clean, not polluted, green-blue coloured, rich in trout Neretva river. Mostar, the cultural and economic centre, with its flowering gardens and agricultural products such as tobacco, early vegetables, cherries, figs and grapes.

Thanks to the heterogeneous climate and relief, the area of Herzegovina has a long and rich tradition in collecting of different types of growing wild medicinal and aromatic plants and spices, forest fruits and mushrooms.

Herzegovina-Neretva Canton is one of ten Cantons of Federation of Bosnia and Herzegovina. It consists of nine municipalities, from Prozor in the north to Neum in the south. They surrounding the river Neretva from its spring ( Konjic municipality ) to the river basin (Metković, municipality in Republica Croatia bordering the Canton). The total surface of the canton is about 4 800 km<sup>2</sup> with a total population of about 274 000 inhabitants before the war.

Present cultural, educational, economic centre is Mostar at 65 m altitude and about 60 km distance from Adriatic Sea. It has sub-Mediterranean climate, with average annual air temperature of 15°C, with average maximum temperature of 26°C in August and average lowest temperature of 5°C in January, with an annual rainfall of 1414 mm and annual number of sun hours of 2136, making this town one of the sunniest in B&H.

The area is characterised by the transition from moderate-continental climate in the north to Mediterranean climate in the south.

The Canton has very good traffic infrastructure. The Canton is connected by roads and railway with others parts of B&H as well as with others states. The seaport Ploče in Republica Croatia offers the possibility of overseas transport.

Local population, displaced persons and refugees are the inhabitants of the Canton. Destruction and devastation of productive companies, general lack of financial resources and the political environment have caused a very low employment rate. The process of returning to normal is still slow. People coming back to the villages and towns face a whole range of problems, but employment is the biggest one. A way to earn money is to deal with agriculture and collection of medicinal and aromatic plants and other NWFP.

## **The Situation of Collection, Purchase and Processing of Medicinal Plants Before the War**

Tradition of collection of different types of growing wild medicinal, aromatic plants and spices, as well as forest fruits is based on use of medicinal plants for centuries in popular medicine and on specific climate, soil and others factors. For these reasons the former Yugoslavia defined this area as an area rich

in medicinal plants from the point of view of the number of types and of the available quantity.

It is estimated that in some habitats in Herzegovina there are 1300 species of plants with some medicinal characteristics. Some of them are of unique quality in the world, such as sage (*Salvia officinalis*), immortelle (*Helichrysum italicum*), heath (*Saturea montana*), juniper tree (*Juniperus communis*), autumn crocus (*Colchicum autumnale*), St. John's wort (*Hypericum perforatum*), hemp stalk (*Vitex agnus castus*), etc.

Data do not exist on the distribution of species of the plants or on collected quantities. In former Yugoslavia some data were available for Dubrovnik area and it was estimated that some 5 700 hectare are covered by *Salvia officinalis*, by rosemary 50 hectares and *Helichrysum italicum* 730 hectares.

Rural and suburban households deal with plant collection as main or additional activity.

Collective farms and Cooperatives making the part of APRO "Herzegovina" (former Hepok) with main office in Mostar dealt with purchase. Collective farms were placed in all big cities of the Canton having purchase stations in the villages. The purchase included some 30 species of different plants, forest fruits and mushrooms such as sage, immortelle, black and red juniper, *Satureja montana*, black and white linden, St. John's wort, gentian, autumn crocus, bilberry. Some of them were for the export, especially sage. To domestic customers the plants were delivered without final processing, having impact on the quality and price.

In addition to this established traditional purchase practice there was some conflict of interest among other organisations and private entrepreneurs from B&H and from others republics of former Yugoslavia. At the time of collection and purchase of the plants they sent people with money paying directly for the plants. This had an impact on the changing rate of prices, quality and supply.

At the same time the increasing rate of consumption caused the unskilled, irresponsible and unorganised collection of medicinal plants. So it is possible to claim that in some especially accessible regions the natural resources were exhausted and some were degraded. Some highly esteemed species are now on the brink of extinction. People dealing with collection of medicinal plants were guided exclusively by gains of profit, and they did not take into consideration the natural capabilities. This has lead to the danger of extinction of some species such as gentian and immortelle. Regarding collection of forest fruits we find a similar situation (juniper, *Rosa canina*) and mushrooms. Mushrooms are pulled out from the ground without taking care of mycelium, which are necessary for reproduction the next year.

## The Purchase

On the basis of the data that are available it is calculated that the purchase of medicinal plants, forest fruits and mushrooms in B&H before the war was 5 to 7 thousand tons, and the value of the export was about 15 millions US\$.

Several years before the war organised purchase through holding company APRO "Herzegovina" in the area of Herzegovina the purchase was from 600 tons to 1 200 tons. Purchase through other organisations 250 – 400 tons, and 1000 tons through different sellers for a total of about 2 500 tons. Of these purchases the share of sage was about 50 – 60%. The estimation was that the natural potential of Herzegovina was 6000 tons of different plants and fruits.

Before the war there was no processing capacity for the medicinal plants in the Canton. In 1983 the organisation HEPOK DISTILLERY, which was the part of APRO holding and producer of a wine distillate and brandy, developed a procedure for the production of essential oil and extracts (sage, immortelle, laurel) and offered products to the market. A small production was maintained until the war when a part of the production equipment was damaged causing the end of production.

In the cooperation with Institute for the Agricultural Research from Mostar and with Institute for medicinal plants from Belgrade the distillery invested significant funds in three years research to investigate the possibility of having plantations growing of some medicinal and aromatic plants. The

purpose of this investigation was to insure that at least 50% of the raw material necessary for the future production could be provided. Good results of the investigation as well as the market research caused the Distillery to undertake an investment program to build the capacity for processing and finishing the medicinal plants into the products such as tea, cosmetics and essential oils. War caused closing of the project.

## Present Situation in Purchase, Processing and Finalisation of the Medicinal Plants

After the war was finished and the Dayton peace agreement was signed, with the help of the International community and with own efforts some restoration of the work of Collective farms in the Canton has occurred in the cities Mostar, Konjic, Jablanica, Stolac, Ćapljina, Prozor, etc. The collection and purchase has been reactivated mainly because minimum investments were necessary for the activity. But a problem occurs when buyers do not have "cash" money for the purchase and the competition starts again among buyers, and cooperatives remain without income.

In 1994 in Mostar 70 tons of sage were purchased, but in 1995 and 1996 the purchase stopped because some disorders in export occurred. Also there is the problem in collection because some areas are still covered with mines.

The population started to return to places of origin and the only possibility to earn income is to work in the field of agriculture and to collect medicinal plants.

"BOSNIA FLORA" Konjic, whose owners have twenty years experience in this field, is the biggest private enterprise in the Canton dealing with purchase and processing of forest fruits and mushrooms, medicinal plants and snails. The firm invested some financial resources in the education of the people working in the field with collectors and advising them on ways and time of gathering, drying, and storing of the plants. The area is at 200 to 2000 m height above sea level.

To illustrate we will display the data on the purchase of the plants in the municipality of Konjic:

### THE PURCHASE OF THE PLANTS IN MUNICIPALITY OF KONJIC IN 1999

ENGLISH NAME	LATIN NAME	TONS
Bilberry fresh	Vaccinium myrtillus	35
Bilberry dried	Vaccinium myrtillus	1
Blackberry fresh	Rubus Fruticosus	10
Raspberry fresh	Rubus ideaus	10
Linden Flower	Tilia flos	5
Dog rose fresh	Rosa canina	10
Dog rose dried	Rosa canina	2
Boletus mushroom	Boletus sp.	25
Yellow chanterelle	Chanterelle	5
Juniper	Juniperus communis	25
Chestnut	Aesculus hippocastanum	150

The development of the collection and purchase of the medicinal plants will have to make this activity profitable and sustainable from the point of view of preservation of the different species.

In May 2000, on suggestion of GTZ / AGRO PROJECT, Government Organization from Germany, with main office in Sarajevo, the association of the collectors, buyers, processors and scientific institutions dealing with medicinal plants on level of Federation B&H was established. This association will ask all the responsible authorities dealing with the process of issuing the permission of annual plans for the forest management, that the rational use of medicinal plants and other NWFP be assured.

Collective farms and specialised companies dealing with use and purchase of medicinal plants, who

are members of the associations, are obliged to produce the guidelines on way, time and conditions of collecting and gathering the plants aimed to improve and protect the medicinal plants. Special emphasis should be given to the species whose existence is already endangered such as gentian or immortelle.

The Association will ask the State, Canton and the municipalities to increase control and to take some measures against those not observing the existing regulations in this field.

The Association has the objective to replace the traditional way of work and disorganisation with a new form of organisation that will contribute to the fulfilling of three basic conditions for a successful launch of value added NWFP on the regional and international markets. These conditions are appropriate quality, price and delivery time in suitable packaging. In addition, the Association will work on development of opportunities for cultivation and forestry, ensuring to the processors sustainable supplies of standardised quality raw material.

The resources from the banks will be required to give incentives to the development of this export – oriented activity under favourable conditions with low interest rate and long grace period.

The Association on the Canton level should be established to ensure smooth implementation.

## **Conclusion**

This paper is intended to raise the attention of the participants of the Seminar on the possibilities of regional collaboration in this field. Especially because our country is under reconstruction after the war and the international community has invested substantial effort in the reconstruction.

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# **PROSPECTS OF UTILIZATION OF NON-WOOD FOREST PRODUCTS IN ARMENIA**

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## **Introduction**

Modern Armenia lies in the southern part of the Transcaucasus, between latitudes 38° 50' and 41°18' N. and longitudes 43° 27' and 46° 27' E. It occupies the small north-eastern part of the extensive Armenian Highlands and the peaks of the Lesser Caucasus. The total area of the Republic is 29 800 km<sup>2</sup>. Armenia is a typical highland country, over 76 percent of the land lying at altitudes between 1000 and 2500 metres above sea level. Some 11.2 percent of the total area of the country is wooded.

## **Present Situation**

The wooded area of Armenia today amounts to 459 900 ha of which 334 100 ha are forest. There is 0.1 ha of forest land per person of population. Sixty-two percent of the woodland lies in the north-east and 36 percent in the south-east. Only 2 percent of the forests lie in the central regions.

Over 250 varieties of trees and bushes grow in Armenia's forests. The principal forest species are oak, beech and hornbeam. Historical, archaeological, palaeobotanical and other data indicate that the wooded surface of the Republic used to be three times as large, amounting to around 35 percent in the first millennium BC. Because of the economic and energy crisis that arose in the 1990s after the collapse of the USSR, Armenia's forests are now threatened with annihilation.

The people of the Republic have been forced to use wood as fuel. Expert estimates are that some 30 000 hectares of timber — a total of about 6 million cubic metres — were felled in the 1990s. The forests suffered significant damage since most of the felling was not authorised. There is a great deal of restoration work to be done. At present no more than 500 hectares of forest are restored in any year. At that rate, it will take over 60 years to restore the spoiled areas.

## **Timber Reserves**

Forestry data from 1993 put Armenia's timber reserves at 41 740 000 cubic metres. Average annual overall growth is 450 000 cubic metres, average yearly growth of one hectare is 1.3 cubic metres, and average reserves per hectare are 125 cubic metres. Average density is 0.53 and average age is 99 years. These figures are indicative of unsystematic, intensive exploitation of the forests, resulting in growth and reserve indicators significantly below their potential values.

Of total timber reserves, beech accounts for the greatest proportion, with 20 680 000 cubic metres (49.5 percent), followed by oak with 12 500 000 cubic metres (29.8 percent) and hornbeam with 6 million cubic metres (14.3 percent). All remaining varieties together amount to reserves of 2 700 000 cubic metres (6.4 percent). These figures require correction since they take no account of unauthorised felling. An audit of forest resources and forestry operations is essential, no full audit having been performed since 1993.

## Variety Of Forest Species

Some 120 (about 40 percent) of the woody species growing in the forest are wild fruit or berry bearing plants used extensively by the population either as edible preserves or as root stock for high-yielding cultured varieties. The most valuable plants, yielding fruit which can be processed on an industrial scale, are: dog rose, pear, apple, Cornelian cherry, currant, dewberry, raspberry, gooseberry, hawthorn, walnut, beech, fig, pomegranate, blackthorn, cherry plum, hazel and sea-buckthorn. (See annex.)

Medicinal plants represent a fairly high proportion of the forest flora in Armenia (annex). The most valuable medicinal plants, which can be processed on an industrial scale are: sea-buckthorn, dog rose, hawthorn, lime, juniper, dewberry, oak and barberry.

Among the variety of forest species in Armenia, edible wild plants such as gooseberry, currant, raspberry, dewberry, hawthorn, dock sorrel and asparagus are of particular interest (annex).

A wide variety of fungi have been recorded in Armenia's forests. Altogether 314 varieties have been found in mixed forests and 266 in deciduous woodland.

The inhabitants of Armenia, prefer the common, high-calorie varieties (annex) such as: meadow mushroom (*Agaricus campestris*), *Agaricus silvaticus*, granulated boletus (*Suillus granulatus*), butter mushroom (*Suillus luteus*), milky agaric (*Lactarius deliciosus*) and chanterelle (*Cantarellus cibarius*).

Sea-buckthorn (*Hippophae rhamnoides*), widespread in Armenia but limited in range before the 1950s, is especially prized. It was introduced widely from the Altai region in the 1950s. Its range in Europe is limited (the Danube estuary and the Baltic coast). There are over 3 000 ha under sea-buckthorn in Armenia, roughly 2 500 of them fruiting. Harvests vary between 5 and 20 centners per hectare. With specially planted bushes and the use of agricultural technology, yields can be raised to 50-100 centners per hectare.

In the 1980s Armenia produced some 300 tonnes of sea-buckthorn fruit annually.

## The Value Of Sea-Buckthorn

Sea-buckthorn fruit contains large quantities of biologically active substances (medicinal oil, vitamin C, carotene, organic acids etc.), making it irreplaceable (see annex) as a raw material for the pharmaceutical and food industries — producing medicinal oil and alcohol-free beverages.

As a forest crop sea-buckthorn possesses many valuable economic traits. It is one of the best land-improvement species and most promising crops for the afforestation of dunes, embankments and ravines. Armenia has accumulated extensive experience in the cultivation and processing of sea-buckthorn, producing both oil and alcohol-free beverages. If any European partners should be interested, it is ready to establish industrial plantations and joint processing facilities in short order.

## Reserves and Prices

Reserves of basic non-wood forest products in Armenia have not been quantified. Expert assessments suggest the yearly volume of such reserves is between 5 000 and 10 000 tonnes.

Market prices for the principal edible and medicinal plants and fungi fluctuate in the range US\$ 1 to 4 per kilogram of produce.

## Annex

### Chemical Composition of the Fruits of the Sea-Buckthorn

(*Hippophae rhamnoides*)

Ripe fruits contain (as proportion of gross weight)

Moisture	81.4 percent
Total carbohydrates	2.57 percent

*of which:*

glucose	1.32 percent
fructose	0.71 percent
sucrose	0.07 percent
Pectins	0.79 percent
Tannins	0.13 percent
Fat	4.4 percent
Total carotenoids	4.5 mg

*of which:*

$\alpha$ -carotene	0.71 mg/100g
$\beta$ -carotene	0.91 mg/100g
Lycopersicin	1.35 mg/100g
Vitamin C	193. mg/100g
Vitamin E	2.9 mg/100g

Juice yield from pressing:	65-70 percent
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**Sea-buckthorn juice contains:**

Proteins	3. percent
Ash	0.5 percent
Organic acids	3.27 percent
Pectins	3.7 percent
Water-soluble carbohydrates	2.5 percent
Fat	0.2 percent
Carotenoids	2. mg/100g
Vitamin C	185. mg/100g

**Sea-buckthorn oil contains:**

B-group vitamins (B1, B2, B3)  
Vitamins of groups A, E, C, PP

**Trace elements:**

Potassium	14.4 mg eq/l
Calcium	13.5 mg eq/l
Magnesium	4.4 mg eq/l
Chlorine	140.7 mg eq/l
Phosphorus	40. mg/100

### List of edible fungi picked in Armenia

*Agaricus bisporus* - button mushroom  
*Agaricus campestris* - meadow mushroom  
*Agaricus silvaticus*  
*Pleurotis eryngii*  
*Pleurotus ostreatus* - cultivated tree oyster  
*Calocybe gambosa* - St. George's mushroom  
*Armillaria mellea* - honey agaric  
*Chantarellus cibarius* – chantarelle

Lactarius deliciosus – milky agaric  
Suillus lutens – butter mushroom/ slippery Jack  
Suillus granulatus – granulated boletus  
Lepista personata – field blewit  
Lepista nuda – wood blewit  
Macrolepiota procera – field parasol  
Macrolepiota excoriata

### Medicinal forests plants

*Rubus idaeus* - raspberry  
*Crataegus sp.* - hawthorn  
*Humulus lupulus* - hop  
*Urtica dioica* - nettle  
*Sambucus nigra* - elder  
*Tilia cordata* - lime, linden  
*Origanum vulgare* - oregano  
*Quercus sp.* - oak  
*Berberis vulgaris* - barberry  
*Arctium palladinii* - burdock  
*Juniperus oblonga* - juniper  
*Equisetum arvense* - field horsetail  
*Rubus caesius* - dewberry  
*Rosa canina* - dog-rose  
*Hippophae rhamnoides* - sea-buckthorn  
*Hypericum perforatum* - St. John's wort  
*Tussilago farfara* – foalfoot  
*Chelidonium majus* - celandine  
*Sorbus aucuparia* - service-tree  
*Fragaria vesca* - wild strawberry  
*Asparagus officinalis* - asparagus

### Edible forest plants

*Rumex crispus* – dock sorrel  
*Asparagus officinalis* – asparagus  
*Polygonatum glaberrimum* – Solomon's seal  
*Allium ursinum* (*A. victorialis*) – ramson  
*Mentha longifolia* – mint  
*Cornus mas* – Cornelian cherry  
*Rubus caesius* – dewberry  
*Crataegus sp.* - Hawthorn  
*Rubus idaeus* - raspberrrr  
*Ribes sp.* - currant  
*Grossularia reclinata* - gooseberry  
*Elaeagnus angustifolia* - oleaster  
*Prunus spinosa* - blackthorn  
*Pyrus sp.* - pear  
*Prunus divaricata* - cherry plum  
*Mespilus germanica* - medlar  
*Punica granatum* - pomegranate  
*Amygdalus communis* – almond  
*Hyppophae rhamnoides* - sea-buckthorn  
*Fagus orientalis* – beech  
*Juglans regia* – walnut

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# THE SITUATION OF NON-WOOD FOREST PRODUCTS IN MOROCCO

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## Summary

In Morocco, the forest domain covers about 9 million hectares and is quasi-totally state-owned. Beside the wood products, the Moroccan forests provide people with various non-wood products such as fruits (carob, argan, wild pear, pine-kernel, acorn, pods, jujube, wild-rose berry, mulberry, blackberry, almond, etc.), mushroom, honey (bee-keeping), cork (*Quercus suber*), alfalfa (*Stipa tenacissima*), lichen, resins, gums, oil (argan, almond), fragrances (thyme, jasmine, etc.), edible leaves, etc.

The Moroccan forest also provides millions of fodder units for the national livestock (which, in its turn, produces meat, milk, wool, skin, etc.), fish, bush meat, manure, mulch, humus.

It should be pointed out that, in Morocco, the collection from forests of cork, carobs, lichen, alfalfa, argan (*Argania spinosa*) and, sometimes, honey, is exploited at an industrial scale.

On the other hand, one should not forget that essential forest functions such as protection, erosion control, climate and water resources regulation, beautification of the landscape, healthy positive influence on man and animals, prolongation of dam life, etc. are also tremendous non-wood forest products.

This paper analyses the general situation of the non-wood products in Morocco and the major benefits local people are obtaining from them. Recommendations are made for a better development and promotion of NWFP, within the framework of sustainable forest management.

**Key words:** NWFP, Forest, Morocco, Maroc, Fuel, Fodder, Local Communities, Sustainability, Food, Nutrition, Medicine, Flavours, Tannins, Gums, Resins, Ecotourism, handicrafts, Cosmetics, Beekeeping, Dye stuffs, Household subsistence, Forest Inventory, Management, Cork, Alfalfa, Non-farm income.

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## Introduction

For tens of centuries, quite before the Pharaonic period, the Greek, Phoenician and Sabaeen civilisations, people have, throughout time and space, collected from forests and used different products of both plant and animal origin, and not only timber. Gum Arabic – a NWFP extracted from *Acacia Senegal* – for example, was used some 5 000 years ago (Davison, 1980). Pharaonic hieroglyphs mention it, under the appellation "kami"; it was used for wrapping mummies (Nair, 2000). Local communities, living in the vicinity of forests, have always recognised the forest ecosystem as a reservoir of valuable biological resources, indispensable for their food security/subsistence.

If foresters and other scientists have, very often, overlooked the importance of these non-timber products, today the gap is being bridged. NGOs, ethnobotanists, conservationists and many others are focussing their attention on these products, recently designated Non-Wood Forest Products (NWFP).

In this paper we analyse the concept of NWFP and examine the particular situation of these products in the Kingdom of Morocco. We will attempt to make recommendations aimed at validation of NWFP and making them part and parcel of any forest inventory and sustainable forest management.

## Morocco and its Forest Sector in a glimpse

Situated at the extreme northwestern part of the African continent, the Kingdom of Morocco has an estimated total area of 710,850 km<sup>2</sup>. Its climate is of Mediterranean type: very luminous around the year, with an irregular distribution of rainfall, concentrated during a fresh and humid season whereas the hot season is dry. Numerous plains lie along the Atlantic Ocean and the Mediterranean Sea coasts. In the inner lands, four main ranges of mountains break the monotony of the flat country: the Rif mountain in the North, the Medium Atlas in the centre north, the Higher Atlas in the centre, and the Anti-Atlas in the centre south. The altitude of these mountains is generally over 2000 meter and culminates at Jebel Toubkal, in the Higher Atlas, with an altitude of 4160 m.

The population was 26 millions in 1994, with a growth rate of 2.06% per annum. About 48.6% of the population is rural and about 45.25% are under 20 years of age. The average annual per capita GNP is US\$1180 (1995, market price).

The natural woody vegetation (forests and shrubs, with very variable stand density) covers an estimated area of 5 813 900 ha of which 30% are coniferous and 70% are broad-leaved (Ellatifi, M. 1983b). This total represents around 8% of the country's land area. The principal naturally occurring woody species (trees and shrubs) are the following: *Quercus ilex*, *Q. suber*, *Q. faginea*, *Argania spinosa*, *Acacia gummifera*, *Cedrus atlantica*, *Tetraclinis articulata*, *Juniperus thurifera*, *J. Oxycedrus*, *J. Phoenicea*, *Cupressus atlantica*, *Pinus halepensis*, *P. Pinaster var. moghrebiana*, *Abies pinsapo*, and other "secondary" species such as *Q. coccifera*, *Ceratonia siliqua*, *Olea europea var. oleaster*, *Pistacia atlantica*, *P. Lentiscus*, *P. terebinthus*, *Rhus pentaphylla*, *Phillyrea angustifolia*, *Zizyphus lotus*, *Acer monspessulanum*, *Taxus baccata*, *Buxus balearica*, *Sorbus torminalis*, *Arbutus unedo*, *Retama sphaerocarpa*, *Withania frutescens*, *Morus alba*, *Retama sphaerocarpa*, *Daphne laureola*, *Erica arborea*, *Buxus balearica*, *Cercis siliquastrum*, *Ilex aquifolium*, *Fraxinus xanthoxyloides*, *F. angustifolia*, *Celtis australis*, *Opuntia ficus indica*, etc.

Besides the woody natural vegetation, there is a state-owned area of about 3.16 million ha of Alfa-grass (*Stipa tenacissima*). Add also, a total area of about 530,000 ha of afforestation of which 46% are coniferous (mainly *Pinus sp.*), 41% are *Eucalyptus sp.* and the remaining 13% are other broad-leaved species (mainly *Acacia spp*) (Ellatifi, 1999).

## The Concept of NWFP

It was in 1995 at the meeting held in Yogyakarta, Indonesia (Chandrasekharan C., 1995) that FAO adopted the following definition of Non-Wood Forest Products (NWFP):

"NWFP consist of goods of biological origin other than wood, as well as services derived from forests and allied land uses" (FAO, 1995). Unfortunately, this definition is incomplete for it does not include other important non-wood forest aspects such the social, cultural, religious, ornamental, environmental, and protection functions of the forest. It should, then, be refined to fill in this gap.

On another hand, it should be pointed out that there is a significant difference between "Non-wood" forest products and "Non-timber" forest products. The latter term embodies products which are tree-derived but which do not necessitate felling trees (Simons A. S., 1996). The term "Non-wood" tends to exclude any sort of wood originating from forest trees, including fuelwood and poles. In Morocco, as it is the case in many other developing countries, fuelwood collection is a vital function the forest daily plays in the livelihood of rural communities. The Moroccan forest legislation recognises for local communities settled in the vicinity of the forest, the right to freely collect "dead" wood in the forest for domestic use as "fuel" for their cooking and heating needs. This "fuelwood" is then collected without tree felling, as are collected mushroom, fruits, nuts, etc. from forests. Consequently, for Morocco and similar countries – and in this paper – we will consider fuelwood as a NWFP.

## The Situation of NWFP in Morocco

In Morocco, in forested areas, Man, for centuries, has always been part and parcel of the forest ecosystem. Nowadays, everywhere, even in the most remote mountainous areas, one would encounter some villages (douars) where inhabitants are permanently settled in the vicinity of the forest stands. Sometimes, instead of villages, the settlers are nomads, temporarily established in goat-hair tents, with their herds freely grazing in the forest. These people are generally poor, and their daily subsistence, and that of their livestock, has always been, and continues to be dependent on the forest, particularly for a wide range of NWFP (Ellatifi M. 2000).

The major non-wood forest products people rely on, in Morocco, under the umbrella term "NWFP" are the following:

Food and nutrition, Fuel, Fodder, Cork, Medicine, Ecotourism, Tannins and Gums, Dye stuffs and Food colorants, Flavours, Resins, Cosmetics, Construction materials, Household furniture, Farm tools, Handicrafts, Bark, dry foliage, etc.

The other essential forest functions to be added to this list are protection, ornamental, social, religious, conservationist, cultural and tourist.

### **Food and nutrition**

In Morocco, this category of NWFP covers a wide range of items, including fruits, nuts, acorns, seeds, leaves, tubers, roots, mushrooms, sap, gum, tender shoots, palm hearts, honey, bush meat, fish, etc. Forest food provides essential vitamins (especially vitamin C), minerals, carbohydrates and proteins. It also adds variety and spice to the people's diet. Among the forest species involved in this category, we include: *Pyrus mamorensis*, *Juglans regia*, *Quercus suber*, *Pinus pinea*, *Argania spinosa*, *Olea europea*, *Zizyphus lotus*, *Chamaerops humilis*, *Artemisia herba alba*, *Arbutus unedo*, *Laurus nobilis*, *Ceratonia siliqua*, *Rosmarinus officinalis*, *Morus alba*, *Opuntia ficus indica*, *Asparagus angustifolius*, *Thymus sp.*, *Rubus ulmifolius*, *Rosa canina*, Almond-tree, *Mentha pulegium*, etc.

Fishing in rivers, reservoirs, lakes and lagoons is an important source of proteins and vitamins for people. It is controlled by the Forestry department.

Moroccan forests are also an important source of bush meat, from vertebrates (mammals, wildlife and grazing livestock), and invertebrates (snails). We estimate (Ellatifi, M. unpublished) that an average of 8 million head of livestock (Bovines: 750 000; Sheep: 3 450 000; Caprines: 3 800 000) graze in the forest during an average period of 5 months/year. This constitutes 22% of the national total and provides for 620 000 Fodder Units (FO) grazed annually in forests. A total of 67 300 tons of meat (Bovines + Sheep + Caprines), 40 million litres of cow milk and 21.7 million litres of sheep and goat milk is produced each year.

### **Fuel**

As discussed above, fuelwood is considered here as a NWFP. To estimate the magnitude of its consumption in Morocco, a national study was carried out by the Ministry of Agriculture (Forestry Department, Cellule d'Etudes et de Prospections, Casablanca), between 1988 and 1994 (Ellatifi, 1989, 1998, 1999, Ellatifi et al., 1998).

This study consisted in a stratified random sampling with exhaustive drawings (Ellatifi, M. 1991). It covered both rural and urban zones. The source population of households is 4 444 270, of which 56.7% are urban (Ministry of Planning, 1987) and 43.3% are rural. Given their limited total number, all the small socio-economic enterprises in rural zones were visited (exhaustive sampling). The source population of these enterprises in urban zone was 9,250.

In urban zones, the sampling was carried out with an error of 10% at 95% confidence-level. In rural zone the error was 15% at 95% confidence-level. For households' fuelwood consumption, two factors

were considered in the stratification process: (1) remoteness of the household from the nearest forest edge, and (2) altitude of the household. In this line, the following strata were identified (Ellatifi, 1999):

- Remoteness from the forest: 3 strata: inside forest; less than 10 km from forest; more than 10 km. from forest.
- Altitude: 4 strata: less than 500 m; between 500m and 1,000m; between 1,000m and 1,500m; and over 1,500m.

It is worth noting that the 1 924 586 rural households, in Morocco are geographically distributed as follows (Ellatifi et al., 1998, Ellatifi, 1999):

Regarding the household remoteness from the forest:

About 17% of the rural households are located inside forest,  
43% at less than 10 km. from forest edge,  
40% at more than 10 km. from forest edge.

On the other hand, regarding the altitude above sea level:

About 50% of the rural households are located at less than 500 m.,  
29% between 500 m. and 1,000 m.,  
14% between 1,000 m. and 1,500 m., and  
7% at more than 1,500 m.

Table 1 gives the detailed household distribution in space vis-à-vis altitude and remoteness from forest.

**Table 1. Distribution of studied sample of rural households, according to their altitude and their remoteness vis-à-vis the forest edge.**

Remoteness from forest	Altitude				TOTAL
	Below 500 m	From 500 m to 1000 m	From 1000 m to 1500 m	Over 1500 m	
Inside forest	5.75%	5.42%	4.26%	1.63%	17.06%
Outside forest, <10 km from forest edge	21.72%	12.37%	6.30%	2.70%	43.09%
Outside forest, >10 km from forest edge	22.50%	11.50%	3.05%	2.80%	39.85%
<b>TOTAL</b>	49.97%	29.29%	13.61%	7.13%	100%

Source: Ellatifi, 1999.

The Moroccan total biomass energy consumption is 18.3 million m<sup>3</sup> per annum, with an error of 13.25% at 95% significance-level, of which 91.6% are consumed by households and 8.4% by socio-economic establishments. Of this total, 88% are consumed in rural areas, while only 12% are consumed in urban areas (Ellatifi M. et al., 1998).

The consumption of forestry fuelwood reaches 9.6 million m<sup>3</sup> per annum, i.e. 52.4% of the total consumption. In the same time, the total forestry potential for fuelwood is estimated at 2.9 million m<sup>3</sup> per year, i.e. 18% of the consumption originating from the forests. In other terms, the annual deficit (forest consumption-forest potential offer) is 6.7 million m<sup>3</sup> per annum (Ellatifi M. and Elhimer, M. 1998).

The forest fuelwood consumption represents 18% of the total annual energy consumption in Morocco (9 727 517 TEP, in 1994). It is at the second rank, after fuel (53%), far before electricity (9%) and mineral charcoal (4%) (Ellatifi, M. et al., 1998, Ellatifi, M. 1998).

Fuelwood, as a NWFP in Morocco originates at national level from the following forest species (Table 2):

**Table 2: Distribution of the Moroccan fuelwood consumption among species**

Forest species	Consumption in Urban areas (% of Urban total)	Consumption in Rural areas (% of Rural total)	Total national Consumption (% of National total)
Eucalyptus spp.	43.03	15.12	19.59
Quercus suber	17.32	22.42	21.6
Other Quercus spp.(1)	5.46	8.46	7.98
Argania spinosa	1.14	5.23	4.57
Cedrus atlantica	6.5	3.27	3.8
Other coniferous species (2)	2.3	0.8	1.04
Other forest species(3)	24.25	44.7	41.42
<b>TOTAL (in million cubic metres)</b>	<b>1.5</b>	<b>8.1</b>	<b>9.6</b>

(1) *Quercus ilex*, *Q. faginea*, *Q. coccifera*

(2) *Pinus halepensis*, *P. pinaster* var. *moghrebiana*, *P. canariensis*, *P. brutia*, *Abies pinsapo*, *Cupressus atlantica*, *C. sempervirens*, *Juniperus thurifera*, *J. oxycedrus*, *J. phoenicea*, *Tetraclinis articulata*

(3) Different other trees and shrubs.

(Source: Ellatifi M., unpublished)

### **Fodder**

Besides the fodder provided to wildlife, the Moroccan Forest domain hosts annually an average of 8 million head of livestock during an average period time of 5 months, during which they graze around 620 million Forage Units (FO). One FO is equivalent to the energy provided by one kg Barley, or 1885 calories or 7.9 kJ. This volume corresponds to 25% of the annual needs of these livestock.

During a period of drought, the national livestock suffers heavy loss in number, but a study (Ellatifi M. unpublished) revealed that in the vicinity of forests the mortality is reduced by 2/3 compared to that in unforested areas. Forests, through NWFP – here fodder – relieve the hunger periods and save livestock. In Morocco, after a drought period, about 50% of the surviving animals are saved due to forest stands in which they grazed around 40% of their fodder needs per year (Ellatifi M., unpublished).

### **Cork**

Out of the 2 million hectares of cork-oak forests (*Quercus suber*), Morocco possesses 355 000 ha. This area places it at third in the world, behind Portugal and Spain. The largest single-block of cork-oak forest in the world in the Ma'mora, situated in Morocco, to the East of Rabat city.

Cork is an important NWFP obtained from the cork-oak bark. There is a male cork and a female cork with significantly different properties and uses. In Morocco, cork is harvested as a NWFP, locally, by nearby communities and industrially at the national level for export. The average national production is 4 million tonnes per year, 70% of which are male cork and 30% female cork.

### **Wildlife**

Another important NWFP in Morocco is wildlife, namely birds and mammals living in the vicinity of forests, permanently or temporarily during the year. Besides its varied and spicy meat, wildlife, if well managed, within the framework of an integrated and sustainable forest management, interacts very positively with the forest stands and their dynamics. For example, they act as seed conditioning and dispersal agents. This essential non-wood forest resource should be recorded in all forest inventories to be included in forest management. The involvement of local communities in wildlife management and monitoring is able to sustain people's nutrition, generate local income, preserve and develop bird and animal populations.

## **Medicine products**

In the tropics, mainly, but also everywhere else on the globe, forest ecosystems constitute rich reservoirs for medicine and pharmaceutical plants. These NWFP are traditionally exploited by nearby communities since the oldest times. These local communities are the repository of a tremendous knowledge they received from their ancestors and transmit to their descendants – unfortunately with some loss. The medical and pharmaceutical industry has already widely used these NWFP. There is much hope for curing many other diseases with yet undiscovered medicants still hanging in the canopies of the world's forests.

## **Ecotourism**

Ecotourism is another NWFP which can help local communities and the country improve their income. Big trees, large forest stands, nice sites, diversified topography and landscape, wildlife, etc., could be a big attraction for local, national and international visitors. But careful attention should be paid to the influence of tourists, it is a two-edged sword: without control and sound management, unruly tourism could harm the forest, the landscape, wildlife and even degrade the local knowledge, customs and traditions. That is why, instead of tourism, this NWFP is called *ecotourism*: a tourism which preserves the environment and the local communities culture and values.

## **Protection and Conservation functions**

These are two essential functions played by the forest. They are very difficult to count in monetary terms and are considered as NWFP. Forests protect human settlements, dams, roads, agricultural areas and other infrastructures from winds, moving sand dunes, hydraulic erosion, etc. They also mitigate excess temperature, regulate water delivery and help replenish underground water-tables.

Forests are also recognised as large and rich reservoirs where many valuable biological resources (animal, bird, insect, plant species) are conserved, some of which are rare or endangered.

## **Social, cultural and religious functions**

These are also NWFP which, very often, were neglected or overlooked by foresters and other scientists. Forests enable Man to renew with Nature, the world of plants and animals. They constitute an environment where human beings find relaxation, rest and stability; "stable existence in a stable environment". They are also a source of inspiration for Man. Don't we say "majestic like a cedar", "strong like an oak", etc.?

As is the case in many other parts of the world, in Morocco, one finds in certain areas, maraboutic woods/groves. These are limited stands of forest species (*Cupressus atlantica*, *Quercus ilex*, *Zizyphus lotus*, *Ficus retusa*, *Ceratonia siliqua*, etc.) that are respected by local communities and carefully monitored and maintained for the spiritual value they put in them. Very often they are situated in the vicinity of a graveyard and/or around a Holy site (Sidi Said, Sidi Ahmed, Moulay Bou'azza, etc.). Their harvest is generally forbidden. But at least in Morocco, these maraboutic woods are losing their ancestral spiritual roles.

Furthermore, in many cultures, associated with forests, trees and forest wildlife, are tales, fairy-tales, nursery-tales, anecdotes, songs, etc. which have amazed many generations of children.

## **Other NWFP**

Many other Non-Wood Forest Products are used at the local level by nearby communities, in cities, or at the industrial/international level. Among them we list the followings:

**Tannins and natural Gums:** used locally (leather, dyes, etc.) or in industry activities such as paper ink, textile, cosmetics, pharmaceuticals, antioxidants, soaps, lacquers, etc. In Morocco many species are sources of such NWFP: *Rhus spp.*, *Acacia mollissima*, *Acacia gummifera*, *Acacia cyanophylla*,

*Tetraclinis articulata*, *Eucalyptus sideroxylon*, *Juniperus sp.*, *Tamarix aphylla*, *Erica arborea*, etc.

**Handicrafts:** Baskets, silk-making from silkworms raised on leaves from mulberry (*Morus alba*), utensils, bags, sleeping mats, pillows, sponges, brooms, chairs, tables, weaved materials, etc.: *Chamaerops humilis*, *Juncus sp.* *Arrundo donax*, etc.

**Flavours and Aromates:** *Artemisia herba alba*, *Laurus nobilis*, *Thymus, sp.*, *Mentha pulegium*, *Myrtus communis*, *Rosmarinus officinalis*, *Lavandula stoechas*, *Juniperus, sp.*, *Pistacia terebinthus*, etc.

**Resins:** (*Pinus sp.*, *Cedrus atlantica*, *Juniperus sp.*), etc.

**Bark and dry foliage**

**Farm tools**

**Dye stuffs and food colorants**, etc.

## Conclusions / Recommendations

The Moroccan forest domain, as we have seen, produces not only timber, but also a profusion of rich and varied NWFP, at different levels. Some of these NWFP are countable in monetary terms, others not or very roughly. Unfortunately these crucial products are not yet estimated at their fair value; they remain neglected or overlooked by foresters and scientists. They often go unrecorded in official statistics. Nevertheless, better managed, they could help rural communities enhance their livelihood and meet their needs without disturbing the forest ecosystem.

One could never emphasise enough the fact that sustainable forest management can not be achieved without the full involvement of local rural communities living in the vicinity of the forest. These communities are part and parcel of the forest ecosystem and they have a treasure of traditional knowledge on forest species, plants, wildlife, traditional harvesting and use of NWFP. They play a pivotal role in the future of the forests, "their" forests. An African proverb says: "If many little people, in many little places, do many little things, they can change the face of earth".

To better preserve the Moroccan forests and bridge the sizeable gap in our outlook towards NWFP and local communities living in the vicinity of the forest, we recommend the following key actions:

- Incorporate NWFP into forest inventories and official statistics.
- Involve local communities in all plans and studies aiming at the achievement of a sustainable forest management.
- Document local knowledge and traditional technologies relate to NWFP.
- Develop ethnobotanical research.
- Develop confirmative research on the traditional medicine use of plants.
- Distribute more equitably the added value generated by the whole watershed in which forests grow.
- Involve NGOs and other concerned bodies in public-awareness campaigns tailored for target audiences and related to forests, NWFP and local communities.
- Promote traditional and income-generating activities to enhance the livelihood of local communities living near forests.

## References

- Chandrasekharan, C. 1994. *Non-wood forest products: a global view of potentials and challenges*. Paper for the international Seminar on Management of Minor Forest Products, Dehra-Dun, India, 13-15 November, 1994, FAO, Rome.
- Davison, R. L. 1980. *Handbook of water-soluble gums and resins*. McGraw Hill Book company, New York.
- Ellatifi, M. 1991. *The consumption of fire-wood in the Wilaya of Casablanca and its incidence on the Moroccan forest*. Casablanca, Morocco.
- Ellatifi, M. et alinea. 1998. *Etude de la consommation nationale de bois de feu au Maroc* (1994). Ministry of Agriculture, Rural Development and Maritime Fisheries (Forestry Department, Cellule d'Etudes et de Prospection, Casablanca), Morocco.

- Ellatifi, M. 1998. *Fuelwood Consumption: A Major Constraint for the Sustainable Management of the Forest Ecosystem in Developing Countries. The Example of Morocco*. In the Proceedings of Foresea Miyazaki 1998 International Symposium on Global Concerns for Forest Resources Utilization – Sustainable Use and Management-, Miyazaki, Japan.
- Ellatifi, M. 2000. *Rural communities as a corner-stone of sustainable forest management*. Paper presented in the XXI IUFRO World Congress, Kuala Lumpur, Malaysia, 7-12 August 2000.
- Ellatifi, M. unpublished. *Economy of forest and forest products in Morocco: Balance and Perspectives*. PhD dissertation in Economics.
- FAO, 1995. *Non-wood forest products for rural income and sustainable forestry*. Non-wood forest products 7, FAO, Rome.
- FAO, 1996. *Domestication and commercialisation of non-timber forest products in agroforestry systems*. Non-wood forest products 9, FAO, Rome.
- Ministry of Planning, 1987. *Enquete sur la consommation des menages, annees 1984-1985*. Aspects energetiques. Direction de la statistique, Rabat, Morocco.
- Nair, B. 2000. *Sustainable utilization of gum and resin by improved tapping technique in some species*. Paper for the Joint FAO/ECE/ILO Committee on Forest Technology, Management and Training's Seminar on "Harvesting of non-wood forest products", Menemen-İzmir, Turkey, 2-8 October 2000.
- Simmons.A.J. 1996. *ICRAF's strategy for domestication of non-wood tree products*, pp. 8-22. Non-wood forest products 9, FAO, Rome.

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## LA SITUATION DES PRODUITS FORESTIERS AUTRES QUE LE BOIS AU MAROC

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### RÉSUMÉ

Le domaine forestier marocain couvre environ 9 millions d'hectares et appartient en quasi totalité à l'État. Outre le bois, les forêts fournissent divers types de produits comme des fruits (caroube, argane, poire sauvage, pignons, glands, gousses, jujube, baies d'églantine, mûre, cassis, amande, etc.), des champignons, du miel, de l'écorce (*Qercus suber*), de l'alfa (*Stipa tenacissima*), des lichens, des résines, des gommes, des huiles (huile d'argane, huile d'amande), des essences pour parfum (thym, jasmin, etc.), des feuilles comestibles, etc.

Les forêts fournissent également des millions d'unités de fourrage pour le bétail (qui produit à son tour de la viande, du lait, de la laine, des peaux, etc.), des poissons (dans les rivières et les lacs), la viande du gibier chassé, du fumier, du paillis et de l'humus.

Il faut souligner qu'au Maroc la récolte de liège, de caroube, de lichen, d'alfa, d'argane (*Argania spinosa*) et, parfois, de miel se fait à l'échelle industrielle.

Par ailleurs, il ne faut pas oublier que les fonctions essentielles de la forêt comme son rôle de brise-vent, de fixation des dunes de sable, de lutte contre l'érosion, de protection contre les avalanches, de régulation du climat et des ressources en eau, le rôle esthétique pour le paysage, l'influence positive sur la santé des hommes et des animaux, la prolongation de la durée de vie des barrages, etc., sont également des produits forestiers d'une importance considérable.

Le document analyse la situation générale des produits forestiers autres que le bois au Maroc et les principaux avantages que les communautés locales en retirent.

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## НЕДРЕВЕСНЫЕ ЛЕСНЫЕ ТОВАРЫ В МАРОККО

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### РЕЗЮМЕ

В Марокко леса занимают примерно 9 миллионов гектар и почти полностью принадлежат государству. Помимо древесных материалов марокканские леса обеспечивают жителей другими различными недревесными лесными товарами, такими, как плоды (плоды рожкового дерева, плоды аргании, дикая груша, семена сосны, желуди, бобы, китайские финики, шелковица, ежевика, миндаль и т.д.), грибы, мед (пчеловодство), пробка (*Quercus suber*), люцерна (*Stipa tenacissima*), лишайник, смолы, камедь, масло (аргановое масло, миндальное масло), ароматические вещества (тимьян, жасмин и т.д.), съедобные листья и т.д.

Что касается недревесных лесных товаров, то марокканские леса также обеспечивают миллионы кормовых единиц для скота (который в свою очередь производит мясо, молоко, шерсть, кожу и т.д.), рыбу (в реках и лагунах), мясо диких животных, навоз, мульчу, гумус.

Следует указать, что в Марокко заготовки пробки, плодов рожкового дерева, лишайников, люцерны, плодов аргании (*Argania spinosa*) и иногда меда ведутся на промышленной основе.

С другой стороны, не следует забывать важную роль, которую играют леса в том, что касается защиты от ветра, фиксации песчаных дюн, защиты от водной эрозии, защиты от обвалов, регулирования климата и водных ресурсов, ландшафта, положительного влияния на человека и животных, увеличения продолжительности жизни плотин и т.д.

В настоящем докладе анализируется общее положение в области недревесных лесных товаров в Марокко, а также выгоды, получаемые населением в результате использования этих товаров.

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# EXPERIENCES OF THE NON-TIMBER FOREST PRODUCTS (NTFP) BASED ENTERPRISE DEVELOPMENT IN NEPAL

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## Abstract

Nepal is rich in biodiversity, having about 7000 species of higher plants with about 700 medicinal herbs including about 250 indigenous species. The estimates indicate that NTFPs worth up to US\$26.5 million are traded annually from Nepal. The Environment and Forest Enterprise Activity (EFEA) is one of the forestry projects that supports the rural community in NTFP-based small enterprise development in a region of Nepal from where the annual trade of NTFPs is worth US\$4.08 million. Among many, the prioritised NTFPs for enterprise development are *Nardostachys grandiflora* D.C., *Valeriana jatamansi* Jones, *Picrorhiza scrophulariflora* Pennell, *Swertia chiraita* (Roxb. Ex Flem, Karst), *Morchella conica*, *Zanthoxylum armatum* D.C., *Cinnamomum tamala* (Buch.-Ham), *Sapindus mukorossi* Gaertn, *Delphinium himalayai* Munz., *Eulaliopsis binata*, and *Shorea robusta*. Some of the lessons learned are: the rural people, particularly women, have a great potential for organising themselves for income generating activities such as rope making from *Eulaliopsis binata* and plate making from the leaves of *Shorea robusta*; the local community plays vital role in the conservation of wild species once they are aware of their importance; and resourceful remote areas having high value NTFPs can do value addition for better income and improved livelihood with initial technical support.

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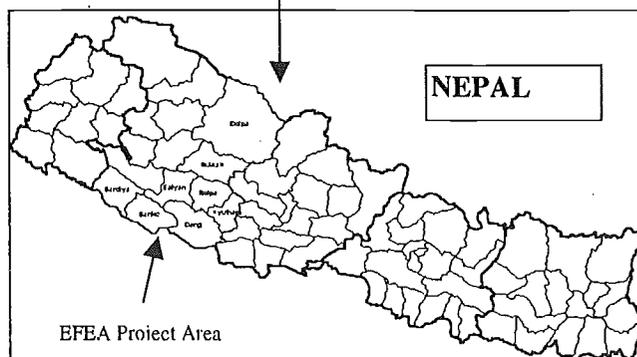
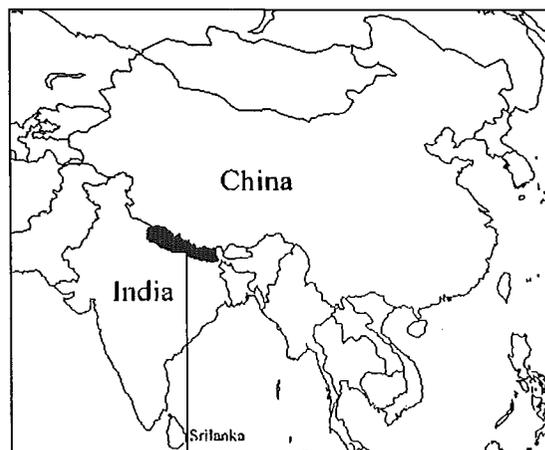
## Background

Although the Himalayan Kingdom of Nepal is a small country, with an area of 147 181 square kilometres and 18 491 097 inhabitants (1991 census), it has unique geography. The altitudinal variation in a span of only 193 km mean width (north to south) is from 305 meters to 8848 meters above mean sea level (amsl). This uniqueness has made Nepal a land of rich bio-diversity that hosts a wide range of non-timber forest products (NTFPs). The NTFP trade has been a traditional practice in Nepal and the rural people of the hill and mountain regions have been involved in the collection and sales of NTFPs since time immemorial.

There are several factors threatening the survival of some species and reducing the quality of many NTFPs, such as unsustainable harvesting, population pressure, increasing and expanding markets and cash needs.

Nepal has a natural gift of over 7000 species of higher plants out of which there are over 700 species of medicinal herbs and about 250 species are endemic to the country (NTFP workshop proceeding, 1999).

The estimated value of the annual harvest and trade of commercial NTFPs from forests and pastures of Nepal to India is US\$26.5 million (NTFP Workshop Proceedings 1999).



There are different projects being implemented in different parts of Nepal. One of these, the Environment and Forest Enterprise Activity (EFEA), is involved in developing the NTFP-based enterprises while giving equal importance to the conservation aspect. The discussions in this paper are based on the work experiences of EFEA.

## The Environment and Forest Enterprise Activity (EFEA) Project

This project is funded by USAID/N and implemented by His Majesty's Government of Nepal (HMG/N) in eight districts (Dang, Salyan, Pyuthan, Rukum, Rolpa, Dolpa, Banke and Bardia) of the Mid-Western Development Region. The goal of EFEA is to increase rural household income through sustainable forest management and forest-based enterprises. The Forest-based Micro-enterprise Development (FBMED) component of EFEA is called "Ban Udyam" (BU) in Nepali and technical assistance is provided jointly by the Biodiversity Support Program (BSP) of Washington DC, USA, and New ERA, Nepal. FBMED is concerned with NTFPs only. The area under EFEA-Ban Udyam covers all three ecological regions having different altitudes (the terai, including the Siwaliks at <600 meters, the mid-hills at 600-2000 meters, and the high mountains at 2000-4500 meters).

Ban Udyam's twin goals are enhanced livelihoods and improved forest management.

Ban Udyam accomplishes its goals in two ways:

- directly, by supporting NTFPs based forest enterprises; and
- indirectly, by providing training, technical assistance and extension information to EFEA partners (HMG/N, local NGOs and INGOs).

The contribution of this project area to the national trade of NTFPs is quite considerable, US\$4.08 million (EFEA annual report 1997/98). There are many NTFPs found in this area.

Two studies have been conducted by Ban Udyam to identify the potential NTFPs in the EFEA area, based on which NTFPs based enterprises could be developed. These studies are "Forest Products Market/Enterprise Options Study in EFEA Area 1997" and "Situation Analysis in Banke and Bardia districts of EFEA Area, 1998". The studies identified the following NTFPs having potential for enterprise development.

### NTFPs of EFEA Area with Potential for Enterprise Development

S.N.	Local Name	Scientific Name
1	Jatamansi	<i>Nardostachys grandiflora</i> D.C.
2	Sugandhawal	<i>Valeriana jatamansi</i> jones
3	Kutki	<i>Picrorhiza scrophulariflora</i> Pennell
4	Chiraito	<i>Swertia chiraita</i> (Roxb. Ex Flem, Karst)
5	Guchichyau	<i>Morchella conica</i>
6	Timur	<i>Zanthoxylum armatum</i> D.C.
7	Dalchini	<i>Cinnamomum tamala</i> (Buch.-Ham)
8	Rittha	<i>Sapindus mukorossi</i> Gaertn.
9	Atis	<i>Delphinium himalayai</i> Munz.
10	Pipla	<i>Piper longum</i> Linn.
11	Bet	<i>Calamus tenuis</i>
12	Shikakai	<i>Acacia concinna</i> (Wild) D.C.
13	Neem	<i>Azadirachta indica</i> A. Juss.
14	Amala	<i>Phyllanthus emblica</i> L.
15	Barro	<i>Terminalia bellirica</i> (Gaertn.) Roxb.
16	Harro	<i>Terminalia chebula</i> Retz.
17	Tendu	<i>Diospyros tomentosa</i> Roxb.

S.N.	Local Name	Scientific Name
18	Satawari	<i>Asparagus racemosus</i> Wild.
19	Sabai Grass	<i>Eulaliopsis binata</i>
20	Sal leaves	<i>Shorea robusta</i>

Out of this list of potential NTFPs, the following nine species were identified as having the most potential:

1. Jatamansi *Nardostachys grandiflora* D.C.
2. Sugandhawal *Valeriana jatamansi* Jones
3. Kutki *Picrorhiza scrophulariflora* Pennell
4. Chiraito *Swertia chiraita* (Roxb. Ex Flem, Karst)
5. Guchichyau *Morchella conica*
6. Timur *Zanthoxylum armatum* D.C.
7. Dalchini *Cinnamomum tamala* (Buch.-Ham)
8. Rittha *Sapindus mukorossi* Gaertn.
9. Atis *Delphinium himalayai* Munz.

In addition to these potential NTFPs, the Sabai grass (*Eulaliopsis binata*) and sal (*Shorea robusta*) leaves were also identified during the community forest users group (CFUG) workshop as potential items for small scale enterprises.

## Lessons Learned

*NTFP-based enterprise development is a feasible as well as a desirable strategy for increasing rural incomes from community forestry. In order to have NTFP-based enterprise development, sustainable community forest management incorporating the conservation and commercial utilization of potential products (NTFPs) is necessary as a pre-condition.*

Some of the lessons learned during the last four years of work (1996/97 – 1999/2000) are as follows:

1. Small Scale Enterprise Based on Sabai grass (*Eulaliopsis binata*)

*The potential of the self-organizing strength of rural women can be enhanced with an awareness program and preliminary technical support for their confidence building.*

This grass is found in its wild form in the forests of the terai and mid-hills. The most important use of this grass is to make ropes for domestic purposes. In the rural areas where thatch houses are predominant, this rope is extensively used in tying roofs, walls, and fences, as well as in making cots and bullock carts. In the EFEA-Ban Udyam project area this practice is very common, particularly with Tharu (an indigenous ethnic and disadvantaged group of Nepal) community, which constitutes a considerably high proportion of households in the project area, particularly in Dang, Banke and Bardia districts.

The traditional practice of making ropes from this grass is by hand, which takes a lot of time and is hard on the hands. Realising this fact, a group of twelve Tharu women is supported by the project to make ropes by a small, manually operated machine which costs less than US \$70. The maintenance of this machine is simple and the local women can do it by themselves. This women's group is running this activity as a small-scale enterprise in their village. The following benefits have been realised by the community people:

- Gainful utilisation of the NTFPs from their community forests (CFs)
- Opportunity for employment generation in the form of grass collection, rope making and marketing
- Women's empowerment for income generation, decision making and marketing
- Time saving for other domestic work and also workers' hands are not hurt
- Better quality of rope obtained as compared to hand-made rope
- Income generation: On average, 20 kg of rope is produced in a day (one woman working for eight hours). So the gross income = 20 kg x Rs14/kg = Rs280 = US\$4 approximately. The average cost of production is estimated as Rs6.50/kg x 20 kg = Rs130 = US\$2 approx. The amount in monetary value may look insignificant, but it is quite good when compared to other available opportunities (wage labour) where one woman can earn only Rs50-60 (less than a dollar) a day. This shows that there is up to one hundred percent more earning power from this small, locally established, community oriented and NTFP-based enterprise.

## 2. Small Scale Enterprise Based on Sal (*Shorea robusta*) Leaves

*Communities have potential to organize themselves for managing and utilizing their resources; they only need exposure and initial technical support. There is opportunity for the development worker to enrich forest management for economically viable NTFPs (even minor products such as sal leaves) while working with such groups to foster long-term objectives that meet self-defined progress and long-term bio-diversity conservation goals.*

Nepalese forests of the tropical and sub-tropical belts have high quality *Shorea robusta*. A total of 233 698 hectares of this type of forest are handed over to the community as community forests where the community manages the forests and benefits from them. It is obvious that there will be ample amount of Sal leaves in these forests. There is a very high potential for making different types of plates from these leaves. The Nepalese commonly use these leaf plates on different occasions such as marriage parties (mostly in the rural areas), and rituals, worship ceremonies and festivals in both rural and urban areas. Some fast food service providers in the urban areas also use these plates. Presently most of these plates come to Nepal from India, at least in the bordering towns. (The Kantipur daily, July 18, 2000, reports that leaf plates worth about US\$25,000 are imported annually to Nepalgunj from India) In the hills and mountains the people make them by hand as per their family requirements.

Since the raw material for this product is locally available in ample quantity, rural labour is only partially employed and capital requirement is also quite small, its production by manually operated machine was realised as an important intervention. Therefore, the EFEA-Ban Udyam project is supporting a women's group in producing and marketing the manually operated, machine-made leaf plates for rural income generation. Various benefits realised by the community people through this small-scale enterprise are:

- Capacity building of the community people in organising themselves;
- Use of their unutilised, locally available natural resources/NTFP;
- Help in supporting the safe environment through use of these disposable and degradable plates in place of non-degradable items;
- Women's empowerment;
- Helping the nation to reduce the importation of leaf plates;
- Employment opportunities in the form of leaf collection, Lafa preparation (loosely sewing the leaves together to make a particular size) and marketing;
- Income generation: Leaf plates of different shapes and sizes are produced by the manually operated machines as the market demands. Presently, three types of plates (small and medium size, used for snacks and big ones used for dinner/lunch) are being made by this women's group. On average, it is estimated that the women's group is receiving a benefit of approximately 50% over their production cost. The maximum margin is obtained in the case of medium type of plates (Tapari) where the net income is higher than the average of all three types of plates together.

### 3. Establishment of Distillation Plant for Aromatic Herbs in Dolpa (high mountain area)

*Many high value NTFPs are naturally growing in the high altitudes of Nepal, but their sustainable commercial exploitation for the betterment of the local people is a recent realization although they have been utilized there for a long time.*

The district of Dolpa is rich in medicinal and aromatic plants and people of this remote area have been collecting and selling various high-value NTFPs from natural resources. Most of these NTFPs are being exported in their raw form to other countries where they are processed for better market value. This fact initiated a need for the semi-processing/processing of these raw materials before export so that transportation costs are reduced and a higher margin of profit is retained in the local area.

Among the many types of NTFPs of this area, two (*Nardostachys grandiflora* D.C. and *Valeriana jatamansi* jones) were prioritised for the extraction of their aromatic oils. The priority was based on the following criteria:

- Present collection and sale: Both of them had been collected and sold for years by the local people.
- Collection volume: A considerably high volume of *Nardostachys grandiflora* D.C. (about 60 metric tons) is collected and sold each year in this area (Forest Product Market/Enterprise Option Study, 1997).
- Policy/regulations: As per national policy, raw Jatamansi cannot be exported; hence, the extraction of aromatic oil from it is a potential aspect for value addition.
- Availability of technology: The technology for this oil extraction is available.
- Market for product (oil): There is market for oil from both Jatamansi and Sugandhawal.

This enterprise in the remote area of Dolpo is expected to have following impact:

- Generation of employment opportunities: This enterprise is creating employment through the involvement of the local people in the collection, processing and marketing of NTFPs and their products. In addition, the local people will also be able to collect and sell products to be used as fuel needed during the extraction process.
- Sustainable use of natural resources: Through this project, emphasis is given to create awareness among the local people/traders about the sustainable utilisation of NTFPs. Various training/orientation activities are making the people aware of the importance of regeneration, proper time of harvest, appropriate harvesting practices and sustainable harvest, etc. This helps in bio-biodiversity conservation through sustainable utilisation, conservation and community monitoring.
- Rural income generation: This has provided an opportunity for rural people to create additional income through the marketing of processed products.
- Community benefits: Since local community groups such as the community forest user groups (CFUGs) are the major shareholders of the oil extraction company, the benefits will also be shared accordingly. In this way, the poorer section of society and disadvantaged groups will also have equal opportunity to receive the proportionate benefits. Local individuals are also given the opportunity to buy shares.

### 4. Conservation of Natural Species, Pipala (*Piper longum*)

*Even with very little intervention, an early recognizable income-based conservation approach is workable with communities, and this could be an entry point to foster long-term sustainable forest-based economic development.*

There has been a hand over of the national forest to the community people for community management and use. The CFUG program was started in late seventies, and the latest available statistics show that 9061 CFUGs have been formed in the last two decades. A total of 657 864 hectares of

forestland have been handed over to 9061 CFUGs having 1 008 237 beneficiary households. These forests are managed by the users as per the operational plan approved by HMG/N. For management purposes, cleaning, weeding, pruning, and thinning, etc., are common practices adopted by the CFUGs.

In the EFEA-Ban Udyam project area an interesting observation was made. During the cleaning process, the CFUG members would cut and throw the natural *Piper longum* plants (vines). The users did not know about the plant. They did not realise its important use as a medicine or as a food plant, nor did they realise its market value. Bio-diversity conservation being one of the objectives, the EFEA-Ban Udyam project started an awareness program on the use, protection and conservation of this species in community forests (CFs). The first program was started in Sishwara CF in Bardia district in 1998. Since realising the importance of this natural, high-value plant, forest users in this particular CF have created a pipala plot of 0.5 hectares inside a 45-hectare community forest. From this small area, they have been able to harvest 145 kg of pipala fruits worth NRs20,000 (local price) = US\$275. The total value is not as important as the realisation of its importance and the conservation of this wild species.

## Conclusions

Some of the major points to be mentioned in conclusion are:

- There has been enhanced awareness in the communities on the sustainable utilisation and conservation of natural resources for future generations.
- There is ample scope for the value addition of some of the major NTFPs that are currently exported in their raw forms.
- Local communities of remote areas have shown great potential in self-organising for forest based income generating activities.
- The empowerment of rural people, particularly women of indigenous ethnic groups, in income generation and decision making is visible.
- Better forest management for biodiversity conservation, forest product increments for domestic use and enhanced production of high-value NTFPs is realised.

## References

- Annual Progress Reports, 1997/98 and 1998/99. *Environment and forest Enterprise Activity (EFEA)*, Tulsipur, Nepal.
- Forest Product Market/Enterprise Options Study, 1997. BSP/New ERA, Kathmandu, Nepal.**
- FUG Database Record, April 03, 2000. MIS, Department of Forests, Kathmandu, Nepal.
- Kantipur (daily newspaper) July 18, 2000. Kathmandu, Nepal.
- Medicinal Plants of Nepal for Ayurvedic Drugs, 1995. Natural Products Development Division, Department of Plant Resources, Kathmandu, Nepal.
- Nepal and the World, a Statistical Profile, 1997. FNCCI, Kathmandu, Nepal.
- Outreach Publication, 1999-2000. EFEA-Ban Udyam, Tulsipur, Nepal.
- Rawal, R.B. and Ashok Poudyal, 2000. *Experiences of Ban Udyam in the Development of NTFP-Based Enterprises*, Nepalgunj, Nepal.
- Situation Analysis of Banke and Bardia Districts, 1999. *A Forest Enterprise Development Perspective*, BSP/New ERA, Kathmandu, Nepal.
- Subedi, Ram Hari, 1999. Problems, *Constraints and Opportunities to Sustainable Production and Collection and Trade of NTFPs in the Mid-Western Development Region of Nepal*, in the workshop proceedings on Non-Timber Forest Products: Production Collection and Trade in the Mid-Western Development Region of Nepal, Nepalgunj, Nepal.
- Workshop Proceedings, *Non-Timber Forest Products: Production, Collection and Trade in the Mid-Western Development Region of Nepal*, 1999. EFEA-Ban Udyam Project, Tulsipur, Nepal.

# **POLICIES TO PROMOTE SUSTAINABLE FOREST OPERATIONS AND UTILISATION OF NON-WOOD FORETS PRODUCTS**

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## **Summary**

*(No translation in French & Russian available)*

Turkey, lying between about 42 N and 36 N latitudes, is the only country in the world having three different climates, namely, Mediterranean, continental and oceanic. The land mass of Turkey lies between sea level and over 5500 m in altitude.

Due to different climatic and geographic conditions in Turkey, many trees, shrubs, herbaceous plant species naturally grow in the country. The non-wood products derived from those plants are generally exported as raw or semi-raw materials while some of the products are consumed in domestic markets as medicine, culinary and aromatic substances and usually the chemical substances extracted from those products are imported for medicine and chemistry sectors in Turkey.

Turkish Constitution and Forest Law have the provisions about the improvement life standards of forest villagers through employment in the forestry activities.

Some essential non-wood products found in Turkey, are resin, resinous wood, storax of *Liquidambar orientalis*, leaves of *Laurus nobilis* L, *Eucalyptus* spp, *Thymus* spp, etc, fruits of *Quercus ithaburensis* Decne, *Rhus* L., *Cerasus mahaleb* L, *Pistacia terebintus* L, *Pinus pinea* L etc, bark of *Pinus brutia* Ten, *Betulus* spp, corms of *Galanthus* and others bulbus plants, oak gull, mushrooms, wildlife, fodder, honey.

**Keywords:** Medical, aromatic plants, non-wood production, mushrooms, bulbs, breeding.

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## **Introduction**

Balsamic substances derived from roots and stems of trees, shrubs and herbaceous plants and leaves, flowers, seeds, roots and corms. Those plants grown in pastures, forests and gaps in forests and from which the provided substances of non-wood forest products used in medicine, pharmacy and cosmetics, perfumery and food industries.

The flora of Turkey is well documented in the 10-volume work of late Prof. P. H. Davis from the University of Edinburg. According to this monumental work and several subsequent publications: The flora of Turkey contains over 10 423 native infrageneric taxa, of which 34.2% are endemic. If the alien and cultivated taxa are included, the number of taxa occurring in Turkey rises to 10 660. The rate of endemism among the 8709 species is 32%. The flora of Turkey thus contains over 3500 endemic taxa which is quite a high rate.

In Turkey non-wood forest products provided from 20.7 million ha forest area, non cultivated agricultural area and other natural resources are mainly as follows:

Aromatic plants	Fodder	plants	Wildlife
Bay leaves	Food plants	Pine Nut	Other
Colourant / Dye plants	Honey	Resin	
Eteric oil plants	Medical plants	Storax / Incense	
	Ornamental	Tannin	

## **Wild Food Plants**

Seasonal vegetables and fruits derived from wild plants are sold in markets or by street vendors in cities and towns in Anatolia. In villages, peasants collect wild plants for their personal or home consumption, and any surplus finds its way to city markets. There is no well-established distribution channel for wild food plants in Turkey.

## **Wild Medicinal Plants**

A recent study of wild medicinal plants identifies 346 taxa of commercially traded wild native plants both internally and through export (Ozahatay et al 1997)

The principle markets for medicinal plants within Turkey are bazaars, market stalls and herbalists ('Aktar'), and pharmaceutical companies purchasing raw materials to process them into drugs. Based on a study of 96 aktars in 40 towns and cities, 179 taxa are sold through aktar shops (Baser et al, 1996). However, it is likely that this underestimates the range of the species traded, given the fact that Istanbul alone has 400 aktar shops. Due to the wide-ranging nature of collection and marketing, it is extremely difficult to estimate the quantities of each species traded.

## **Aromatic Plants**

Turkey is rich in aromatic plants. It is estimated that a third of the flora of Turkey consists of aromatic plants. Aromatic, here, means fragrant, flavouring or containing essential oil.

## **Dye Plants**

Dying carpets, kilims, garments and other materials such as Easter eggs with dye plants has been practised in Anatolia for 6000 years. Dyeing with wild plants is still practised in several parts of Turkey, and such carpets and kilims are highly regarded (Enes 1987).

## **Bulbous Plants**

The main geophytes that are collected from the wild or cultivated in situ for export are described by Ekim et al. 1991. The 'Red Data Book' of Turkey published in 1989 includes mainly the geophytes (Ekim et al. 1989). An important book on the bulbous plants of Turkey was published in 1984 (Baytop and Mathew 1984). Bulbous plants have cultural importance and they increase the quality of landscape, they are also very important in medicine and cosmetic industries. Recently these bulbs are exported to different countries for ornamental purposes.

## **Mushrooms**

Wild mushrooms are among the most widely used wild food plants in Turkey, Although the fungal flora of Turkey has not been fully documented, a recent estimate puts the number of mushroom species at 5000 with at least ca. 2000 being edible (Baytop 1994, Öder 1990).

Some of them are not able to be cultivated such as *Morchella* spp., *Boletus edulis*, *Cantharellus cibarius*, *Lactarius songuifluus* and *Amanita coesdria*. Some such as shiitake mushrooms that have significant importance can be cultivated. Waste materials used to produce saprophytic mushrooms are very profitable in the villages.

## Honey

Honey production is very important for domestic consumption and export. "Anzer Honey", for example, is very valuable and made by the bees from *thymus* sp around Artvin and Erzurum Regions. Also "pine honey" or honeydew is obtained by worker bees at the end of the *Marchallina hellenica* Genn secretion. This locally produced honey is called "Basıra" in Turkey. Pine Honey production is about 7500 (3500-12000) tonnes at Fethiye and Marmaris (Muđla region) (Yılmaz 1991 unpublished).

## Other Useful NWFP

Several other wild plants are used for various purposes such as insecticides, rodenticides, molluscicides, detergents, or in making musical instruments, furniture, boxes or chests, cigarette holders, beads, necklaces, etc.

## Fodder

Forest fodder resources represent a valuable free resource for forest communities. While the precise number of animals grazed on forest land is unknown, according to the Seventh Five Year Development Plan Special Expert's Commission, the number of animals existing in forest villages and considered to be generally grazed in forest areas are: cattle – 5.6 million; sheep – 10.7 million; goats – 11.8 million; and horses – 1.6 million.

MOF is responsible for the management of an estimated 1.5 million ha of Alpine Meadow (grazing lands) existing within forest areas and yielding about one million tonnes of fodder.

Around 2.3 million tonnes of fodder are annually obtained from forest pastures and range lands of 5.8 million ha (FSR Draft Report 1998)

## Wildlife

Turkey's rich fauna comprises 452 birds, 120 mammals, 130 reptiles and 345 fish species. A total of 119 wildlife reserves covering over 1.8 million ha have been established since 1966 (14 of these are located in wetlands). These areas are reserved to protect game and wild animals threatened by habitat loss and degradation and over hunting. There are also 40 wildlife breeding stations where wild animals under threat are bred. Populations from breeding stations are released to 32 wildlife placement areas.

Within forest areas there are 52 000 ha of rivers, natural and dammed lakes, and 20 fish production and breeding stations.

Freshwater fishing is undertaken in 69 lakes and ponds in the forest areas. Freshwater fish production in 1996 was around 37 500 tonnes.

Game hunting is a traditional activity in Turkey. Species taken include game birds and rabbits associated with steppe, arable and forest ecosystems; migratory waterfowl associated with wetlands; and several large game species occurring primarily in forest lands (e.g., bear, wolf, wild pig and ibex). Especially fox is hunted for fur and rabbit for fur and meat. About 20 000 pieces of animal fur or leather are sold per year.

Over 40 forest tree species naturally grow in forest ecosystems. Many endemic tree species are found in The Taurus Mountains (North of Adana) and in the Ide Mountains (South of Çanakkale).

The MOF (Ministry of Forestry) has established 2.5 million ha of protected areas. In addition 27 000 ha of natural forest area are reserved to conserve biological and genetic diversity at two different sites.

## Present Legislation

Turkish Constitution and Forest Law have provisions about the improvement of life standards of forest villagers. Article 170, for example, necessitates measures to improve living conditions of forest villagers through various means.

Forests are managed with the principles set by management plans, their protection, multifunctional use and development are carried out through these plans (Article 26). Harvesting also should be done under the management plans by forest enterprises or contracted out to third parties according to Article 40.

The permission for the collection of all kinds of NWFP and harvest remains are given to forest villagers, these products are only subject to tariff prices. Article 37 reads as: "Other all kind of forest products and remains which is harvested and transported from state forests are included in annual production program, as well as stick, resin, resinous wood, boxwood, storax, are allowed to be collected and transported in determined locations and periods, by being noticed and provided with the payment of tariff prices, giving priority to forest villages development cooperatives or to neighbouring villagers or workers at the production site as stated in Article 40"

According to the Forest Law forest villagers have priority in working or employment. Article 40 reads as: "The forest administration gives the working priority to forest villagers development cooperatives and the local forest villagers living especially in or at the vicinity of forest working place, taking the distance and manpower into account, and without considering the boundaries and forest site of the working place, in state forestry activities such as reforestation, forest maintenance, rehabilitation, road construction, cutting, collection, transport and production ".

The Forest Law (articles 37 and 40) allows GDF to regulate and control the protection of native wild plant species in the state lands, through the system of licensing.

Hunting is regulated in the Hunting Law; according to the Hunting Law; hunting without permission of the forestry organization is banned in forest land. Forestry Organization is in charge of management of hunting activities. Game animals could be hunted during all seasons, or hunted during certain periods or fully prohibited.

The Central Hunting Commission is the decision-making authority for hunting issues. It is established under the chairmanship of the Ministry of Forestry and composed of General Director of National Parks and Wild Life-Hunting, representative of General Directorate of Protection and Control, and two representatives from Hunting Associations.

Central Hunting Commission determines, among others, hunting periods, animal species that can be hunted during all seasons, animal species that can be hunted during certain periods, animal species that their hunting is fully prohibited, hunting types and prohibited hunting areas.

## Other Legal Arrangements

Both national and international regulations guide the management of, and afford some protection to NWFP.

1. The Regulation on Harvesting and Selling Principles of NWFP (1995);
2. The Regulation on Giving Permission of Getting Benefit from Forest Products;
3. Regulation of Collection, Production and Export of Natural Flower Bulbs (1989).

Also, Turkey is a signatory to a number of international conventions and commitments related to the environment including:

1. The International Convention on Protection of Birds (1966);

2. The Convention for the Protection of the Mediterranean Sea against Pollution (1980);
3. Treaty on the Conservation of the World Cultural and Natural Heritage (approved 1983);
4. The Bern Convention on the Conservation of European Wildlife and Natural Habitats (approved 1984);
5. Protocol on Specially Protected Areas in the Mediterranean/Geneva Protocol (approved 1986);
6. First Ministerial Conference on the Protection of Forests in Europe (Strasbourg 1991);
7. Agenda 21 (Rio 1992);
8. Rio Declaration on Environment and Development (Rio 1992);
9. Second Ministerial Conference on the Protection of European Forests (Helsinki 1993 )
10. Convention on Internationally Important Wetlands as the Living Environment for Water Birds/RAMSAR Convention (1994);
11. CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) (approved 1996);
12. Biodiversity Convention (approved 1997); and
13. The EU Council Directive 92/43 EEC, 1992, on the Conservation of Natural Habitats and Wild Fauna and Flora regulates trade between Member States. Five listed medicinal plants occur in Turkey;
14. Third Ministerial Conference on the Protection of European Forests (Lisbon 1998).

## Production Activities

The General Directorate of Forestry (GDF) is responsible for the management of NWFP in the forest areas. There are two production schemes, programmed and non-programmed.

Some important NWFP (e.g. resin, bayleaves, liquidambar oil (storax) are regulated by GDF under annual production programs through management plans. These programs are prepared according to the targets set in the Five-Year Development Plans. Local forest co-operatives and villagers are typically employed by GDF to harvest these products.

The other type is the production of those not taken into the annual production program. The production is executed in accordance with available management plans. If there is not a management plan, an annual or periodical production plan is prepared through inventories of every woody, herbaceous and tuberous plant in the area.

The production plans contain; production area, amount of yield and productivity, harvesting time, harvesting techniques, production periods, drying and storage systems, the base of biological special features and ecological conditions. The aim of these plans is sustainable use of non-wood products.

The periods of plans change according to the characteristics of species and ecological conditions for example, for *rosmarinus officinalis*, *ceratonia ciliciqua* and *thymus* spp the period is two years, for *laurus nobilis* it is three.

Five-Year Development Plans of Turkey requests the inventory of NWFP to uncover the potentials of some products, drawing attention also to the trend of demand in domestic and foreign markets. However, inventories have only been completed for 38 plant species in 24 regional directorates.

Collection, utilisation and marketing rights for some NWFP (e.g., pine nut, chestnut, acorn, thyme, herb tea, snow drop, prunes, natural mushrooms and various bulbs plants) are given to local villagers by GDF at modest tariff prices. The production of NWFP is given in Annex I.

Most of the NWFP are produced for export purposes. Uses of NWFP are not found enough in domestic market, but we witness a considerable increase in domestic demand lately.

The current economic value of NWFP, based on available sources of information, has been under estimated (\$102 million in 1996 and about \$87 million in 1997).

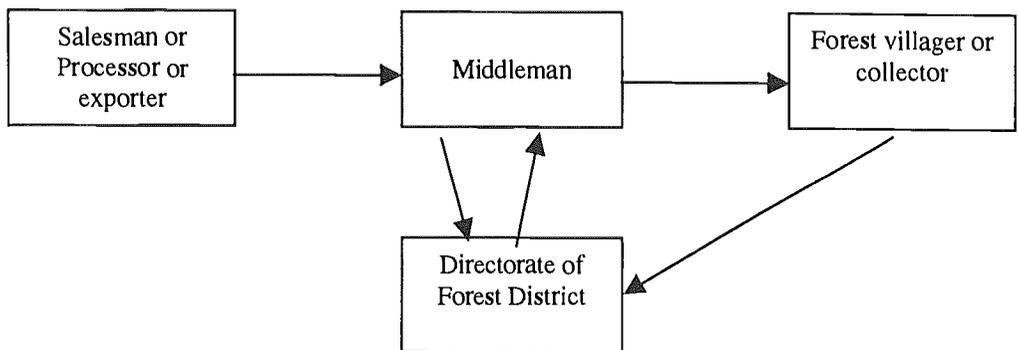
According to estimates, GDF has 3% share in total NWFP revenue and the share of villagers amounts to 30% while the collectors, middleman and exporters get 67% (ISS). These figures suggest that GDF and forest villagers get a very small portion of the gross income from the NWFP.

Many of Turkey's NWFP are exported as raw or semi-raw materials. Medicinal products are of particular importance to Turkey, the third largest exporter of medicinal plants of wild origin after China and India. Gross revenues from NWFP exports in 1996 were over \$102 million (SSI) and \$87 million in 1997 (SSI). Furthermore, imprecise monitoring suggests that the exact quantities of materials harvested for export is unknown and is likely to be underestimated (FSR 1998 Draft Report). The exportation of NWFP is given in Annex II.

If we look at the production and export figures, the former is less than the later. At the first look, it is thought that there was over harvesting and illegal harvesting. Some might be, but most of it comes from outside the forest areas, from the agriculture fields and private lands.

When a demanded NWFP is found, a middleman applies to the Forest District. If it is found appropriate the permission is given. The middlemen make agreements with villagers on the conditions including harvesting cost. Forest districts rangers control the production.

In the light of inventory information, production plans of some plant species are prepared and forest villagers do the production of those NWFP indicated in the plan. The products are sold at a tariff price to villagers, then villagers sell these products to middlemen, the middlemen sell them to companies (processor or exporter) or to other agencies.



The case for natural flower and bulb collection is different. Due to high demand of bulbous plants from abroad, the bulbous plants are picked up regardless of size, resulting in economical loss or danger of extinction in the country. Regulation of Collection, Production and Export of Natural Flower Bulbs (1989) enforced by the Ministry of Agriculture and Rural Affairs is to prevent over collecting and to regulate export of bulbs. The export of permitted species is regulated through the setting of an annual quota determined by the Ministry of Agriculture and Rural Affairs. Each season accredited export companies are permitted to export certain quantities of bulbs (based on the size of the company and the quality of its drying equipment etc.).

According to the Regulation of Collection, Production and Export of Natural Flower Bulbs; CITES Advisory Board and CITES Technical Committee are established from representatives of various related Ministries, Universities and NGOs. The Technical Committee observes and determines the production area and amount of collection every year. In the light of this determination, CITES Advisory Board decides the quota and restrictions on some plant species or prohibits collections of some species.

**Natural Plant Species Not Permitted To Be Collected**

Natural flower bulb species of which collection and exportation is forbidden in 2000 are as follows; All *Orchis* spp, all *Crocus* spp, *Fritillaria* spp (except *F.persica*), *Lilium* spp ( except *L.candidum*), all *Muscari* spp, *Sternbergia* spp ( except *Sternbergia lutea*), all *Tulipa* spp, all *Eminium* spp, all *Biarum*

spp, all *Nymphaeaceae* spp, all *Orchdaceae* spp, *Arum creticum*, *Pancreatium maritimum*, *Hyacinthus orientalis*, *Centiana lutea*, *Cyclamen* spp ( except *C.coum*, *C.cilicium*, *C.hederefolium*), *Galanthus* spp (*G.elwesii*, *G.woronowi*), *Iris* spp ( except *I.tuberosum*) and other tubers and bulb plants.

## Conclusion

The value of Turkey's forests in the past has been based largely on timber values. In general the priorities have been given to timber both in management and inventory terms. But the trend is changing now, environmental and social functions as well as economic ones including NWFP are on the top of the agenda. Particularly the 1992 Summit in Rio has led to considerable change in world forestry policy.

Although distribution of NWFP species have been known, inventory information has not been completed for all the species. Production plans have been prepared for a limited number of NWFP species (e.g. bayleaves). Most of the species production plans have not been prepared yet because of the lack of inventory information.

Most of the NWFP are harvested from forest and natural resources and sold at the market. There is not any information about where and how they are produced (forest or agricultural and range area or cultivated). Forest sub-district chiefs do protection and production. Most of the forest sub-district chiefs do not identify these species. Recognition of these species depends on experience and knowledge. Also forest sub-district chiefs have such burden that they can not spare enough time to deal with NWFP management. For this reason it is necessary to establish a NWFP unit in every Forest Regional Directorate and in some of the forest districts, which have potential of NWFP, to deal with identifying, doing inventory, preparing production plans, harvesting and controlling and protecting activities.

In- service training programmes prepared by GDF are mainly based on administrative and routine problems. GDF does not have enough experts on NWFP. It is necessary to train the staff of GDF and GFVR (The General Directorate of Forest and Village Relations) and forest villagers about NWFP. Technical forestry education programmes at University level are classic and based on traditional forestry. Education programmes on NWFP is not sufficient at Forestry and others Faculties.

Also there is no extension unit in the MOF to deal with introducing knowledge and training of forest villagers on forest activities including NWFP. The active participation of those villagers in forestry activities and the creation of trust between forestry staff and the people are necessary.

As for other difficulties, there is no responsible authority that covers all production areas, especially medicinal and aromatic plants (except Natural Flower Bulbs). As mentioned above, these products are harvested from forest areas and outside forest areas, which are agricultural and range lands.

There are 20 175 'forest villages' in Turkey located in or near forest areas. These villages accommodate over 9 million people. The income level of forest villagers is below the national average and they are largely depend economically on forest resources, in particular on fuelwood for heating and cooking, and forest range land and fodder resources for livestock.

Many of Turkey's NWFP are exported as raw or semi-raw materials or sold in domestic markets. In addition, NWFP are of significant economic value to forest communities providing an important contribution to family diet and cash income. Fodder provided by free grazing in forest areas and by cutting for winter feeding is an important NWFP for forest communities for whom livestock is a primary source of income especially in remote mountainous areas.

Imprecise monitoring of exported products means that the exact quantities of materials harvested for export is unknown and is likely to be underestimated. While some data is available for exported products, the domestic trade and traditional (subsistence) use of NWFP is largely unrecorded. For example, while the domestic trade in a wide range of medicinal plants is evident from observations and records such as salesmen's catalogues, there are no estimates of the scale of this trade. For these reasons

the gross value of NWFP expressed in export revenues can be taken as a minimum estimates of the value Turkey's NWFP.

Many NWFP in Turkey are under priced and some of them over harvested. Villagers generally sell products as raw material resulting in a significant leakage of production benefits away from local sources. This is due to limited experience in, and facilities for processing and marketing. Also especially NWFP are harvested or collected by women and children because of the low price. So sometimes NWFP might be harvested early and some quality and economic loss and resource degradation occurs because of the early collection.

Current arrangements therefore mean that middlemen and exporters gain most of the money from the production of NWFP. Low producer prices encourage over harvesting. This causes degradation of NWFP plants. Higher producer price would likely encourage more sustainable management by local communities. (as higher prices would ensure constant or higher revenues from lower harvesting levels and giving higher importance to production and protection to receive benefits). Where resources are undervalued then some type of price related market or policy correction would have an immediate beneficial effect (FSR 1998).

Plant and animal species are being collected in ever increasing numbers. While limited data means that it is difficult to determine the exact status and potential of forest flora and fauna, the evidence suggests that many species are being harvested unsustainably. Some important export products such as *Laurus nobilis* (bayleaves used for medicinal purposes, soap manufacture and as an oil extract) and ornamental bulbs are known to be over harvested, and many of Turkey's important endemic plant species are endangered (e.g., *Gentiana lutea*, which is collected illegally (Ozhatay et al, 1997). Species whose genetic resources have been adversely affected by excessive utilisation include walnut, Taurus cedar, sweet gum, *Arceuthos drupacea*, *juniperus oxycedrus*.

Overgrazing is an important factor contributing to forest degradation, subsequent soil erosion and biodiversity loss. The production area for forage crops in Turkey is small, covering only 2.5 percent of the total agricultural area and total feed production is insufficient. This increases the pressure on forest areas which are commonly utilised for livestock grazing. (NEAP, 1997).

In terms of wildlife, the Anatolia lion, tiger, beaver and darter are now extinct, while endangered species include leopard, lynx, hyena and the Monk seal. In addition, populations of 45 species are estimated to have greatly declined including deer (*cervus elaphus maral*), roe deer (*capreolus capreolus*), fallow deer (*dama dama*), wild sheep (*Ovis amon anatolica*) and gazelle (*gazella subgutturosa*).

Management of hunting activities is also inadequate. Arrangements for monitoring and management of both game populations and harvest levels are set nationally rather than for ecoregions or specific hunting areas. In practice, the number of most species taken is limited by hunting effort or scarcity.

Tenure security is an important factor in the sustainable management of natural resources. Landowners with secure and long-term tenure have an obvious incentive to look after their land and invest in it. Having the right to use land provides much less incentive to manage the resources.

## Recommendations

NWFP are an important income source for many forest villagers. Successful management of NWFP requires management structures that offer incentives to local resource users to adopt sustainable harvesting practices, reversing the current trend towards overuse and degradation. Solutions include tenure reforms for some forest products, proper resource pricing, development of cultivation, proper harvesting, storage techniques and marketing of some important NWFP species. Extension services, demonstration projects and training of forest villagers should follow together with the provision of low interest rate credits to the producers.

### **Land Tenure**

In Turkey, 99 percent of the forest area is state forest. According to the Turkish Constitution; the ownership of State forest area cannot be transferred to others and the management and exploitation of the forest area is under the responsibility of the state.

Secure land tenure provides a strong incentive for sustainable resource management. Inappropriate tenure arrangements cause unsustainable NWFP harvesting practices. Although villagers have harvesting rights, they have no legal ownership to land. Lack of secure tenure means that damaging practices continue. Secure tenure should be appropriate for long term harvesting and land use rights should be given to forest villagers or collectors.

### **Capturing NWFP Values**

Current arrangements mean that middlemen and exporters gain most of the money from the production of NWFP. Villagers generally sell products as raw material resulting in a significant leakage of production benefits away from local sources. Forest villages and their co-operatives should be supported through low rate credits to establish small scale processing facilities. Particularly in potential non-wood forest product areas these facilities would provide employment and added value (semi-processed products instead of raw products) to local economies. Co-operation with the private sector on processing and marketing issues would also increase forest village revenues from non-wood forest products.

### **Producer Prices**

Low producer prices encourage over harvesting. If villagers sustain higher revenues from NWFP they would care and protect the sources. Higher producer prices would likely encourage more sustainable management by local communities.

### **Multi-functional Planning**

Typically forest management plans do not consider NWFP resources. Even for the few cases where such plans exist, inadequate inventory information (e.g., biological productivity and species distribution) for the vast majority of products means that optimal (sustainable) harvesting levels are not attained. There is considerable scope for improving existing plans and extending the inventory process to cover other NWFP. Site specific inventories of NWFP as part of the forest management process are required for the development of these plans.

### **Market Analysis**

NWFP market analyses have not been done yet. But many kinds of products are sold at the market. Market fluctuation is very high. Market analysis is also necessary to understand likely effects of market expansion, shifts in demand and international price fluctuations. Many kinds of products and derivatives are seen at the market especially at aktars shops. Production in some cases is based on poor market research. Market research should be done to determine NWFP demands.

### **Legal Reforms**

Current regulations on monitoring are not sufficient to protect NWFP. The vast bulk of species are traded under a 'miscellaneous' category, reflecting the relatively minor role that they play in international trade. Such species may nevertheless be very localised in the wild, and seriously threatened by trade people. Trade regulation therefore needs to be tightened. Regulations for the use of NWFP are not collected in a single legislation. There are different and scattered rules under different legislation.

Review of laws and regulations related to forest and range land is needed. Turkey's forest are almost entirely State owned. There is no clear definition of the roles of responsible agencies and institutions. In addition there are overlaps in the legal framework and national legislation sometimes contradicts international laws. Also there is some lack in legislation, enforcement is therefore difficult. A through review and revision of present legislation is needed to eliminate existing conflicts and shortcomings.

To ensure the sustainable use of NWFP; collaboration should be done between the firms and companies dealing with the trade of these plants. Contributions should be made for research and

rehabilitation of ecosystems including NWFP plants.

There is a need for a more participatory approach towards forestry development and management. This is seen as a way to reduce the negative human impact on forest resources in the forms of over exploitation. Particularly when the rural communities have been given more responsibility in the management of forest resources the results are by far positive towards sustainability. In fact, to reach improved and sustainable generation of profits on one side and assumption of responsibilities for resource preservation on the other, participation of local population is needed at all stages of resource management.

A fund should be set up from the contributions of dealing firms and companies and it should be used for achieving sustainability objectives. Funds should be allocated from the national budget, Reforestation Fund, Village (ORKÖY) Fund and firms and companies. These funds would support and encourage the development of new techniques to protect, control and conserve NWFP.

Forest villagers should be encouraged to cultivate wild plant species by providing materials (seeds, seedling, grafting or cutting), financial assistance (low interest rate credits) and training.

NWFP Units should be established in every Forest Regional Directorate and in some of the Forest Districts in potentially rich NWFP areas. Experts (Forest engineer, Agriculture engineer, botanist, chemist) in NWFP should be employed in these units to deal with carrying out inventories, preparing annual production plans and programs, controlling harvesting areas and harvesting activities, giving extension services to the forest villagers and other producers.

One of the research institutes should be converted to a NWFP research institute and training centre (on harvesting, utilising, drying, storing, marketing, cultivating, propagating and protecting).

Some NWFP species grow naturally in unproductive forest area and in maquis land. These kinds of areas should be rehabilitated by improvement cuttings, seeding or planting which in turn would increase the production and price.

Promote opportunities for NWFP using Agro-forestry systems in young forests plantation mixed with *Castanea sativa*, *Pistacia terebintus*, *Laurus nobilis*, *Capparis* sp, *Origanum* sp, *Thymus* sp, *Salvia* sp, *Robinia pseudoacacia*, etc. Surrounding forest villages, then, would get more benefits and protect the forests as it is in the case of *Pinus Pinea* plantations.

The conservation of gene resources and biodiversity should be taken into account in production, conservation and breeding plans. Highly demanded valuable species are generally cultivated or grown in their natural habitats.

After completing the inventory and management plans of NWFP species, care should be taken to keep the ecological balance by taking account of direct and indirect use value, option value and non-use values.

**Sustainable production and uses:**

1. Complete inventories;
2. Prepare production plans;
3. Research and training (Forest staff, local people, villagers, communities or others);
4. Reserve the gene conservation areas (*in situ*);
5. Organise production and harvesting activities;
6. Market analyses;
7. Appropriate land use right;
8. Multi functional planning;
9. Improve producer prices and capturing NWFP values;
10. Participation.

## Prepare and apply implementation projects to overcome the above mentioned problems in the short term

For the achievement of the above items, it is necessary to prepare implementation projects on completing inventory of NWFP of high economic values and develop cultivation techniques. Establishment of pilot demonstration sites will help in the introduction of suitable techniques and training of stakeholders. The General Directorate of Forest and Village Relations should review its crediting policy, which is a very important tool to complement the projects.

## References

- ANONYMOUS 1995 Orman Tali Ürünlerinin Üretim ve Satış Esasları. OGM. İşletme ve Pazarlama Dairesi Başkanlığı Tebliğ No: 283.
- ANONYMOUS 1996 Orman Ürünlerinden Faydalanmak İsteyenlere Verilecek İzinlere Ait Yönetmelik. OGM. İşletme ve Pazarlama Dairesi Başkanlığı Tebliğ No: 289.
- ANONYMOUS 1991 Türkiye'nin Ekonomik Değer Ta siyan Geofitleri üzerinde Taksonomik ve Ekolojik Araştırmalar. OGM. İşletme ve Pazarlama Dairesi Başkanlığı Yayın No: 669.
- ANONYMOUS Ülkemizdeki Bazı Önemli Orman Tali Ürünlerinin Teşhis ve Tanıtım Klavuzu OGM. Yayın No: 659.
- AKMAN, Y. and KETENOĞLU, O.1986. The Climate and Vegetation of Turkey. In: Hedge, I.C.(Ed.), Proceedings of the Royal Society of Edinburgh 89B, 123-134.
- ASLAN N. et al.1996 Türkiyenin Ekonomik Değeri Olan Geofitlerinin Üretimi ve Doğal Populasyonları Hakkında Rapor CITES komitesi İstanbul.
- DAVIS, P.H., MILL, R.R.and KIT TAN (Eds.),1988. Flora of Turkey and the East Aegean Islands. Vol.10 (suppl.), Univeristy Press, Edinburgh.
- BANN C.1998 Forestry Sector Review-Global Environmental Overlays Program Draft Report.
- BAYTOP, T.1994 Dictionary of Vernacular Names of Wild Plants of Turkey. Turkish Language Association, Publ.No. 578, Ankara.
- BAYTOP, T.1963. Medicinal and Poisonous Plants of Turkey, Istanbul University Pub. No. 1039, Istanbul.
- BAYTOP, T.1984 Therapy with Plants in Turkey. Istanbul University Publ. No.2355, Istanbul.
- BAYTOP, T. 1994 The Use of Medicinal and Aromatic Plants in Turkey- A Historical Perspective. In:Final Report, TCDC Workshop on Medicinal Plants, 11-14 October 1993, Eskişehir, Turkey, UNDP, New York.
- BAYTOP, T., Baytop, A., Mat, A. And Sun, S.1989. Poisonous Plants in Turkey, Plant Poisoning and its Treatment. Istanbul University Publ. No.3560, Istanbul.
- BAYTOP, T. And MATHEW, B. 1984. The Bulbous Plants of Turkey. Batsford, London.
- BAŞER, K.H.C. 1992 Essential Oils of Anatolian Labitae: A Profile. Acta Horticulturae. 333:217-238(1992).
- BAŞER, K.H.C. 1993. Non-Labiatae Essential Oils of Turkey. 24th Int. Symp. Essential Oils, 21-24 July 1993, Berlin.
- BAŞER, K.H.C. 1994. Essential Oils of Labiatae From Turkey-Recent Results. Lamiales Newsletter 3:6-11 (1994).
- BAŞER, K.H.C., Honda, G.and Miki, W.1986 Herb Drugs and Herbalists in Turkey. Studia Culturae Islamicae 27, Institute for the Study of Languages and Cultures of Asia and Africa, Tokya.
- BAŞER, K.H.C. 1997. Identification of Wild Food and Non Food Plants of the Medditeranean Region CIHEAM Vol.23 Mediteranean Argonomic Istitute of Chania.
- BOZKURT Y., et al 1982 Türkiyede Orman Yan Ürünleri İ.Ü.Orm.Fak.Yay.NO: 302 İstanbul.
- EKİM, T., KOYUNCU, M., GÜNER, A., ERIK, S., YILDIZ, B, and VURAL, M. 1991. Taxonomical and Ecological Studies on Gephytes of Turkey with Economic Importance. Department of Forestry, Ankara..
- EKİM, T., KOYUNCU, M., ERIK, S. and ILARSLAN, R. 1989. List of Rare, Threatened and Endemic Plants of Turkey. Turkish Association for the Conservation of Nature and Natural Resources, Ankara.
- EKİM, T. Plants. 1987 In: Biological Diversity in Turkey, Environmental Problems, Foundation of Turkey Ankara.
- ENEZ N. 1987. Natural Dyeing .Marmara University Publ. No.449, Istanbul.
- FUJITA, T., SEZİK, E., TABATA, M., YELŞİADA, E., HONDA, G., TAKEDA, Y. TANAKA, T., and TAKAISHI, Y.1995. Traditional Medicine in Turkey . VII .Folk Medicine in Middle and West Black Sea Regions. Economic Botany 49:406-422.
- İŞİK K. 1996 Biyolojik Çeşitlilik ve Orman Gen Kaynaklarımız. Orman Bakanlığı Yayın No: 103
- KALÇAS, E.L. 1974 Foods from the Fields-Edible Wild Plants of Turkey. İzmir.
- KAYACIK H. 1981 Orman ve Park Ağaçlarının Özel Sistematiği 2.Cilt İ.Ü.Or. Fak. Yayın No: 287, 224 S. İstanbul.
- KAYACIK H. 1982 Orman ve Park Ağaçlarının Özel Sistematiği 3.Cilt Kurtulmuş Matbaası 291 S. İstanbul.
- ÖDER, N.1990. Important Edible and Poisonous Mushrooms of Turkey. Panel: Biological Diversity in Turkey 26

October 1990, Ankara.

- ÖZHATAY N., KÜLTÜR S. and AKSOY N.1994. Check-list of Additional Taxa to the Supplement Flora of Turkey. *Tr.J.Botany* 18:497-514.
- SEZİK, E.,TABATA, M. YEŞİLADA, E., HONDA, G., GOTO, K. and IKESHIRO, Y. 1991, Traditional Medicine in Turkey, I.Folk Medicine in Northeast Anatolia. *J.Ethnopharmacol.* 35: 191-196.
- SEZİK, E., ZOR, M. and YEŞİLADA, E. 1992 Traditional Medicine in Turkey. II.Folk Medicine in Kastamonu. *Int. J. Pharmacognosy.* 30(3):233-239.
- SÜMER S. 1987 Türkiye'nin Yeniden Mantarları Ersu Matbacılık Topkapı Ticaret Merkezi No: 289 Cevizlibağ-İstanbul.
- TABATA, M., HONDA, G. and SEZİK, E. 1988. Traditional Medicine and Medicinal Plants in Turkey. Faculty of Pharmaceutical Sciences, Kyoto University, Kyoto.
- TABATA, M.HONDA, SEZİK, G.E. and YEŞİLADA, E. 1988, A Report on Traditional Medicine and Medicinal Plants in Turkey. Faculty of Pharmaceutical Sciences, Kyoto University, Kyoto.
- ABATA, M.,SEZİK, E.,HONDA, G., YEŞİLADA, E., FUKUI, H., GOTO, K. and IKESHIRO, Y.1994, Traditional Medicine in Turkey. III Folk Medicine in East Anatolia, Van and Bitlis Provinces *Int.J.Pharmacognosy* 32:3-12(1994).
- YALTIRIK F., EFE A. 1989 Otsu Bitkiler Sistematığı. Dilek Matbaası İstanbul.
- YEŞİLADA, E., HONDA, G., SEZİK, E., TABATA, M., GOTO, K. and IKESHIRO, Y.1993, Traditional Medicine in Turkey . IV. Folk Medicine in the Mediterranean Subdivision *J.Ethnopharmacol.* 39:31-38.
- YEŞİLADA, E., HONDA, G., SEZİK, E., TABATA, M., FUJITA, T., TANAKA, T., TAKEDA, Y. and TAKAISHI, Y.1995. Traditional Medicine in Turkey. V. Folk Medicine in Inner Taurus Mountains. *J.Ethnopharmacol.* 46:133-152.
- ZEYBEK U. 1998 Türk iyenin Orman Tali Ürünleri ve Değerlendirilmesi Raporu İzmir.

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**PRODUCTION OF SOME MAJOR NON-WOOD FOREST PRODUCTS**

Products Name	Latin Name of species	Unit	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Resins	P. Brutia	Ton	133	87	203	220	-	-	124	223	391	495
Resinous Wood	P. Brutia and P. Nigra	Ton	-	-	-	-	-	4233	5551	3113	1752	1983
Chips of Resionuswood	P. Brutia and P. Nigra	Ton	2032	3549	5345	75	34	6	294	177	515	107
Sweetgum oil	Liquidambar orientalis	Ton	3.4	0.8	0.7	0.6	2	4	1.5	3	1.5	3.5
Laurel leaves	Laurus nobilis	Ton		360	2396	2653	2393	3125	6764	6004	5229	3965
Insence	Liquidambar orientalis	Ton	0.8	0.8	1.6	1	0.8	-	0.9	-	0.9	2
Sage leaves	Salvia spp	Ton	195	240	243	266	403	411	451	684	338	416
Thyme Leaves	Thymus and origanum s	Ton	1165	1576	2610	2700	4814	2728	2235	3157	2440	3772
Cone of Semen Pini	P. Pinea	Ton	10	226	271	143	267	426	418	231	541	903
Linden blossom	Tilia tomentosa	Ton	17	27	7	3	3	5	28	6	7	3
Rosemary leaves	Rosmarinus officinalis	Ton	81	195	270	297	434	398	450	365	170	226
Sumaci Leaves	Ruhus coriara	Ton	99	113	13	60	45	25	19	93	48	62
Cherry Laurel leaves	Prunus lauruscercasus	Ton	124	47	59	41	10	67	73	50	38	31
Rockrose leaves	Cistus creticus	Ton	-	-	-	412	534	152	38	214	251	288
Carob fruit	Ceratonia siliqua	Ton	-	-	-	-	674	530	644	116	12	15
Chesnut	Castanea sativa	Ton	35	83	171	174	259	160	350	88	283	318
Myrtle leaves	Myrtus communis	Ton	4	5	5	4	4	20	22	16	15	3

## PRODUCTION OF SOME MAJOR NON-WOOD FOREST PRODUCTS (cont.)

Products Name	Latin Name of species	Unit	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Jew's Myrtle roots	<i>Ruscis aculatus</i>	Ton	136	167	74	243	120	134	214	90	197	330
Oak Cuppula	<i>Q. ithaburensis</i>	Ton	1	-	-	159	41	-	144	63	12	10
Heath	<i>Erica arborea</i>	Ton	4	178	221	7	362	-	130	5	-	10
Braken	<i>Dryopteris filix-mas</i>	Ton	1	3	57	-	57	-	8	0.4	32	73
Snowdrops	<i>Galanthus</i>	Ton	24	11	29	15	56	4	3	18	24	4
Eastern blue	<i>Anemone blanda</i>	Ton	3	1	16	2	15	11	12	5	4	12
Sawbread	<i>C. cilicium, C. Coum, C. hederefolium</i>	Ton	8	53	63	27	29	37	42	70	67	78
Winteraconite	<i>Eranthis hyemalis</i>	Ton	5	5	6	2	14	8	6	5	1	12
Mushrooms	<i>Morchella esculanta, Cantharellus cibarius, Boletus edulis</i> and others	Ton	19	10	15	8	33	9	65	30	11	29
Others (Moss, Cons, <i>Vicum album</i> and Beech leaves, branch)		Ton	2276	4541	2211	1457	688	5107	7853	6275	14215	4688
Other tuberus		Ton	2	14	-	90	15	-	15	11	84	83
<b>TOTAL</b>			<b>6378.2</b>	<b>11492.6</b>	<b>14287.3</b>	<b>9059.6</b>	<b>11306.8</b>	<b>17600</b>	<b>25955.4</b>	<b>21112.4</b>	<b>26679.4</b>	<b>17921.5</b>

## THE EXPORT OF NWFP IN TURKEY 1991-1998 AS A QUANTITY AND FOREIGN INCOME

	Unit	1991		1992		1993		1994		1995		1996		1997	
		Quantity	1000 US \$	Quantity	1000 US \$	Quantity	1000 US \$	Quantity	1000 US \$	Quantity	1000 US \$	Quantity	1000 US \$	Quantity	1000 US \$
Natural flowers blubs And tuberious	Ton	278	1846	273	2620	322	1935	361	2285	344	2374	662	3634	377	2880
Leaves, moss, branches For ornamental and bouqet	Ton	826	804	1024	1018	985	1498	486	346	154	661	445	592	414	806
Wild Mushrooms	Ton	1375	16081	725	6524	425	6531	95	2920	157	5756	1657	10494	1464	11865
Seeds of semen pini with Coat or without coat	Ton	791	10333	446	8399	278	4698	262	2558	203	1617	456	5649	874	11586
The fructus of Juniperus sp, Coriander, Cumin, Cinnamo	Ton	1006	757	904	833	850	722	935	608	7956	9188	7112	10041	-	-
Laurel leaves	Ton	1889	4131	2453	5686	2453	5686	3350	5921	2870	6025	3202	7005	3763	7637
Thyme and origanum leaves	Ton	3976	8078	4744	10786	4744	10776	6335	16103	5601	13686	6475	15152	6038	13237
Fructus of Mahalep	Ton	467	1303	361	1130	361	1130	248	861	99	548	295	1563	169	1178
Linden blossom	Ton	287	1491	129	596	75	299	349	1633	453	1716	336	1529	-	-
Sage leaves	Ton	509	1096	564	1119	576	1368	400	838	564	1143	671	1450	721	1604
Carob fruit	Ton	8559	1860	11445	3882	11417	4181	7450	2905	8467	3569	12537	5537	5596	3591
Insence	Ton	-	-	-	-	-	-	0.1	0.057	-	-	0.0091	1	6	16
Roots of Glyorrhiza glabra	Ton	3040	2259	1685	1346	1353	999	1140	854	1557	1072	1765	1269	2163	1607
Derivatives of NWFP	Ton	4	1565	-	-	69	355	59	48	1466	1174	916	1510	1323	6231
All kind resin	Ton	0.09	0.189	0.318	0.665	4	10	2250	1224	2540	2356	130	113	331	301
Others	Ton	-	-	-	-	11253	8482	8381	5766	13163	653	25952	36638	22649	24443
<b>TOTAL</b>		23007.09	51604.19	24753.32	43939.67	35165	48670	32101.1	44870.06	45594	51538	62611.01	102177	45888	86982



# **POLICIES TO PROMOTE SUSTAINABLE OPERATIONS AND UTILIZATION OF NON- WOOD FOREST PRODUCTS IN TURKEY**

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## **Summary**

In many countries in the world and for vast numbers of the rural population in the developing countries, NWFP have vital roles in terms of subsistence of household, income and employment from harvesting and industry, marketing, spiritual and cultural needs, source of foreign exchange, biodiversity etc.

There is a need for improvement of propagation methods, management, harvesting, storage and utilisation; promotion of women's participation; improvement of quality of facilities and development of facilities to sustain NWFP. Forest-based small scale enterprises also represent the major source of employment for rural people, which is based mainly upon the collection and processing of NWFP.

Turkey is one of the rich countries with a variety of flora and fauna, which generally are found in forests and wooded lands. However, it is a fact that overproduction, limited facilities for cultivation, inefficient protection measures, poor knowledge about wild resources and insufficient data availability are the major factors threatening the existing NWFP development efforts.

This paper examines the current role and potential for non-wood products in the forestry sector and in the related agencies. It is compiled from a number of publications. It also presents the actual situation and provides a draft policy framework and guidelines for sustainable management of NWFP in Turkey.

**Keywords:** NWFP, rural communities, Forest-based small-scale enterprise, endemic species, collection, processing consumption, trade.

## **I. Introduction**

NWFP are products of biological origin other than wood that may be gathered from the wild, mainly forests, other wooded lands, produced as (semi-) domesticated plants in plantations or in agroforestry schemes, or trees outside forests or produced in intermediate production systems of varying degrees of domestication.

Non-wood forest products have attracted considerable global interest in recent years due to increasing recognition of their contribution to household economies and food security, to some national economies, and to environmental objectives such as the conservation of biological diversity.

Unfortunately very little concerted attention had been given to these important resources in the past. Furthermore, in many countries, forestry sectors' policies had frequently emphasised timber production and often ignored the importance of NWFP and small-scale enterprises based on NWFP.

In due consideration of the increased importance of the non-timber forest products, the Food and Agricultural Organization has already established the Wood and Non-Wood Products Utilization Branch (FOPW) in the Forest Products Division in 1991. The ongoing programme called "Promotion and Development of Non-wood Forest Products (NWFP)" became one of the FAO Forestry Department's priority areas. The programme ensures co-ordination within FAO in the multidisciplinary approach of NWFP development in the world.

NWFP can provide important community needs for improved rural livelihood; contribute to

household food security and nutrition; help to generate additional employment and income; offer opportunities and provide raw materials for processing enterprises; contribute to foreign exchange earnings; and support biodiversity conservation and other environmental objectives. Several million households all around the world depend heavily on NWFP for subsistence and/or income. Some 80 percent of the population of the developing world use NWFP for health and nutritional needs (FAO, 2000).

## II. Definition, scope and characteristics of NWFP

In many publications, the term "*non-wood forest products*" (NWFP) or "non-timber forest products" (NTFP) and the similar terms: "minor", "secondary", and "non-timber" forest products, have appeared as umbrella expressions for the vast array of both animal and plant resources other than wood (or timber in the case of "non-timber") derived from forests, other wooded lands and trees outside the forests (FAO, 1999).

NWFP also refers to market or subsistence goods and services for human or industrial consumption derived from renewable forest resources and biomass (FAO, 1999). In this regard, the scope of non-wood forest products includes from the use of plants and animals and their products to the services of land for conservation and recreation. NWFP may be gathered from the wild, mainly forests, other wooded lands, produced as domesticated plants in plantations or in agroforestry schemes, or trees outside forests produced in intermediate production systems of varying degrees of domestication.

The NWFP may be grouped into three main categories according to their functions and their utilisation purposes both in domestic consumption or commercial basis. These are as follows:

Main category	Sub-categories	Examples of products
<b>Non-wood plant products</b>	Food	Wild and domesticated products, weeds, fruits, flowers, seeds, edible roots, stems, leaves, shoots etc.
	Forage	Food for livestock and wildlife, including birds, fishes, insects, bees, silkworms, etc.
	Pharmaceuticals	Drugs, salves, lotions, purgatives etc.
	Toxins	For hunting, ordeal poisons, salves, ointments, lotions, anaesthetics etc.
	Aromatics	Essential oils for cosmetic and perfume industry, unguent, incense etc.
	Biochemicals	Non-edible fats and oils, waxes, gums and latex, dyes, tannins etc.
	Fibre	Cloth, matting, cordage, basketry, brooms, cork etc.
	Wood	Wood for handicrafts
	Ornamentals	Plants for aesthetically pleasing, horticulture and amenity etc.
<b>Wild Animal Products</b>	Mammals	Meat, horn, skins, wool, bone etc.
	Birds	Meat, hides, skins, wool, bone pharmaceuticals etc.
	Fishes	Meat, eggs, feathers, edible nests, guano etc.
	Reptiles	Food, skins, shell, toxins, etc.
	Invertebrates	Plant exudates (manna), honey, wax, silk lac etc.
<b>Services and Functions of Forests</b>	Habitat	Grazing, shade and shelter for animals
	Soil improvement and protection	Green manure, humus, N-fixation, hedges, soil stabilisation etc.
	Protected areas	Non-consumptive use (Tourism/recreation, wildlife viewing, photography, bird watching etc.) Consumptive use (hunting, shooting, fishing etc.) Aesthetic, scenic and historic sites etc.

Source: FAO Information note 2000.

### **III. NWFP in the world**

Traditionally, maximised revenue from timber production has driven forest policy and management decisions in many countries, and silvicultural systems have been designed specifically to enhance timber production. These policies and practices have in some places conflicted with the interest of forest dwellers and people dependent on the forest for other uses and products, and have limited the development potential of NWFP.

In many parts of the world, NWFP provide food (bushmeat, mushrooms, fruits, nuts, animal fodder), construction materials, fibres (bamboo, rattan, palm leaves), medicines and other health care products and goods of religious or spiritual significance. Most of medicinal plants are traded in local and national markets and relatively few are traded internationally in significant volume. However, there are few reliable global or even national data on production and trade of wild harvested plants and it is difficult to distinguish the wild from cultivated sources in existing trade statistics on these material.

At present, at least 150 NWFP are significant in terms of international trade, including honey, gum arabic, rattan, bamboo, cork, nuts, mushrooms, resins, essential oils, and plant and animal parts for pharmaceutical products etc.(FAO,1997).

It is estimated that the total value of world trade in NWFP of the approximately 150 well-known major items is about 1.1 billion US Dollars yearly. The general direction of trade from developing to developed countries with about 60 percent being imported by countries of EU, USA and Japan. China is the dominant world trader. India, Indonesia, Malaysia, Thailand and Brazil are also major suppliers to world markets (FAO 1997).

The responsibility for the management of wild resources varies from country to country, possibly due partly to the training and interests of the foresters, but probably more to internal policies. In some countries, whether it is obtained from the wild, plantations or fallow (uncultivated), NWFP are a forest responsibility. In some others, it is almost entirely harvested from the wild under the responsibility of agriculturist, or even the mandate of some forestry departments extends to all forms of wildlife, such as in Chile (FAO 1988).

At present, the CITES (Convention on International Trade of Endangered Species) is only one of the basic legal arrangements by which the world-wide trade of NWFP is generally laid out. The other important international arrangements and initiatives on protection, sustainable management and utilization procedures of NWFP are IUCN (International Union on Conservation of Nature), WWF (The World Wide Fund for Nature) and the UN Convention on Biological Conservation (CBD).

### **IV. NWFP in Turkey**

Turkey is a country at the cross-roads of Europe, Asia and Africa so that makes it rich in biodiversity as well as in cultural diversity. From sea level to over 5000 meters, the country has a high altitudinal variation and many different types of ecological regions including higher rainfall in the north, Mediterranean and sub-tropical in the south and west, arid and semi-arid in the middle, alpine, and alluvial in lower plains. These ecological variations make it possible for very diverse fauna and flora types from coastal habitats to alpine habitats.

In terms of biodiversity, the geographical location makes Turkey the richest country among the countries of Europe, North Africa, Middle East and Middle Asia. It is a genetic centre for a large number of plant species, mainly found in forested areas, with about 9000 plant species, 3000 of which are endemic. Besides, Turkey has a wide variety of wildlife and fauna resources such as mammals (128 species), birds (449 recorded), reptiles (85 species) and others. As a result of these conditions, forests in Turkey have a rich variety of natural resources that provides diversity of NWFP from both plants and wildlife.

In Turkey, forests are the major natural areas where the wild resources of NWFP are found and

collected. Therefore, the responsibility for the management of wild resources remains with the interests of forestry organizations, possibly due partly to training and internal policies. Some NWFP are also collected from the areas that are outside of forests, such as rangelands, privately owned lands, alpine regions etc. Only the forestry organization is responsible for management, collection and protection of the NWFP before selling them abroad.

### 1. Major species, production and utilization structure

Local and the nearest forest villagers and their co-operatives are employed or contracted by the forestry organization in the harvesting of NWFP through a specialized section (Division Directorate of NWFP) of the General Directorate of Forestry in Turkey. During the 5<sup>th</sup> Five Year Development Plan period, NWFP inventory was carried out by General directorate of forestry for a selected 62 major species. Management and utilization plans were prepared. Information given in this plan is about production capacity, rotation parcels, propagation, drying and storing techniques and domestication strategies of certain of these species.

In Turkey, production of the NWFP is generally conducted by two main types of production means, both are supervised and controlled by forestry departments. Many NWFP are produced from the forest areas and provide significant contributions to the local communities and country economy as well. These two production types are:

(i) *By annual production programs of forestry sector* in which some of the NWFP such as resin, bay leave and styrax are harvested by General Directorate of Forestry through its annual production programs. Those programs are prepared according to the targets given in the five-year development plans and the demands of the domestic and foreign markets.

(ii) *By modest tariff value charges* that are annually determined by the forestry sector according to Articles 37 and 40 of the forest Law. This is a concession right of employment for the people who are living in the forest villages. Pine nut, chestnut, thyme and herb tea, natural mushrooms are the most common products produced in this way.

As an example, the followings are the 15 most important non-wood forest products, species and their production quantity (in 1994 and 1999) produced in Turkey:

Product	Species from which produced	Unit	Quantity produced	
			1994	1999
Resin	Pinus brutia (Turkey red pine)	tonne	350	400
Bay leaves	Laurus nobilis	tonne	2393	3662
Styrax (Luquidambar oil)	Liquidambar orientalis	kg	2003	2000
Resinous wood	Pinus spp. and other coniferous	tonne	4334	6877
Salvia (leave)	Salvia spp.	tonne	403	403
Thymus (leave)	Origanum spp., Thymus spp, Coridothymus	tonne	4814	2587
Pine nut	Pinus pinea	tonne	267	693
Natural mushrooms	various	tonne	33	17
Sumac (leave, fruit)	Rhus cotinus (coriaria)	tonne	45	62
Rosemary (herbacous)	Rosmarinus officinalis	tonne	434	206
Cherry laurel (fruit)	Prunus laurocerasus,	tonne	10	31
Lime (flower)	Tilia spp.	kg	3351	3262
Chesnut (fruit)	Castanea sativa	tonne	259	121
Snow drop, Cyclamen and other bulbous plants (bulb)	Galanthus nivalis, Cyclamen spp. and others	tonne	129	207
Carob (fruit)	Ceratonneia siliqua	tonne	674	15

Source: Forestry Special Expertise Report for 8. Five Year Development Plan, (unpublished)

In terms of the income opportunities NWFP represent one of the vital resources for the forest

villagers in some regions. Some part of the produced NWFP is consumed by the local people for their household needs as food, medicine, herbal tea and for other purposes after limited and simple processes. However, these products are mostly sold as raw material so that the important part of the profit in this field are earned by middlemen, processors and traders from outside including foreign countries.

The following chart, illustrates the existing line of action of the harvesting, collection, consumption, processing and marketing of the major NWFP and the main actors employed in these lines in Turkey.

## **2. Protection of NWFP**

Ministry of the Forestry of Turkey is the unique organization which has the responsibility for protection activities of the NWFP resources but only in the forest areas. Protection of NWFP is carried out together with the general forest policy legislation and there are no special rules for protection of NWFP resources. Because of less attention to NWFP than wood- based resources, attempts at the protection of NWFP often remain second in priority after the primary forest resources. Thus, it can be said that NWFP are not properly protected despite their wide varieties and invaluable importance for the people and the country's economy.

Recently, together with better recognition of the importance of these resources there have been some restrictions on trading of some certain species. These species are mainly rare or endangered and the reason for restriction or prohibition on trading is to conserve their gene resources and biological diversity. In 1995, a number of species such as *Styrax (Luqiudambar orientalis)*, bulbs of some natural plants, species of *Orchidaceae* (salep) in every form, were prohibited from export by the Export Regime Decision of 1995.

However, the protection and conservation measures and activities taken for the NWFP resources are not effective enough, so that many plant species are become endangered and unfortunately in the near future some of them will not be existing.

## **3. Marketing structure of NWFP**

The revenue from timber production has shown a declining trend, mainly because of the increased emphasis on environmental, landscape and recreational objectives that resulted in reduced fellings. At the same time, NWFP and the value of recreation have shown a net increase and consequently, the value of NWFP is clearly higher than the value of timber. If the value of NWFP and public benefits from recreation are taken into consideration, the forestry balance sheet statement will become slightly positive. The commercialization of NWFP and environmental benefits, which is absolutely necessary in order to find the financial resources required for managing a multipurpose forests.

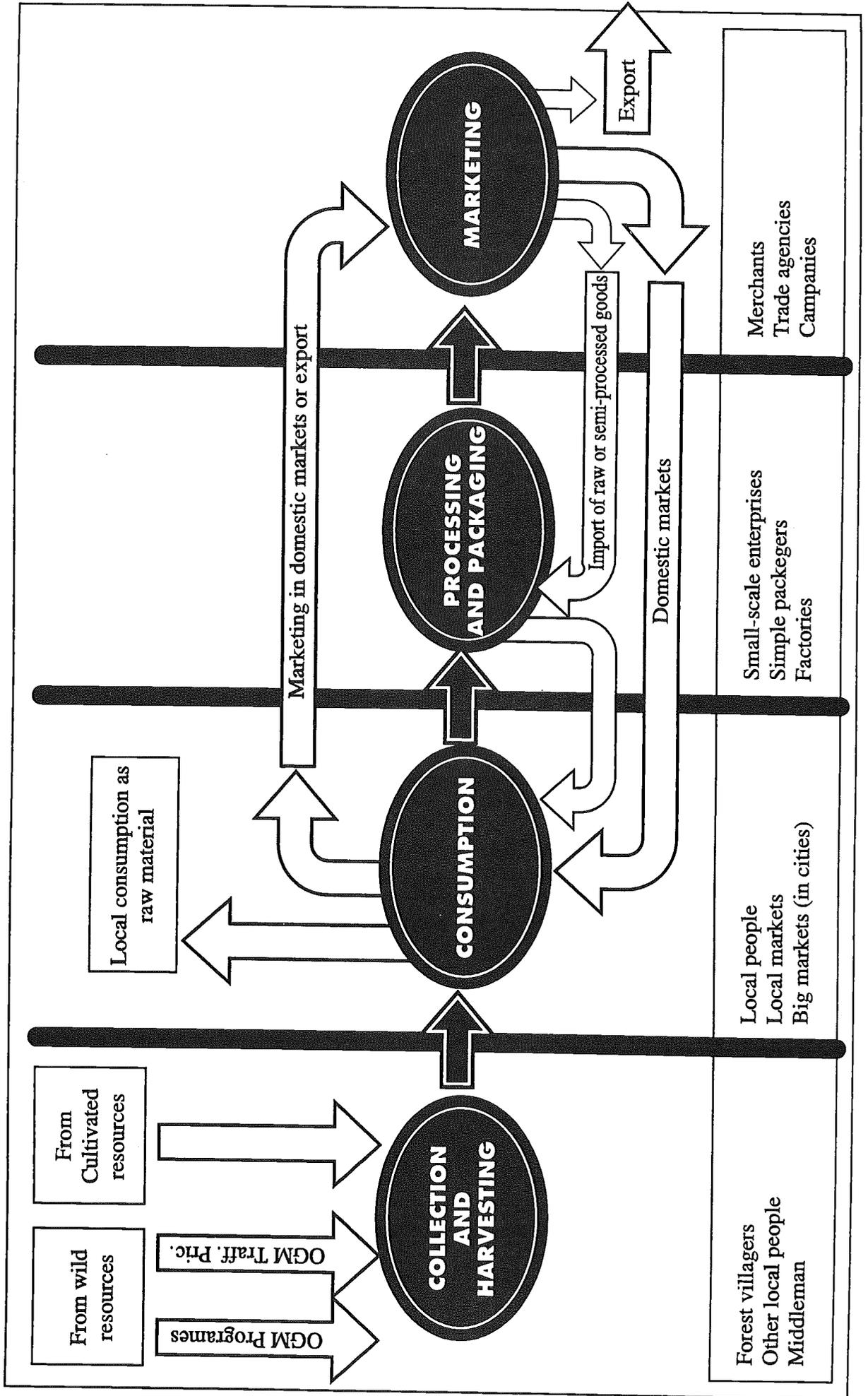
However, due to limited experience and the lack of capabilities for processing and marketing, NWFP are mostly sold as raw material so that the important part of the profit in this field is earned by middlemen, processors and traders from outside including foreign countries. Inadequate awareness, lack of infrastructure in the rural areas, access to markets, low volume of products, poor handling and poor storage capabilities are the major constraints to the formal development of markets for NWFP.

Annual export revenue gained from NWFP is around 70 million US\$ which is higher than the wood export revenue because of the higher demand in foreign markets. Revenues from wildlife and other services of forests are not included in this figure. Yet, potential contributions of NWFP are much higher and they should be attained through more efficient management and utilization of such resources.

## **4. Problems and constraints on Protection, management and harvesting of NWFP**

Increased population, technological development and trading attractiveness create and increase pressure on the natural habitats of flora and fauna. These natural resources are being threatened mainly in two ways; (i) destruction of natural habits and (ii) excessive harvest of natural vegetation for commercial purposes.

# Flow chart of operation and treatment processes of NWFPs in Turkey



Despite the rich and diverse natural resources for production of NWFP in Turkey, geographical distribution, quality and quantity points of view present difficulties. There are several problems dealing with definitions, conservation, production, utilization and marketing of the major NWFP resources. The following major problems need to be solved in order to achieve sustainable conservation, management and production of NWFP resources and to increase the profits and contributions to local and national economies in Turkey:

- Studies and information on existing situation, potential capacity, uses and distribution of NWFP resources are not sufficient;
- Irregular, unplanned and uninformed utilization of NWFP are threatening the biodiversity of them and causing serious degradation on the existing wild resources;
- Insufficient institutional capacity of forestry organizations and other related agencies;
- Uncertainties and conflicts regarding the use and production rights of local people, restrictive forest legislation;
- Underdeveloped markets, lack of knowledge and experience on the processing and marketing of these products, insufficient contribution programs and poor knowledge on training;
- Majority of these products are being exported as raw material;
- Insufficient and inappropriate knowledge and efforts for cultivation and domestication of NWFP.
- Wild fauna and intangible benefits of forest resources are largely ignored and considered outside of the NWFP;
- Protection measures, especially for endangered and unique species, are not efficient.

## 5. Policies and Strategies to be considered for better management of NWFP

Revised policies and principles that are recommended for implementation on the management of NWFP in Turkey have been developed for the 8<sup>th</sup> Five Year Development Plan (2001-2005) by the Special Forestry Expertise Commission Report are as follows:

- Appropriate measures should be considered such that as much profit as possible is obtained at local, national and global levels in a way that effective protection and sustainable management of natural NWFP resources is maintained.
- Active participation of forest villagers and local communities at all management stages of NWFP should be provided.
- Local people and private sector should be encouraged for expansion of domestication and cultivation activities of certain NWFP that have a deficient supply so as to meet demand and needs on a sustainable basis.
- In order to increase revenue and benefits, appropriate technical and financial incentives should be promoted for all interested parties including forest villagers and private sector on processing and production of final products of NWFP.
- Arrangements and incentives concerning the improvement of domestic and foreign trade of NWFP should be established and encouraged.
- All interested parties must carry out effective ecological, management and protection principles together with the appropriate measures for sustainable management of NWFP. The following principles and measures might be considered for better management of NWFP.

Principles	Measures to be taken	Actors
<b>1- Ecological</b>	selective of species selective of resources selective of sites	forestry institutions, other state agency professionals, local people, other forest users
<b>2- Management</b>	economic aspects, social aspects tourism aspects distribution of benefits income-sharing arrangements	local people, small-scale entrepreneurs, outsiders, travel agents

Principles	Measures to be taken	Actors
3- Protection	identification of the status institutional improvement participation process monitoring of ecosystem domestication and cultivation	forestry institutions, local people, tourism agencies, other stakeholders

## 6. Recommendations proposed for the solution of the present constraints

### *In terms of overall management*

In Turkey, there are no special and appropriate policies specifically governing the management, harvesting, processing and marketing of NWFP. Community participation, including tenure rights and incentives, usufruct rights, investment and involvement of private sector, credit facilities, regulations relating to processing and trade, evaluation of social and environmental values and establishment of relevant standards should be considered. Thus, it is the fact that there is need to develop a general policy framework on NWFP suitable to serve as a model to be adapted and integrated into the national forest policies. The following actions are recommended.

In order to provide necessary knowledge, data basis of and more attention to NWFP, activities for multipurpose management planning and inventory of forest resources should be improved and extended. Planning process should include participation and contribution of local people.

Measures should be considered in order to improve institutional and personal capacities of the MOF and other related institutions for the sustainable management of NWFP.

Collaborative works with universities, research institutions, NGOs and private sector should be strengthened for possible solutions to the problems facing different management stages (production period and techniques, processing, protection, marketing, valuation, utilization etc.) of NWFP. Information on these areas should be compiled and computerized in a special data base so as to use them effectively.

In order to resolve land use conflicts over use of NWFP resources, stakeholders are to be encouraged to pursue mechanisms that bring together all parties involved to clarify tenure, access user-rights and benefit sharing issues.

State organizations should deal with mainly protection and sustainable management of NWFP but harvesting and marketing matters should remained with local communities and private sector.

### *In terms of production, harvesting and domestication*

Domestication of NWFP resources is the best way forward in many cases. This involves a move from gathering in the wild on communally owned land to the deliberate cultivation of NWFP on tenured farm land. The domestication of a chosen species then involves genetic selection and the management of varieties or cultivars.

Activities on fodder protection and utilization through planned grazing in open areas in forests and controlled utilization should be improved and implemented in a collaboration way with villagers. This is an important NWFP in Turkey (particularly in the East and Southeast of Anatolia).

Production of suitable NWFP that are not able to meet demand should be produced from cultivation lands by local people and private sector as well as in open and degraded forest areas under the control of forestry sector.

Arrangements for production activities of wild resources should be provided that define and follow appropriate harvesting methods.

### *In terms of protection*

It should be taken into consideration that our future generations have the rights of using and profiting from the existing natural resources at least as much as we have taken over from our ancestors. For that reason, owing to the economic, environmental, scientific, and aesthetic importance of these resources, paying more attention to careful protection of these resources is our main responsibility.

There are international and national basic legislative measures for the protection of some important rare species and their habitats in Turkey. However, due to the inefficiency of these legal arrangements and/or deficiency in implementation, it may be said that natural habitats are not properly being protected as much as they need.

In order to provide more effective protection measures for NWFP resources, mainly for important wild plants, the following measures should be taken into consideration:

- Research studies on inventories and reliable data on natural population, botanical and commercial names, registration, IUCN categories etc. are needed.
- Legal arrangements for protection, production and trading must be established.
- Monitoring and periodic evaluation of existing and necessary data should be provided.
- Creation of specific protection sites should be considered.
- Education at all levels is certainly needed.
- Necessary measures and careful attention should be paid for protection of biodiversity and gene resources of existing NWFP all over the country.

The first ten major endangered wild plant species that are determined according to the international criteria and their IUCN categories in Turkey as follows:

Botanical Name	Commercial name (Turkish)	IUCN category
1. <i>Acorus calamus</i>	eğir	E
2. <i>Ankyropetalum gypsophylloides</i>	çöven	K
3. <i>Ballota cristata</i>	çalba	R
4. <i>Barlia robartiana</i>	salep	E
5. <i>Gentiana lutea</i>	centiyan	E
6. <i>Gypsophiyla arrostii</i> var. <i>nebulosa</i>	çöven	R
7. <i>Lycopodium annotinum</i>	Kibrit otu	K
8. <i>Origanum minutiflorum</i>	Yayla kekiği	R
9. <i>Paeonia mascula</i>	Tıbbi Yakayık	R
10. <i>Ruscus aculeatus</i>	Diken kökü	V

E = Endangered, R = Rare, V = Vulnerable, K =

### *In terms of marketing*

As mentioned before, the majority of the NWFP are exported mainly as raw material and due to the lack of processing capacity the main part of the revenue is going out. Furthermore, lack of infrastructure and difficulties on the access to the markets of the rural areas ensure the important part of the profit go to middlemen and traders other than the local people. Facilities for handling, storage, processing, access to markets are absolutely needed for getting a greater profit for the rural people and country's economy as well. The following are recommended:

- Measures for advanced processing facilities should be encouraged, supported and strengthened in order to export as final products, instead of raw material so as to provide more revenue for local and national economy;
- International agreements should be properly applied and experts should be employed in customs controls during the NWFP trading;

- Standardization measures for certain NWFP through international norms should be established and applied effectively;
- Research, monitoring, evaluation and information should be provided and followed concerning the actual trends in national and international markets.

*In terms of contribution to rural employment and other socio - economic aspects*

NWFP range from products used for local consumption to products that are traded in the national and international markets. However, in many countries, particularly developing countries, the majority of these products are used for subsistence in support of small-scale, household-based enterprises that provide income and employment for rural people, especially women. In such countries, forest grazing, forest fodder and collection, grading and processing of aromatic and culinary plants are a major income generating activities and contribute to local and national income. Therefore, goods and services provided by forests and trees are often much more important locally or even nationally than timber production in some regions.

Government, NGOs, private sector, donors and assistance agencies should place adequate emphasis on NWFP activities which have a high potential for poverty alleviation, food security and nutrition of rural people living around forests when designing, implementing and evaluating development policies and programmes (e.g. forestry, health and nutrition) in forested areas.

Efforts should be dedicated by all concerned institutions/organisations to enhance the overall socio-economic benefits based on NWFP.

Evaluation of all benefits of NWFP, also including specific non-market benefits and socio-cultural values, should be given increased attention by all related parties. Management policies should be based on an adequately representative structure amongst environmental, economic and socio-cultural interests.

Gender considerations should be given appropriate importance while implementing policies and programmes relevant to NWFP.

The Forest Law gives uses and production rights to forest villagers and local communities that should be improved and sustained.

Forest villagers and other interested groups that are interested in the protection, production, processing and marketing of NWFP should be trained.

## **REFERENCES**

- Josep A, Fuwape and Jonathan C. Onyekwelu 1997, The Economic values of NWFP in Nigeria, XI WFC Proceedings, volume 3., Antalya (FAO, 1999- State of the World Forests).
- Hibberd, J.K. 1997, International Forest Environment, Research and Management, Canberra, Australia.
- Merlo, M., 1995, Common property forest management in northern Italy, Unasylva 180, Vol. 46.
- Özhatay, N., Koyuncu, M, Atay, S., Byfield, A, 1997 Türkiye'nin doial Tıbbi Bitkilerinin Ticareti Hakkında bir Çaliima (Actions for Plants), Doial Hayati Koruma Derneii, Istanbul.
- Ministry of Forestry, 1999, Forestry Special Expertise Commission Report for the 8<sup>th</sup> Five Year Development Plan (unpublished).
- FAO, 1997, State of the World Forests

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## **POLITIQUES VISANT À PROMOUVOIR LES OPÉRATIONS DE COLLECTE ET L'UTILISATION DURABLES DES PRODUITS FORESTIERS AUTRES QUE LE BOIS EN TURQUIE**

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### **RÉSUMÉ**

Dans de nombreux pays du monde, et en particulier dans les pays en développement, les produits forestiers autres que le bois tiennent une place essentielle pour des groupes nombreux de populations rurales car leur récolte et leur transformation ainsi que la commercialisation assurent leur subsistance, des revenus et un travail; cette activité répond en outre aux besoins spirituels et culturels, elle est une source de devises, préserve la biodiversité, etc.

Il est nécessaire d'améliorer les méthodes de multiplication, de gestion, de récolte, d'entreposage et d'utilisation, de promouvoir la participation des femmes, d'accroître l'efficacité des installations de transformation et de développer les moyens d'assurer l'exploitation durable de ces produits. Les petites entreprises d'exploitation forestière représentent également la principale source d'emploi pour les populations rurales, dont le travail consiste essentiellement à récolter et à transformer les produits forestiers autres que le bois.

La Turquie est un pays qui présente une grande richesse de flore et de faune, généralement dans les forêts et les terres boisées. Il est toutefois de fait que l'exploitation excessive, l'insuffisance des cultures, l'inefficacité des mesures de protection, l'insuffisance de la connaissance sur les ressources de la flore sauvage et l'insuffisance des données entre autres facteurs, entravent les efforts de développement des produits forestiers autres que le bois.

Dans le document, on examine la place actuelle des produits forestiers dans la foresterie et le potentiel de développement du secteur en se fondant sur un certain nombre de publications. On présente aussi la situation actuelle, ainsi qu'un projet de cadre de politique générale et de directives en vue d'une exploitation durable des produits forestiers autres que le bois en Turquie.

**Mots clefs :** produits forestiers autres que le bois, communautés rurales, petites entreprises d'exploitation forestière, espèces endémiques, récolte, transformation, consommation, commerce.

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## **ВНЕДРЕНИЕ ОТВЕЧАЮЩИХ КРИТЕРИЯМ УСТОЙЧИВОСТИ МЕТОДОВ ЗАГОТОВКИ И ВИДОВ ИСПОЛЬЗОВАНИЯ НЕДРЕВЕСНЫХ ЛЕСНЫХ ТОВАРОВ В ТУРЦИИ**

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### **РЕЗЮМЕ**

Для многих стран мира и особенно для огромного числа сельских жителей в развивающихся странах заготовка, переработка и сбыт недревесных лесных товаров (НДЛТ) имеют жизненно важное значение с точки зрения обеспечения средств к существованию, доходов и занятости, а кроме того, они позволяют удовлетворять духовные и культурные потребности, служат источником иностранной валюты, помогают сохранять биоразнообразие и т.д.

Чтобы обеспечить устойчивость заготовки недревесных лесных товаров, необходимо совершенствовать методы просвещения, управления, заготовок, хранения и использования; расширять участие женщин; модернизировать перерабатывающие предприятия и создавать новые мощности. Малые предприятия в лесном секторе также представляют собой важный источник занятости для сельских жителей, которые в основном занимаются заготовкой и переработкой недревесных лесных товаров.

Турция относится к странам с богатейшей флорой и фауной, которая обычно обитает в лесах и лесных территориях. Однако совершенно очевидно, что чрезмерные заготовки, ограниченные возможности выращивания, неэффективные природоохранные меры, плохое знание ресурсов дикой природы и недостаточный объем данных являются важнейшими факторами, угрожающими нынешним усилиям в области развития сектора НДЛТ.

В настоящем докладе, основанном на целом ряде публикаций, рассматриваются нынешняя роль и потенциальные возможности недревесных лесных товаров в лесном секторе, а также соответствующих учреждений. В нем также содержатся обзор существующего положения и проект политики и руководящих принципов устойчивого управления сектором недревесных лесных товаров в Турции.

**Ключевые слова:** НДЛТ, сельские общины, малые предприятия в лесном секторе, эндемические виды, заготовка, переработка, потребление, торговля.

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# **CONSIDERATIONS ON THE NATIONAL POLITICS, SOME MANAGEMENT STRATEGIES AND SUSTAINABLE PRODUCTION NWFP**

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## **Summary**

People have benefited from Non-Wood Forest Products (NWFP) for many generations and many of the products have as long a tradition in human history as do timber products. We have been using various terms to describe Non-Wood Forest Products, including minor, secondary, special, non-timber and none traditional. On the other hand, NWFP are plants and parts of plants that are harvested from within and on the edges of natural and disturbed forests. NWFP are formed into a diverse set of products:

leaves and twigs that may be components of decorative arrangements;  
food items such as fruits, fungi, and juices; and  
roots, leaves and bark processed into herbal remedies or medicines.

Besides, NWFP contribute significantly to local and regional economies. If the current trends continue the trade and use of NWFP will grow substantially over the near future. We would be hopeful that NWFP have recently been receiving more attention from everybody.

On the other hand, Europe has got 11 000 species of plant and at least 2000 species are used on a commercial basis, some 1200-1300 of which are native to Europe. Of these, 90 percent is still wild collected (some 20 000-30 000 t/yr). Wild collection is particularly prominent in Albania, Turkey, Hungary and Spain. There are approximately 9500 plant species in Turkey and 3000 of these are endemic and native to Turkey. Some of the endemic species are an important part of the world NWFP market, for example; storax, snowdrop (*Galanthus nivalis*), bay-leaf (*Laurel nobilis*), stone pine cone (*Pinus pinea*). Analysis of trade data revealed that Turkey exports over \$100 million in a year (Figure 1).

In this paper, the role of NWFP in the national economy, the production methods in Turkey, the national politics of Turkey on this concept and sustainable forest management strategies are investigated. Some recommendations such as, adjustments to legislation, improved management programs, public awareness and education, enhancement of cultivation efforts and certifications of plant material from sustainable sources are proposed.

Key words: Non-Wood Forest Product (NWFP), Sustainable Management, Economics.

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## **Introduction**

People have benefited from Non-Wood Forest Products (NWFP) for many generations in many areas such as medicines, food items, cosmetics, pesticides and decorative arrangements. As a NWFP, we can understand the following items; trees, bushes, branches, twigs, fruits, leaves, roots, bark and flowers of plants, onions, rhizomes, rounds, fungi, forest soil and the others.

Besides, NWFP contribute significantly to local and regional economies. If the current trends continue the trade and use of NWFP will grow substantially over the near future. In Turkey, generally there is an important commercial potential related to wild collection of medicinal plants. Every year, some thousand tonnes of roots, leaves, flowers and seeds belonging to native plants of Turkey are collected for both exporting and local needs.

In Turkey, the collection of endemic and native species from the wild has long been known. For example, every year 500 tonnes of roots of *Gypsophila* and *Ankropetalum* and about 90 tonnes of seeds of

*Colchicum speciosum* have been collected. Consequently, some species may become threatened as a result of over collection from the wild (Özatay, 1997).

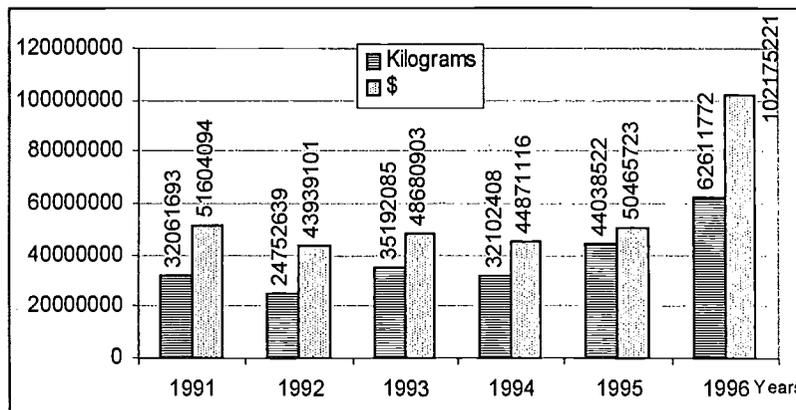
In this paper, the role of NWFP in the national economy, the production mistakes in Turkey and the other issues are investigated. Furthermore, some recommendations such as adjustments to legislation, improved management programs, public awareness and education and sustainable management strategies are proposed.

### The Role of NWFP in Turkey's Economy

Europe has about 11 000 species of plant and at least 2000 species are used on a commercial basis, some 1200-1300 of which are native to Europe (Lange, 1998). Turkey has a crucial position in NWFP because of its geographic conditions. There are approximately 9500 plant species in Turkey and 3000 of these are endemic to Turkey. Some of the endemic species are an important part of the world NWFP market, for example; storax, snowdrop, bay-leaf, stone pine corn.

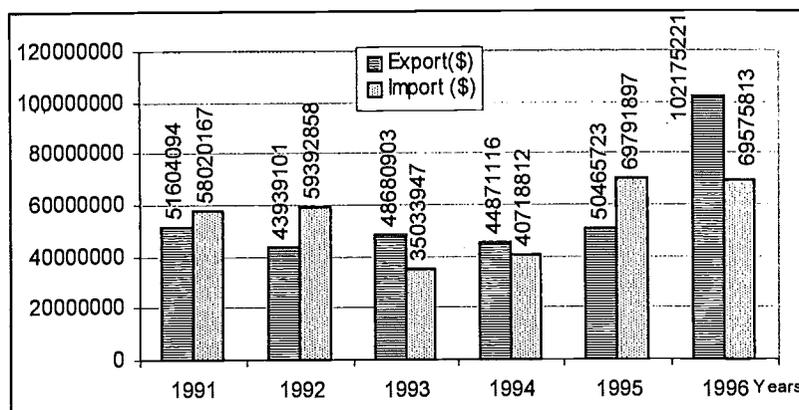
Turkey has a rich flora and fauna inside or outside forest areas. Although, some of the NWFP (for example; resin, storax, pine roots with resin) have been harvested by Forest General Administration. The others have been harvested by unconscious, unplanned and overzealous collection according to the situation of the demand and supply.

NWFP related to a yearly production plan are resin, storax and pine roots with resin. Some NWFP unrelated to a yearly production plan are bay-leaf, stone pine corn, oak gall, acorn, juniper berries, lime leaves and flowers, eucalyptus leaves, carob, chestnut etc. (....., 1995).



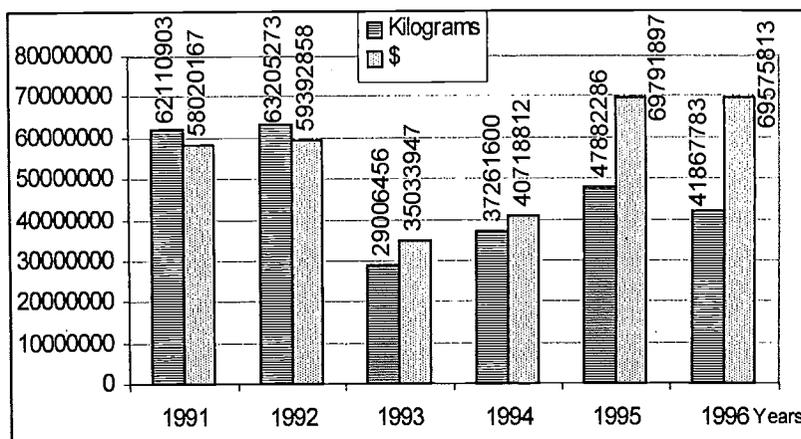
**Figure 1. Exports of NWFP From Turkey: 1991 to 1996 (The Records of NWFP Department Adm. of Forest Gen. Adm. of Turkey)**

The importance of NWFP to the economic portfolio of Turkey has been increasing each day. Although, the value of NWFP exports is over \$100 million, the value of imports has reached to \$70 million in recent years (Figures 2,3).



**Figure 2. Comparison of Export-Import Situation of NWFP of Turkey. (The Records of NWFP Department Adm. of Forest Gen. Adm. of Turkey)**

It is investigated that the value of NWFP export is covered about 60% of total forest products exports of Turkey ( Bozkurt and Göker, 1981). Prominent NWFP of export of Turkey include; mushrooms, kekik (thyme), bay-leaf, cinnamon, cumin, carob. Turkey is an important supplier for these products in the world markets. Important imported NWFP are rhizome and rubber (Blatner and the others, 1998).



**Figure 3. Imports of NWFP to Turkey: 1991 to 1996. (The Records of NWFP Department Adm. of Forest Gen. Adm. of Turkey)**

The collection of NWFP has contributed to the rural economies of some countries. Although Turkey has got tremendous potential for NWFP, the additions of this sector to the regional and national economies aren't at the desirable level.

### The Process Failures of NWFP In Turkey

The lack of social and technical regulation, improper workforce and the other issues regarding the harvesting of NWFP could negatively impact the NWFP industry. The problems could lead to over-harvesting, degradation of the environment, quality and productivity failures regarding NWFP and some social problems.

Stocking and transporting of NWFP collected in improper conditions change the physio-chemical properties of the NWFP and cause loss of yield. In the collection of the some NWFP such as roots from the under ground by machine or workforce, an important erosion problem appears in the region over time due to not paying due attention to the environment and the soil.

Continued harvesting without prudent management could lead to degradation of the forest and social ecosystems. Decline of the forest could result in loss of habitat and availability of products. Thus, Turkey is faced with the loss of some natural species. The natural occurrence of endemic species in Turkey have been notably reduced due to over-harvesting and some of the species should be added to the Convention for International Trade in Endangered Species (CITES).

## **Sustainable Management Strategies of NWFP**

Most forest management strategies are focused on timber-based products. There is a wealth of knowledge on managing forests for wood products. But very little information exists on managing forests for edible, medicinal or floral products. Silvicultural prescriptions for natural forest ecosystems that include NWFP are severely lacking and much more work is needed to develop a comprehensive body of knowledge on how to manage forest resources for NWFP.

As only few important NWFP were used for trade, these products did not get due emphasis from forest managers and policy-makers who concentrated on timber and other wood products. Despite this lack of attention and policy thrust, collection, processing and trade of NWFP continued to thrive in social and traditional uses. In recent years, economic value has been growing in local, national and international markets.

Since the Rio Earth Summit and Launching of the Bio Diversity Conventions, most countries have realized the need to take steps for development of policy guidelines for management and sustainable harvesting of NWFP. Considerable effort is still required at national and international levels in policy development, analysis and proper implementation. Close collaboration with the actual gatherers and primary users in the local communities, researchers and Non-Government Organizations (NGO) is required. (Mukerji, 1997).

Basic assessment data is vital for sustainable management strategies of NWFP. This includes the evaluation of the economically important plants available in a given area. How plentiful they are, how they can regenerate to ensure sustainable harvesting, distribution of forest types, which parts give what product.

There is an urgent need for each country to conduct research work on the following vital subjects for development of sustainable management practices for various NWFP (Mukerji, 1997, Gould, 1998).

- Codification and evaluation of all local knowledge about occurrence, harvesting technique and use of various NWFP both for subsistence and sale.
- Collection of quantification data covering the entire year to better assess seasonal influence on growth and yield of NWFP from different plant parts like leaves, flowers, fruits, rhizome, bark, shoots etc. in a representative unit area.
- Development of improved technology for natural propagation, non-destructive harvesting, post-harvest treatment for increasing shelf life, local primary processing and storage to reduce wastage and over-harvesting.
- Prospecting, screening, evaluating chemical and pharmacological NWFP and identifying candidate species for development of products and uses.
- Developing silvicultural systems for ensuring multiple use of forests to enhance desired NWFP production along with timber yield.
- Developing techniques for domestication through biotechnology for cultivation in agroforestry systems for species that have developed industrial demand to prevent unsustainable exploitation in natural forest areas and for ensuring a regular supply to the industry.
- Development of processing and product diversification technology and market information system for improved product availability and market scope and to reduce replacement by synthetics.

The quantification of the contribution of NWFP in the national economy is essential, especially in the informal sector of meeting the subsistence needs, employment generation, health care, food security, etc., of the rural people as well as its true commercial value in local, regional, national and international trade. Such assessment of NWFP resources as well as quantification and valuation of benefits will ensure a better focus of policy makers on the need for investment and development of these vital sectors of rural and national economy.

## **Development of Operational Programmes**

Sustainable harvesting should be first oriented towards meeting local needs and only then can commercial prospects be explored. For large-scale commercial exploitation, the focus needs to be ex-situ cultivation to preserve the natural resources and ensure regular supply.

Moreover, creation of a national level program for assessment of demand outlook, identification of market opportunities and ultimate use at national and international level as well as price trend and possible threat from substitutes at national and regional level are important for market development. There is an imperative need for development of regional co-operation in exchange of market information, process technology, production and price situation and international demand to counter monopolistic market control by cartels of multinational traders and industry.

On the other hand, the key to developed management of NWFP is demonstrated to be collaborative management, which is being implemented by participatory rural appraisal. It is suggested that sustainable NWFP forest management strategies also need to address economic and social aspects besides just those of ecological silvicultural and ecosystem processes.

## **Awareness and Education of Rural Communities**

Generally, the local people have fairly good knowledge as to where and when to harvest and which product to derive maximum profit. However, the assumption that local harvesting is being done on a sustainable basis is unfounded as it is mostly market driven and new technologies and tools for gathering, post-harvest processing and storage have not percolated to the grassroots level leading to low quality yield and a lot of wastage.

As such, there is urgent need for organizing, through appropriate agencies, the training of universities, Forest General Administration, proper firms and local stakeholders in modern methods of harvesting for sustainable production as well as technology for storage and post-harvest treatment, primary processing and quality control. This will ensure additional value and ready acceptance of the products at attractive prices in the markets. Moreover, the village-level organizations like cooperative societies will be in a better position to implement the approaches in this subject.

Tenure rights of local people and forest residents are an important issue for sustainable development of NWFP and its commercial harvesting. In Turkey, the public owns most of the forest area. However, the local people have the right of collection of some NWFP for personal consumption either free of cost or on payment of a small token fee. Trade in most of the commercially important products like resin and storax, etc. have been either nationalized or is done only through designated traders without free market conditions. As such, there is urgent need to clarify these tenure arrangements and codify the layers of traditional rights, use pattern, dwellers, concessions and privileges of the local communities and forest settlers.

## **Conclusions**

Today, many countries do not have policies related to NWFP and such there is an urgent need for improvement of policies that consider the need to protect the forest resources, to benefit local

communities, and to meet their cultural and spiritual needs. However, some efforts have been initiated some governments to regulate the collection of many NWFP on public lands. Several mechanisms are being evaluated, including long-term leases and harvest permits. The development of appropriate and effective regulatory methods however, is still in its infancy (Chamberlain and the others, 1998).

As to Turkey, the local public and the other entrepreneurs derive substantial revenue from the collection, sale and processing of some NWFP that improve their economic status. Unfortunately the contributions of these NWFP are yet to be properly reflected in their contributions to GDP of the country. On the other hand, the lack of regulations regarding the harvesting of NWFP could negatively impact the NWFP industry in Turkey. It could even lead to over-harvesting and degradation of the resources.

Essentially, in both Turkey and the other countries, some models do exist for other products, particularly wild life, that could prove helpful in developing appropriate regulatory schemes for NWFP. Some existing models are designed to regulate harvest, generate revenues for the management agencies and provide significant disincentives for over-harvesting. (Chamberlain and the others, 1998). Undoubtedly, in Turkey, regulations can be developed and implemented that will improve the management and marketing of NWFP, too.

The other important issues are markets and consumers. Perhaps the most critical factor that will affect the future of the NWFP industry is the nature and temperament of consumers. These characteristics include demographics (age, income, etc.) and psychographics (preferences, aversions, opinions, etc.). The tremendous growth in the industry is being driven by a segment of the populations that shares similar demographics. The psychographic characteristics of the consumers also affect product demand. Products that are preferred today may be rejected tomorrow! Monitoring and understanding consumer characteristics are essential for the long-term sustainability of the NWFP industry because only by understanding the psychographic attributes of the consumer base can appropriate marketing strategies be developed.

Finally, much more effort is needed to document and share the knowledge regarding NWFP that exists throughout the world. And much more work (related to education, marketing, regulation, etc.) is needed to develop a comprehensive structure of knowledge on how to manage NWFP resources in both Turkey and other countries.

## Literature Cited

1. Özatay, N. and Atay, S., "Kekik in Trade in Turkey", Proceedings of the XI. World Forestry Congress, Vol. 3., 13-22 October 1997, Antalya / Turkey.
2. Lange, D., "Europe's Medicinal and Aromatic Plants: Their Use Trade and Conservation", Traffic International, 1998, UK.
3. \_\_\_\_\_, The methods of Production and sale of NWFP, T.C. The Ministry of Forest, Forestry General Administration, 1995, Ankara.
4. \_\_\_\_\_, The Records of NWFP Department Adm. of Forest Gen. Adm. of Turkey, 1998, Ankara.
5. Bozkurt, Y. and Göker, Y., "Orman Ürünlerinden Faydalanma (Using of the Forest Production)", İ.Ü. Press No: 2840, 1981, Istanbul.
6. Blatner, A. K. and Alexander, S., "Recent Price Trends for Non-Timber Forest Products in the Pacific Northwest", Forest Product Journal, Vol. 48, No: 10, 1998.
7. Mukerji, A. K., "Importance of Non-Wood Forest Products (NWFP) and Strategies for Sustainable Development", Proceedings of the XI. World Forestry Congress, Vol. 3., 13-22 October 1997, Antalya, Turkey.
8. Gould, K. Howard, A. F. and Rodriguez, G., "Sustainable Production of Non-Timber Forest Product: Natural Dye Extraction from El Cruse Dos Aguadas, Peten, Guatemala", Forest Ecology and Management, 111 (1), 1998, U.S.A.
9. Chamberlain, J., Bush, R., and Hammet A. L., "Non-Timber Forest Products", Forest Product Journal, Vol. 48, No:10, 1998.

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# **HARVESTING OF NON-WOOD FOREST PRODUCTS IN POLAND AND THEIR RESOURCES – AN OVERVIEW”**

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## **Summary**

This paper reviews commercial harvesting of non-wood forest products (NWFP) – first of all understory vegetation resources (berries, mushrooms and herbal plants). The reason for decreasing NWFP harvesting statistics in the last years consists in changes in management solutions adopted recently – from one state company to many private firms – the data of the Polish statistical office is not complete. Until 1999, because of new regulations, the view on the harvest of NWFP is more detailed and complete. The paper also makes a comparison between harvesting and resources of some important NWFP.

**Key-words:** non-wood-forest-products; non-wood-forest-products-resources; non-wood-forest-products-harvesting

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## **Introduction**

Inventory and study of yield of the most important non-wood forest products and recording of data on their harvesting - for commercial and own use are very important in sustainable forest use. Systematic inventories conducted in the same time intervals allow assessing of resource dynamics. Comparing of data on resources and harvesting makes it possible to evaluate whether the use is sustainable.

Detailed information about "geography of resource" and yield of the most important forest berry - bilberry (*Vaccinium myrtillus* L.) and herb - alder buckthorn (*Frangula alnus* Mill.) is already available (1). Unfortunately, in Poland the complex research on other forest floor species has not been conducted. Mushrooms also have not been a subject of inventory and yield research yet. Harvesting for personal use has never been studied, unlike in Czech Republic (8), Finland (7) or Sweden (4).

Before 1989 very detailed statistics of harvested forest berries, mushrooms and herbs had been recorded. After this year, when companies dealing with purchase and processing of NWFP became private, statistics are very rough and show lower level of harvesting than is actual.

## **Methodology of Inventory and Yield Research**

In Poland inventories were carried out according to similar methodology. Workers of Forest Service filled out questionnaires about the cover area and some other characteristics of inventoried species. The result of inventory was the complete and detailed data on "geography of resources" of understory vegetation.

Yield research is the second step to recognise forest floor resources. It is realized using a net of sample plots, on which berries or herb raw-materials are gathered. Grochowski (1) introduced two important terms: theoretical yield - everything that could be harvested, and practical yield - the amount of berries or herb raw-material that can be harvested with economical benefits and without resource destruction. Only data collected in these two parts of research give the full information about resources.

## Resource and Harvesting of the Most Important Forest Floor Species

Resource - as a practical average yield, and commercial harvesting of selected forest floor species, organized by state, are shown in Table 1. Grouping of data from many years makes it possible to avoid seasonal variations in yields.

**Table 1. Resource and harvesting of selected understory species \***

Species	Practical average yield per year tonnes	Harvesting - average per year, tonnes			
		1952-60	1961-70	1971-80	1981-85
1	2	3	4	5	6
<b>bilberry</b> ( <i>Vaccinium myrtillus</i> L.)	30105	13715	144666	6921	2710
<b>red bilberry, cowberry</b> ( <i>Vaccinium vitisidaea</i> L.)	1285	541	206	61	89
<b>cranberry</b> ( <i>Vaccinium oxycoccus</i> L.)	470	160	126	39	19
<b>wild raspberry</b> ( <i>Rubus idaeus</i> L.)	2200	1045	708	242	64
<b>blackberry</b> ( <i>Rubus sp.</i> )	4960	1958	1666	1236	368
<b>rose</b> ( <i>Rosa sp.</i> )	3120	1287	724	829	370
<b>mountain ash</b> ( <i>Sorbus aucuparia</i> L.)	4695	478	768	1046	863
<b>elder</b> ( <i>Sambucus nigra</i> L.)	3755	533	894	1287	834
<b>chanterelle</b> ( <i>Cantharellus cibarius</i> Fr.)	5000	-	2622	1951	1356
<b>edible boletus</b> ( <i>Boletus edulis</i> Bull.: Fr)	3000	-	499	278	70
<b>butter boletus</b> ( <i>Suillus luteus</i> L.: Fr.)	3200	-	412	382	181

\*Data are compiled from "Ubozna produkcja lesna" (1) (Table 12 and 13, page 288, Table 16, page 316, and Table 25, page 459). Data on the practical average yield per year, except bilberry, were estimated by specialists in 1965.

Nowadays, according to authors (1, 6), these resources are rather lower. Only commercial, organised harvesting is shown in Table 1. No one recorded gathering activity of people for personal use, thus its level is unknown. Harvesting organised by the state was decreasing greatly from year to year.

If the estimates of practical yield were correct, the use of forest vegetation resources was sustainable. Among forest berries only bilberry was utilized intensively – in 1961-1970 the harvesting reached almost a half of the practical yield (to obtain the total harvest amount it would be necessary to add harvesting for personal use). Utilization of mushrooms was generally intensive but far to "overharvesting" as well.

In 1998 Forest Use Department of Forest Research Institute (Warsaw) conducted the inventory of four herb species, which are under partial conservation: alder buckthorn (*Frangula alnus* Mill.), lily of the valley (*Convallaria maialis* L), asarabacca (*Asarum europaeum* L.), and common bearberry (*Arctostaphylos uva-ursi* L.). The method used in the inventory was similar to that used in earlier works. The results of the inventory revealed that the resources of the first two species are large, while the resources of asarabacca and common bearberry are a little low and it might be necessary to put these species under total conservation. A comparison of the results of two alder buckthorn inventories conducted in 1963 (2) and 1998 is made in Table 2.

**Table 2. The area of alder buckthorn (*Frangula alnus* Mill.)**

Year	Ground cover class (%)			Total
	1-30	31-60	above 60	
	Hectares			
1963	148147	12286	3179	163612
1998	279573	88315	25824	393712

## Conclusions

Unfortunately, due to lack of research work and detailed statistics, such comparisons as presented in Table 1 are impossible now. Existing inventory and yield research results are out of date and statistics are not complete. The only way to solve this problem is the so-called multipurpose forest inventory (5). According to Glowacki (3), in 2000, Polish Main Statistical Office begins to gather more detailed information about the harvesting of understory vegetation resources.

## References

1. Grochowski, W. 1990: *Ubozna produkcja lesna*. [Minor Forest Production]. PWN. Warszawa.
2. Grochowski, W., Zdanowski, A. 1963. *Bazy kruszyny pospolitej (Frangula alnus Mill.)*. [Resource of alder buckthorn (*Frangula alnus* Mill.)] Forest Research Institute. Warsaw. Typescript.
3. Glowacki, S. 2000: *Aktualne problemy ubocznego uzytkowania lasu w Polsce* [Recent problems of Minor Forest Utilisation in Poland]. Stan i perspektywy badan w zakresie uzytkowania lasu. Konferencja naukowa, IBL, Sekocin, 30-31.03.2000.
4. Hultman, S. G. 1983: *Hur mycket bär och swamp plockar vi egentligen?* [How many berries and mushrooms do we actually pick?]. Var FU 35.
5. Lund, H. G. 1998: *The Non-Wood Forest Resource Mystery*. EFI Proceedings. 23.
6. Muszynski, Z., Muszynski, J., 2000: *Problem zrownowazonego i trwalego uzytkowania runa lesnego*. [Problem of sustainable utilization of forest floor resources]. Stan i perspektywy badan w zakresie uzytkowania lasu. Konferencja naukowa IBL, Sekocin, 30-31.03.2000.
7. Saastamoinen, O., Lohiniva, S. 1989: *Picking of wild berries and edible mushrooms in the Rovaniemi region of Finnish Lapland*. Silva Fennica. Vol. 23. No 3.
8. Sisak, L. 1998: *Socio-economic importance of main non-wood forest products in the Czech Republic*. Lesnictvi-Forestry, 44 (12).



## **LA RÉCOLTE DES PRODUITS FORESTIERS AUTRES QUE LE BOIS EN POLOGNE ET LE VOLUME DES RESSOURCES – APERÇU**

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### **RÉSUMÉ**

Les auteurs du document étudient l'exploitation commerciale des produits forestiers autres que le bois – en premier lieu les ressources du sous-étage du couvert végétal (baies, champignons et plantes aromatiques). La diminution des statistiques relative à l'exploitation de ces produits au cours des dernières années tient à des transformations dans les méthodes de gestion adoptées récemment – passage d'une unique société publique à un grand nombre de sociétés privées – ce qui fait que les données de l'Office polonais de statistique ne sont pas complètes. Jusqu'en 1999, du fait de la nouvelle réglementation, l'information sur les volumes récoltés de produits forestiers autres que le bois est plus détaillée et plus complète. Les auteurs comparent également la récolte et le volume des ressources pour plusieurs produits importants.

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## **ЗАГОТОВКА НЕДРЕВЕСНЫХ ЛЕСНЫХ ТОВАРОВ В ПОЛЬШЕ И ИХ РЕСУРСЫ: ОБЩИЙ ОБЗОР**

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### **РЕЗЮМЕ**

В настоящем документе приводится обзорная информация о коммерческой заготовке недревесных лесных товаров (НДЛТ), в первую очередь подпологовых растительных ресурсов (ягод, грибов и травянистых растений). Причина наблюдающегося в последние годы уменьшения объема статистических данных о заготовке НДЛТ заключается в проведенной в последнее время реорганизации управленческих структур (раньше этой деятельностью занималась одна государственная компания, а теперь – множество частных фирм); этим и объясняются пробелы в данных, собираемых Статистическим управлением Польши. С учетом новых правил картина заготовок НДЛТ до 1999 года являлась более полной и подробной. В настоящем документе приводится также сравнительный анализ заготовок и ресурсов некоторых важнейших НДЛТ.



# **POLICY GUIDELINES FOR THE PROMOTION OF A SUSTAINABLE UTILIZATION OF NON-WOOD FOREST PRODUCTS**

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## **Summary**

Hundreds of millions of people, mostly in developing countries but also in developed countries, derive a significant part of their subsistence needs and income from plant and animal products gathered from forests.

The sustainable utilization of NWFP is widely acclaimed by many national and international conservation and development agencies as an option for forest conservation and increasing rural income generation at the same time. However, there are also many constraints and frequently false hopes that have been raised by the promulgation of the value of NWFP.

There is a wide range of technical needs and social and policy implications involved when promoting NWFP. In this paper a number of important policy issues are reviewed related to increasing the economic potential of NWFP while at the same time, conserving the biological diversity of forest resources. These include: the need to develop suitable management systems; clarification of user rights over the resource, particularly where it is considered common property; research and development needs in understanding the biological dynamics of the resources and in domestication; development of appropriate monitoring and evaluation systems; development of effective processing and equitable marketing systems for the product; various legal issues and trade regulations, including intellectual property rights.

The paper provides an overview of some of these key policy issues and constraints by describing and analysing lessons learned from selected case studies dealing with the promotion of a sustainable utilization of NWFP.

**Key words:** NWFP, policy, management, forests, processing, trade.

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## **Introduction**

Since immemorial times, people have gathered plant and animal resources in the forest for their food and shelter needs. Examples include edible nuts, mushrooms, fruits, herbs, spices, gums, aromatic plants, game, fodder, fibres used for shelter construction, clothing or utensils, naval stores, and plant or animal products for medicinal, cosmetic or cultural uses. Still today, hundreds of millions of people, mostly in developing countries but also in developed countries, derive a significant part of their subsistence needs and income from plant and animal products gathered from forests.

“Non-wood forest products” (NWFP) and similar terms, like: “minor”, “secondary”, and “non-timber” forest products (NTFP), have emerged as umbrella expressions for the vast array of both animal and plant products other than wood (or timber in the case of “non-timber”) derived from forests or forest tree species. The term “NWFP” will be used throughout this paper for reasons of consistency and clarity and does not imply any value judgement regarding the other above described terms in use.

Deforestation and forest degradation resulting in a severe loss of biological diversity have stimulated many programmes and activities world wide to halt and remediate this process. Among the underlying causes of deforestation is poverty, particularly of socially disadvantaged groups in rural areas.

Therefore the sustainable use of forest plant and animal species is receiving even more attention now as a means of mitigating deforestation, hence maintaining forest cover and preserving biodiversity, while at the same time realising a sustainable income from it. NWFP are now widely acclaimed by many national and international conservation and development agencies as a panacea for forest conservation and rural income generation. And indeed, in many cases, their sustainable use can actually contribute significantly towards achieving both objectives at the same time. However, there are also many constraints and frequently false hopes that have been raised by the promulgation of the value of NWFP.

There is a wide range of technical needs and social and policy implications involved when promoting NWFP. What follows is an attempt to provide a short overview of some key development constraints and their related policy issues.

### **Policy guidelines related to the management of resources providing NWFP**

The foremost issue regarding the development of NWFP, be it for subsistence or commercial use, is related to the lack of information on the availability and growth dynamics of the species from which the non-wood products can be obtained. First, the species and their spatial distribution needs to be well known and assessed. In fact, in most cases the distribution of many species providing NWFP is not known at all and even less their potential yield of non-wood products that can be harvested in a sustainable manner. Botanical research and development work is needed in order to define the baseline information required to elaborate available and sustainable supply levels for major non-wood products for key species. Also, harvesting techniques can still be further improved as in many cases, the harvesting of the product (like roots or bark for example) is critically affecting the growth of the species or may even kill it.

In addition to compiling descriptive and quantitative data on the area and quality in terms of biological diversity of the existing (forest or tree) resources, clarifications on the access and user rights to the resources providing NWFP are part of the essential baseline information. The commercial exploitation of many NWFP is often undertaken in a non-sustainable manner because of a free access system to the forest for harvesting resources in uncontrolled/unlimited quantities. The majority of species, which actually yield non-wood products, occur with low frequency, especially in tropical forests. In general, species with low densities are unlikely to become important suppliers of commercially large quantities, as they are highly susceptible to the impacts of over-harvesting. Basic research knowledge on the resource, in terms of both biology and the socio-economic considerations is essential before any commercial exploitation of a particular NWFP can be promoted. As appropriate and feasible, local knowledge on conservation and use of NWFP resources should be collected, documented and adopted as a basis for their management.

In case of forest based resources, forest management techniques to address the above mentioned resource supply constraints for NWFP are usually done by adjusting silvicultural interventions in a way to promote the growth of the selected species. For example, girdling in the forest of unwanted species around a selected tree is done to favour its growth and consequently increase its fruit production. However, forest management and silvicultural interventions for NWFP are expensive to implement and they also have their technical limits. In addition, in those cases where several user groups have conflicting user claims, like for timber, or for grazing and/or for gathering NWFP, it is quite a challenge to find and implement the silvicultural treatment(s) that would satisfy all. For example in semi-arid regions, there are conflicts between NWFP gathering and grazing interests. Pastoral interest leads to lopping of tree branches for fodder or for setting fire to renew grazing lands. These practices result in habitat degradation and species loss with subsequent reduced availability of NWFP. In dense forest zones for example, conflict between the wood values and non-wood values for many tree species exists, especially when the derived benefit from timber and NWFP are directed to different user groups. *Baillonella toxisperma* (moabi), *Pterocarpus soyauxii* (padouk), *Carapa guianensis* (andiroba) and *Milicia excelsa* (iroko), to name just a few, have high timber values at overseas markets, but their local NWFP uses (fruits) are valued highly by the native people.

Domestication and farming of species providing NWFP is another option to address resource supply constraints. When highly valued species become depleted in the forests, domestication is and has been usually the most common response. As farm crops, through agroforestry schemes or full-scale plantations, species providing NWFP can be cultivated. Most of our agriculture crops were once NWFP. Gradually, these forest plants and animals were domesticated by farmers and became part of agriculture. This domestication process is still ongoing, as shown by recent and successful examples such as macadamia nuts (*Macadamia integrifolia*) or tropical exotic fruits like star fruit (*Averrhoa carambola*) or durian (*Durio zibethinus*).

However, domestication of the resource through farming is not always technically possible, economically feasible or socially and environmentally acceptable. Domestication and farming of NWFP may work well for some species but not for others, like the case of some highly valued mushroom species but which we do not yet know how to cultivate them. Also, farmed products may be considered qualitatively inferior when compared with wild gathered species, such as is the case of many medicinal plants (ginseng). The economic feasibility for farming NWFP is limited as long as the non-wood products can still be obtained at a lower price from forest gathering. The social dimension of domestication is also important. Often forest dependent peoples or those socially disadvantaged groups, who actually depend on gathering NWFP for their survival and cash income, might not have access to farm land at all, or not be able to compete with large-scale production of NWFP by well-established farmers (such as the large-scale farming of plants like mint or camomile for herbal teas). Farming NWFP also has an environmental implication in the sense that it reduces the economic incentives for forest dependent peoples to conserve the ecosystems in which the NWFP species still may occur.

### **Policy guidelines related to processing, marketing and trade**

Improving processing, marketing and trade of NWFP is the next key issue, especially when a commercial utilization of NWFP for national or international trade is envisaged. NWFP have attracted considerable global interest in recent years due to increasing recognition of their contribution to household economies and food security. Several million households worldwide depend heavily on these products for subsistence consumption and/or income. At the local level, some NWFP provide raw materials for industrial processing, including for (inter-) nationally traded commodities such as foods and beverages, confectionery, flavourings, perfumes, medicines, paints and polishes. Presently, some 150 different NWFP are significant in terms of international trade, of which the most important ones are: gum arabic, rattan and bamboo products, cork, forest gathered vegetables, herbs and mushrooms, essential oils, wild honey and plant and animal parts for pharmaceutical products.

Major impediments for trade in NWFP include: the irregularity of supply and the large number of low volume products involved; unsuitability of product standards to regulations and consumer preferences; the absence of quality control and product information to consumers; and in many developing countries the insufficiency of transportation infrastructure (roads) for the rapid shipment of the products between production zones and the nearest major market (especially for fresh food products). For overseas trade, further bottlenecks are: the lack of regulations on the importation of these products (especially for food and medicinal plant products) or when they exist, cumbersome administrative customs procedures and lack of harmonization of NWFP import regulations among the importing countries.

Commercially successful processing and marketing of NWFP is basically a private sector driven issue, be it at the level of households, cottage industries or trans-national companies. However, commercial success also depends on appropriate government policies to create the conducive environment for the development of NWFP-based enterprises, particularly for those aimed at the household or village level of socially disadvantaged groups. National strategies may focus to facilitate the start-up of small-scale enterprises and that could include for example: technology and product development by providing access to improved technical standards, providing a framework for technology transfer and training programmes towards household processing or village level enterprises for marketing food products like mushrooms, herbs, fruits or nuts; fiscal incentives and promotion of export and/or import substitution schemes. Along these lines, the FAO Community Forestry Unit has recently

developed a toolkit on “Market Analysis and Development for community-based tree and forest product enterprises”. This toolkit has been designed for extension workers to assist local people identify potential products and develop income generating activities through improved processing and marketing of NWFP. (<http://www.fao.org/forestry/FON/FONP/cfu/topics/en/mark-e.stm>).

Fair trade associations often have a catalytic role to play towards a successful commercialization of NWFP. The aim is to promote the development of autonomy and emancipation of small-scale rural producers through the establishment of commercial relations based on fair trade. These organizations either buy products directly from the producers for resale at more rewarding (inter-) national markets or provide technical and marketing support to the rural producers associations locally. The profits are transferred back to the producers to be invested in the further development of their activities. This concept constitutes an important market support for developing countries to promote new products, and a growing number of cooperatives world-wide market their NWFP by means of this channel. Most successful are local (or village-level) processing activities to increase value adding, such as grading, improvement of packaging and conditioning of products. The aim is to ensure that demand and supply develop in parallel, that the supply is from sustainably managed resources, and that the products satisfy the expectations of the clients on the one hand, and improve the income of the producers on the other. This is a big challenge and may be difficult, but it is not insurmountable. Working progressively, it is clear that many more NWFP will be able to follow the commercial path taken by numerous products that are now presently sold in large quantities in the international market such as herbal and aromatic products, honey and mushrooms, and handicrafts made with all sorts of non-wood forest products like pine cones, rattan, palmleaves, lianas or other natural fibres. An overview of some fair trade agencies, their activities and how to contact them is presented by Durbeck in the FAO Forest Department publication *Unasylva*, nr. 198: “Non-wood Forest Products and Income Generation” (1999/3), pg 9-11. [www.fao.org/docrep/x2450e/x2450e00.htm](http://www.fao.org/docrep/x2450e/x2450e00.htm)

## **Policy guidelines for institutional support**

Lack of institutional capability is a major constraint to the development of NWFP and weaknesses in the interrelated aspects of the above presented resource-processing-trade aspects are a symptom of an underlying lack of institutional capacity. Institutional strengthening involving clear policies, rules and regulations, development of skills, improved strategic planning, organisational systems and structures, decentralisation of activities and mechanisms for committed participation as an area requiring urgent attention by governments. For example: information on trade in NWFP is scarce and data are rarely collected or published at a national level. When data on NWFP are recorded, under-reporting, double counting, grouping of NWFP at different stages of processing or taken together with other products from agricultural sources, and the use of unrealistic prices, are systematic shortcomings of such statistics. Also, much of the production and consumption is at subsistence level and as a consequence their economic importance is still largely under-estimated or even ignored in government decision making regarding rural development, natural resource management planning and in government budget allocations.

As recommended by the International Expert Consultation on Non-Wood Forest Products (Yogyakarta, Indonesia, 1995 –governments should undertake formulation, review and/or revision of policies having direct impact on NWFP, with clear orientation towards sustainable management of resources by:

- Properly identifying and accounting the contribution of NWFP in the system of national accounts;
- Enhancing the investment and budgetary provisions for development of NWFP;
- Introducing appropriate pricing mechanisms;
- Granting local organizations (e.g. cooperatives, user groups) and private sector a greater voice in management of the resources;
- Recognising the socio-cultural importance/significance of the products and their resource base;
- Establishing strategies by clearly identifying priorities;
- Review existing rules and regulations having adverse impact on NWFP and take suitable legislative action and institutional adjustments to make necessary changes.

These proceedings are available on-line at [www.fao.org/docrep/V7540e/V7540e00.htm](http://www.fao.org/docrep/V7540e/V7540e00.htm).

The Expert Meeting further recommended that: governments should establish clear identity for NWFP by suitably incorporating it in the public forest administration system. Public administration agencies having jurisdiction over (and/or financial interest in) forest resources should have a clear mission and plans that proclaim and explicitly strengthen their commitment to stewardship of NWFP and partnership with local resource users, NGOs, private sector and other stakeholders and financial institutions. Planning, programming and intersectoral coordination (including development of relevant statistical information) should be explicit functions of the agency responsible for implementing forest/NWFP policy. Governments should support the establishment/strengthening of research institutions having capability to conduct research on the different aspects of NWFP and provided with funds, support facilities, trained researchers, and an effective mechanism for involving users of research results. Information systems (statistical, technological/scientific and others) need to be established, covering resource inventories, resource distribution, production, processing, marketing, utilisation, trade, consumption and other vital aspects.

The above mentioned policies and institutional support which specifically govern the conservation, management, harvesting, processing and trade of NWFP are lacking in most countries, but efforts have been made recently to redress this. Overall, the development and implementation of national policy frameworks to support the development of the NWFP sector remains a major challenge. Key elements for further policy debate and improvement include the regulations about the access to public forest resources and clarification of duties, responsibilities and user rights among forest owner and user groups. Particularly delicate and complex to address is the case of highly valuable NWFP such as medicinal plants where indigenous people claim their intellectual property rights and call for the implementation of benefit sharing arrangements with pharmaceutical industries or other resource user groups.

## **Conclusion**

In conclusion, much of the current effort on NWFP development is focusing on providing or increasing alternative sources of income for forest dwellers or poor populations living near the forest. Large-scale commercialisation of a product is neither guaranteed to benefit these people nor to protect the resource. It may not even be technically feasible or socio-economically viable. Calls for increased attention to production of NWFP are often less motivated by economic considerations than by environmental and social concerns. There is a range of policy implications involved and many important issues are being grappled with in the current efforts to tap the economic potential of NWFP. These include: the need to develop suitable management systems; research and development needs in understanding the biological dynamics of the resources and in domestication; clarification of user rights over the resource, particularly where it is considered common property; development of effective processing and marketing systems for the product and improving their trade regulations; and various institutional strengthening needs, particularly on the issue of intellectual property rights as to elaborate how the country, the local user or other entity can be adequately compensated for use of the resource by outsiders.

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## **DIRECTIVES DE POLITIQUE GÉNÉRALE POUR LA PROMOTION D'UNE UTILISATION DURABLE DES PRODUITS FORESTIERS AUTRES QUE LE BOIS**

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### **RÉSUMÉ**

Des centaines de millions de personnes, principalement dans les pays en développement mais aussi dans les pays développés, tirent une part importante de leurs revenus et satisfont une part importante de leurs besoins de subsistance des produits végétaux et animaux provenant des forêts.

L'utilisation durable de produits forestiers autres que le bois est applaudie par de nombreux organismes de protection de la nature et de développement nationaux et internationaux, qui y voient une possibilité de préserver les forêts tout en augmentant les revenus des communautés rurales. Toutefois, de nombreuses contraintes se présentent aussi et souvent la promotion de la valeur des produits forestiers autres que le bois a suscité de fausses espérances.

La promotion des produits forestiers autres que le bois met en jeu une gamme étendue de besoins techniques et des incidences d'ordre social et politique très diverses. Dans le document un certain nombre de questions importantes de politique générale sont exposées, qui portent sur les moyens d'augmenter le potentiel économique des produits visés tout en préservant la diversité biologique des ressources forestières. Il s'agit des éléments suivants : nécessité de mettre en place des systèmes de gestion durable; clarification des droits de l'usager sur la ressource, en particulier quand elle est considérée comme un patrimoine commun; besoins en matière de recherche-développement pour comprendre la dynamique biologique des ressources et pour les mettre en valeur; mise en place de systèmes efficaces de surveillance et d'évaluation; mise au point de systèmes efficaces de transformation et de commercialisation équitable du produit; plusieurs questions d'ordre juridique et réglementation commerciale, y compris la question des droits de propriété intellectuelle.

Le document contient un exposé général de quelques-unes de ces questions fondamentales de politique et de ces contraintes et expose et étudie les enseignements tirés de certaines études de cas consacrées à la promotion de l'utilisation durable des produits forestiers autres que le bois.

**Mots clefs :** Produits forestiers autres que le bois, politique, gestion, forêts, transformation, commerce.

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## **ВАЖНЕЙШИЕ НАПРАВЛЕНИЯ ПОЛИТИКИ СТИМУЛИРОВАНИЯ УСТОЙЧИВОГО ИСПОЛЬЗОВАНИЯ НЕДРЕВЕСНЫХ ЛЕСНЫХ ТОВАРОВ**

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### **РЕЗЮМЕ**

Сотни миллионов людей – прежде всего в развивающихся государствах, но также и в развитых странах - удовлетворяют значительную часть своих жизненных потребностей и получают доход за счет растительных и животных продуктов, заготавливаемых в лесах.

Многие национальные и международные природоохранные учреждения и учреждения, занимающиеся вопросами развития, приветствуют устойчивое использование недревесных лесных товаров НДЛТ как метод сохранения лесов при одновременном увеличении доходов сельского населения. Однако пропаганда ценности НДЛТ породила многие трудности и зачастую ложные надежды.

При стимулировании использования НДЛТ возникает широкий круг технических потребностей и социально-политических последствий. В настоящем документе рассматривается ряд важных вопросов политики, связанных с наращиванием экономического потенциала НДЛТ при одновременном сохранении биологического разнообразия лесных ресурсов. К ним относятся потребность разработки надлежащих систем управления, уточнение прав пользователя на ресурсы, особенно в тех случаях, когда они считаются общей собственностью, потребности в исследованиях и разработках для понимания биологической динамики ресурсов и для одомашнивания растений и животных, разработка надлежащих систем мониторинга и оценки, разработка эффективной системы переработки и справедливой системы сбыта товаров, различные правовые вопросы и торговые правила, включая права интеллектуальной собственности.

В документе дается общий обзор некоторых из этих ключевых вопросов политики и трудностей, основанный на описании и анализе уроков, извлеченных из отдельных монографий, касающихся стимулирования устойчивого использования НДЛТ.

**Ключевые слова:** НДЛТ, политика, управление, леса, переработка, торговля.

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# **ETUDE SUR LE DEVELOPPEMENT DES PRODUITS FORESTIERS NON LIGNEUX**

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## **SYNTHESE ET CONCLUSION**

### **1-/ CONTEXTE DE L'ETUDE**

Les produits forestiers non ligneux (PFNL) sont définis par la FAO, comme étant « tous les produits d'origine biologique aussi bien que les services, sortant de la forêt ou des terres d'usage similaire, excluant le bois dans toutes ses formes ».

En Tunisie, l'exploitation des ressources forestières fournit une gamme diversifiée de PFNL : des huiles essentielles, des produits d'alimentation, des produits de chasse et des produits d'artisanat local. Provenant soit de la simple cueillette par les usagers de la forêt, soit de l'exploitation par des entreprises, ces produits présentent un intérêt socio-économique manifeste au niveau national (recettes administratives, exportation), régional et local (à l'échelle communautaire et familiale).

Cette importance fait de la promotion de la filière des PFNL un créneau indispensable dans le développement du secteur forestier et une opportunité pour diversifier les sources de revenus des usagers et augmenter leur contribution dans la satisfaction de leurs besoins.

Dans les régions agro-forestières, les PFNL jouent un rôle social et économique prépondérant. La prise en compte de ces PFNL dans l'aménagement des forêts, constitue un élément stratégique déterminant pour assurer une gestion durable des ressources forestières.

Dans ce contexte, la Direction Générale des Forêts a confié au groupement tuniso-finlandais de bureaux d'études EXA-Consult/JAKKO POYRY la réalisation d'une étude pour recenser les PFNL et pour connaître leur importance sociale et économique. Sur la base de ce diagnostic un plan d'action pour la promotion de la filière des PFNL, a été élaboré.

### **2-/ METHODOLOGIE**

Le recensement des Produits Forestiers Non Ligneux (PFNL) et l'appréciation de leur importance socio-économique, ont été réalisés aux différents niveaux :

- Au niveau national : en analysant pour l'ensemble des PFNL, l'évolution des quantités exportées et leurs valeurs durant au moins les quatre dernières années 1995/1998 ;
- Au niveau administratif (régional et local) : l'analyse a porté sur les résultats des enquêtes réalisées auprès des services forestiers régionaux et locaux (165 triages, répartis dans 12 arrondissements). La collecte et l'analyse des données quantitatives (quantités et valeurs des PFNL, classés comme menus produits) ont concerné une période de 3 années (1995/1997) ;
- Au niveau communautaire et familial : Les résultats sont les produits de l'exploitation et l'analyse des données recueillies auprès de 43 douars et 630 familles parmi les usagers ;
- Des enquêtes complémentaires ont été menées avec les entreprises exploitant les PFNL ainsi qu'avec des commerçants et des artisans.

Les enquêtes ont été menées sous forme d'entretien semi-structuré, en abordant l'ensemble des aspects relatifs à l'exploitation et à la valorisation des PFNL ainsi que la perception des personnes interrogées, des contraintes et des perspectives de promotion de la filière des PFNL.

Les principales ressources fournissant les divers PFNL, qui ont une importance socio-économique manifeste, ont été décrites dans des fiches produit/ressources. Ces fiches résument les principales caractéristiques écologiques des ressources fournissant les PFNL, et les données socio-économiques relatives à leur exploitation et à leur valorisation. Une classification des PFNL, selon la nomenclature commerciale douanière et en référence à la classification proposée par les institutions internationales, a été arrêtée.

### **3-/ IMPORTANCE DES PFNL A L'ECHELLE NATIONALE (PRODUITS D'EXPORTATION)**

#### **3-1-/ Huiles essentielles**

A côté des essences de la menthe sauvage, du thym, de l'armoise blanche et de l'églantier, les huiles essentielles produites à partir du romarin et du myrte présentent un intérêt socio-économique manifeste.

#### **3-1-1-/ Importance des nappes de myrte et de romarin et leur productivité**

Bien que le myrte se trouve au Cap Bon et sur certains sommets de la dorsale, l'essentiel des nappes exploitables se cantonnent en Khroumirie et aux Mogods.

Estimée à 80.000 ha, en 1975, la superficie des nappes de myrte est aujourd'hui de 44.2500 ha, accusant un taux de régression de 44,7%. La superficie moyenne réellement exploitée entre 1995 et 1998 est de 7506 ha.

La productivité des nappes est très hétérogène, en fonction de la densité et de la répartition de l'espèce. Les quantités de brindilles récoltées, varie de 0,3 à 0,8 T/ha, ce qui permet d'avoir un rendement moyen en huile de 0,65 kg/ha

Les nappes de romarin, réparties sur une superficie de 360.000 ha avaient un taux d'occupation de l'ordre de 50%, en 1973. Les superficies exploitables sont passées de 360.000 ha à 65.000 ha pour la période 1981/1985.

La Direction des forêts avait décidé de mettre en défense une partie de ces nappes afin d'augmenter leur production, d'améliorer et d'organiser leur gestion. La quantité de brindilles de romarin prélevées est de l'ordre de 0,3 T/ha, produisant 1,2 kg / ha d'huile.

#### **3-1-2-/ Importance économique et sociale**

L'exportation des huiles essentielles de romarin et de myrte rapporte au pays l'équivalent en devise de 1.313.260 Dinars par an (moyenne de 1995/1998), dont 87,26% provient de la vente de l'huile de romarin. Ces huiles sont exportées essentiellement vers les pays de la CEE, en particulier la France. Les quantités moyennes d'huiles exportées sont de 57.043 kg/an pour le romarin (20,370 D/kg), et de 3787 kg/an pour le myrte (47,817 D/kg).

Les recettes de l'administration forestière, provenant de la location des droits d'exploitation des nappes de romarin et de myrte sont de 224.860 Dinars par an (moyenne 1995/1998), dont 89% à partir des nappes de romarin. Le prix moyen payé par les entreprises est 4,850 D/ha.

L'exploitation des brindilles de myrte et de romarin par les usagers (récolte et transport jusqu'au lieu de distillation), permet de créer 91800 journées de travail (JT) chaque année, pour 2300 familles :

- Exploitation des nappes de romarin : 72.000 JT, pour 1.800 familles, avec un revenu annuel moyen est de 264 par famille;
- Exploitation des nappes de myrte : 19.800 JT, pour 500 familles, avec un revenu annuel moyen de 286 D par famille.

#### **3-2-/ Produits d'alimentation**

Il s'agit des champignons, des câpres, des graines de pin pignon, le miel et les caroubes.

### 3-2-1-/ *Les champignons*

Les exportations concernent les truffes (*Terfezia clavaryi*), localisées principalement à Gafsa et Tataouine et les champignons des forêts humides de Tabarka et de Aïn Draham dont principalement : les girolles (*Cantharellus cibarius*), les chanterelles jaunes (*Cantharellus lutescens*), les mousserons (*Marasmius oreades*), les pieds - de - mouton (*Hydnum repandum*), les cèpes ou bolets (*Baletus edulis*).

La valeur totale des exportations des champignons durant la période de 1995 à 1998 est de **971.818 D/an**, dont 83% provient des truffes en raison de la récolte exceptionnelle de 1996. Les prix sont très variables selon la qualité du produit :

- 7 D/kg pour les champignons frais en entiers, contre 2,406 D/kg pour les champignons en morceaux ;
- 2,530 D/kg pour le mélange (truffes et champignons des forêts humides) ;
- 6 D/kg pour les truffes.

L'exploitation et la commercialisation des truffes, concerne **1.120 familles** et leur rapporte un revenu annuel de l'ordre de **421 D par famille**. Toutefois la disponibilité de cette ressource est aléatoire, elle dépend des conditions climatiques particulières (abondance des pluies en fin d'été et en automne, en zone aride). Une seule campagne (1996) a été favorable pour la disponibilité des truffes, durant les 4 dernières années.

Les exportations de champignons, provenant des forêts de Khroumirie et des Mogods, sont de **19.558 kg/an** (moyenne de 1995/1998), pour une valeur de **157.934 D**. En 1998 ces quantités étaient de **16.077 kg** pour une valeur de **143.430 D** (8,921 D/kg).

Le nombre de familles impliquées dans l'exploitation de ce produit, est en moyenne de 330. Chaque famille peut gagner un revenu de 90 D pour un travail effectif de 30 jours.

Les recettes de l'administration forestière provenant de la location des droits d'exploitation des champignons (en zones humides) sont de 19.184 D/an, pour une superficie exploitée de 27690 ha (moyenne 1995/1998). Pour la campagne 1998/1999, l'exploitation des champignons a rapporté à l'administration des recettes de 56.500 D. Cette augmentation importante est le résultat d'une forte concurrence en adoptant une soumission du droit d'exploitation par grande zone (délégation) au lieu de petits lots localisés.

### 3-2-2-/ *Les câpres*

Les nappes de câprier (*Capparis spinosa*), très sporadiques, occupent une superficie totale de **27.511 ha**, inventoriées dans les gouvernorat de Ben Arous, Béja, Kairouan, Zaghouan, Ariana et le Kef.

Pour la période 1995/1998, les nappes considérées en état d'exploitation et proposées par les services forestiers aux adjudicataires, sont réparties sur une superficie totale de 6347 ha, soit 23% seulement de la superficie recensée jusqu'à 1993. En 1997, l'exportation d'une quantité de 4717 kg de câpres, a rapporté **11.345 D**.

### 3-2-3-/ *Les pignons*

Les plantations de pin pignon (*Pinus pinia*) sont localisées dans les régions de Bizerte, Sejnane, Dar Chichou, Tabarka et Aïn Draham. La quantité moyenne de pignons non décortiqués, exportée au cours des deux dernières années (1997/1998) était de **42,08 tonnes / an**, pour une valeur moyenne de **119.112 D/an**, (soit un prix unitaire de 2,831 D/kg). Au cours de 1998, les exportations ont atteint 29,6 tonnes, pour des recettes de **60.831 D** (2,287 D/kg).

### 3-2-4-/ *Le miel*

Les quantités de miel exportées proviennent du secteur forestier et du secteur agricole. La haute qualité du miel, d'origine forestière (miel de romarin et du thym, miel amer d'arbousier (*Arbutus unido*) et de bruyères (*Erica* sp), permet à ce produit d'avoir une place sur le marché extérieur. La quantité moyenne de miel, exportée entre 1995/1998, est de **1214 kg/an**, pour un montant de **21.913 D/an** (soit 19,382 D / kg).

### 3-2-5-/ *Les caroubes*

Le caroubier (*Ceratonia siliqua*) est souvent rencontré sous forme d'individus isolés, essentiellement dans les zones humides et semi-arides.

Les sites les plus intéressants de point de vue de la ressource se trouvent à Zaghouan, au Cap Bon, à Siliana, à Kairouan et au Sahel.

Les caroubes sont utilisées dans l'industrie pharmaceutique et alimentaire, ainsi que dans la composition de certains fourrages. Il est groupé parmi « les oléagineux, graines et plantes industrielles » dans la classification commerciale (douane).

La quantité moyenne exportée au cours des deux dernières années (1997/1998) était de 113,435 tonnes/an, pour un montant de 251.901 D. Il s'agit principalement des graines de caroubes.

En 1998, la valeur des exportations, était de 119.750 D, pour une quantité de graines de 62,93 tonnes.

### 3-3-/ Les produits de chasse

Les produits de chasse regroupent le gibier et les escargots. La valeur totale de la chasse de gibier à l'échelle nationale est estimée à 4.700.000 D, dont 21% provenant des frais de séjours des touristes et 28% des droits de chasse, 17% de la viande et 34% comme valeur récréative.

#### 3-3-1-/ Exportation de gibier

La quantité moyenne de gibiers, exportée pendant la période de 1995/1998, était de 11.438 kg/an, pour une valeur de 46.565 D/an.

Les exportations demeurent faibles par rapport à la quantité obtenue. En 1997 par exemple, les exportations (16,4 tonnes) ne représentaient que 4% de la production totale (400 tonnes).

En 1998, les exportations étaient de 6900kg, pour un montant de 20600 D.

#### 3-3-2-/ Les escargots

La collecte et la commercialisation des escargots concernent deux variétés : les escargots gris et gros à coquilles globuleuses (*Helix melanostoma*) et les escargots à coquilles striées (*Eobania vermiculata*).

Les escargots sont classés, par l'administration forestière, comme produit de chasse. Ce produit provient des forêts mais aussi des parcours et des terres de cultures.

La quantité moyenne exportée pendant la période 1995/1998, est de **688,531 tonnes/an**, pour une valeur de **3. 649. 866 D/an** (5,520 D/kg).

En se référant aux données de la DGF, relatives aux quantités d'escargots tirés de la forêt (permis de colportage), pour les années 1995/1996 (283 tonnes/an), on peut considérer que 40% des quantités exportées proviennent directement de la forêt. La valeur de ces exportations est estimée à **1.460.000 D par an**.

### 3-4-/ Les Produits artisanaux

Il s'agit de la confection des ouvrages de sparterie et de vannerie essentiellement à partir d'alfa (*Stipa tenacissima*), du palmier nain (*Chamaerops humulis*) et du jonc (*Juncus maritimus*) et la fabrication des objets artisanaux (ustensiles ménagers, objets de décoration) à partir des branches et du bois de faible dimension. Les espèces les plus utilisées sont le myrte, l'arbousier, l'osier, laurier rose (*Nerium oleander*) et la filaire (*phillyria angustifolia*).

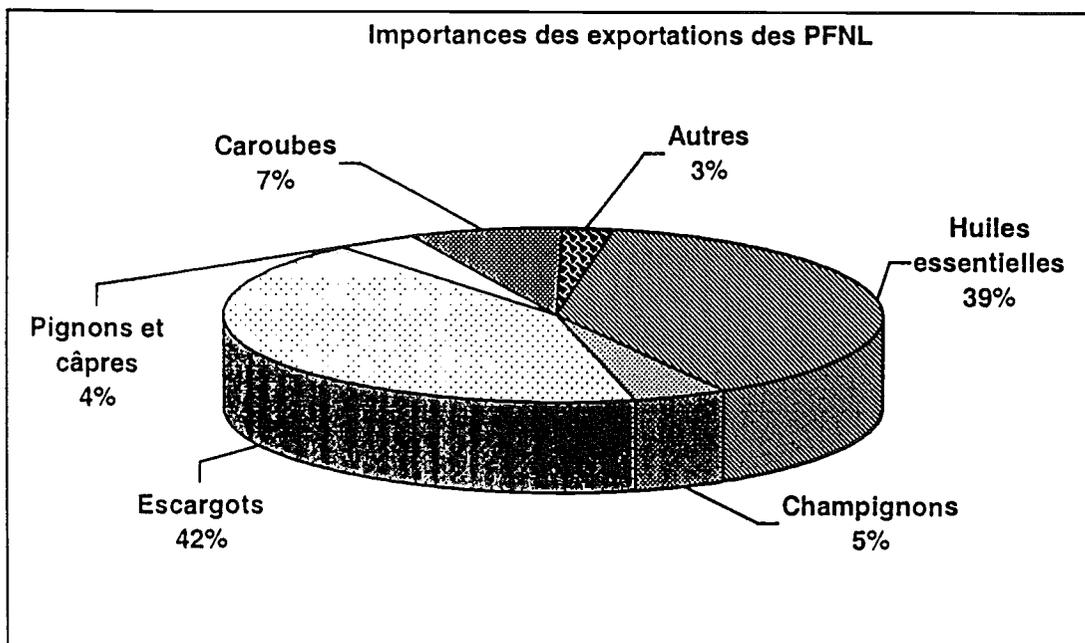
Malgré la diversité des produits artisanaux, les exportations sont limitées au stade actuel aux ouvrages de sparterie et de vannerie en alfa.

La valeur totale des exportations des ouvrages de sparterie et de vannerie est de **16.170 D/an**, dont 88% provient des ouvrages en alfa.

Les objets artisanaux en bois, fabriqués en Khroumirie, sont commercialisés uniquement sur le marché intérieur. Cette activité procure un revenu annuel moyen par artisan de l'ordre de **4386 D**.

### 3-5-/ Conclusion

Les exportations des PFNL rapportent au pays un montant global de **6.195.296 D par an**, réparties comme suit :



L'ensemble des produits destinés à l'exportation présente un intérêt économique et social certain. Malgré les contraintes et les insuffisances liées au mode d'exploitation des ressources qui les fournissent et au mode de leur valorisation et de leur commercialisation, les PFNL continuent à intéresser le marché extérieur. Les perspectives de développement de ce secteur sont importantes compte tenu de l'importance de la marge de progression qui peut être opérée pour :

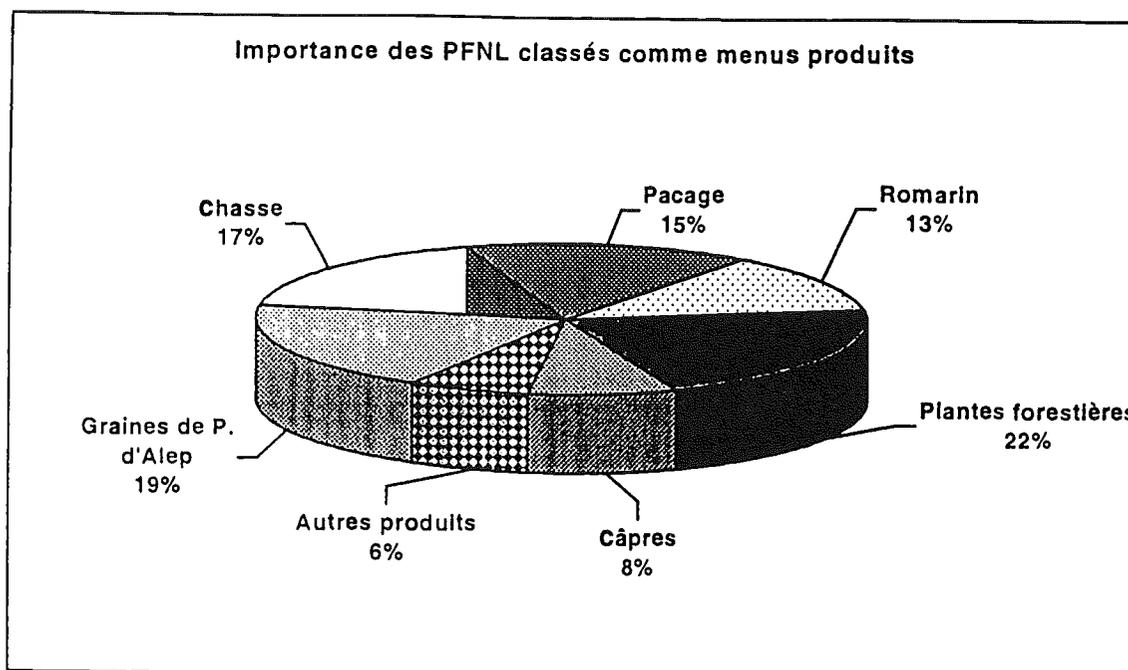
- Augmenter la productivité des ressources et les quantités des produits (cas du câprier, pin pignon, champignons, nappes de myrte et de romarin) ;
- Améliorer la qualité des produits en fonction des exigences du marché (des huiles essentielles et du miel) ;
- Consolider la position des PFNL sur le marché actuel et accéder à des nouveaux marchés.

#### **4-/ IMPORTANCE DES PFNL DANS LES MENUS PRODUITS**

##### **4-1-/ Importance économique des PFNL exploités à titre individuel**

La liste des PFNL recensés comme menus produits, comporte 35 produits, qui rapportent aux administrations forestières régionales, des recettes de **205.895 D/an** (moyenne 1995/1998).

Les PFNL contribuent à raison de **85%** des recettes totales enregistrées dans l'ensemble des arrondissements forestières.



On peut grouper les PFNL (menus produits) et les classer en fonction de leur importance économique, en :

- ☞ Produits dont les recettes comprises entre 18.000 et 45.000 D / an : graines de pin d'Alep, chasse, pacage, romarin, plantes forestières et câpres ;
- ☞ Produits dont les recettes ne dépassent pas les 1000 et 6.000 D / an : olives, gaines de pin pignon, figues de barbarie, asperges, caroubes ;
- ☞ Produits à faible importance (recettes annuelles inférieures à 1000 D/an : champignons, diss, miel (produit par les ruchers appartenant à l'administration), fruits des diverses espèces et autres divers produits (recettes inférieures à 500 D/an).

Aussi, il importe de signaler que :

- certains PFNL destinés à l'exportation, ne figurent pas sur la liste car l'accès aux ressources est gratuit. Il s'agit des escargots et des ressources mellifères ;
- malgré leur importance économique sur le marché, certains produits ne rapportent pas beaucoup à l'administration . Il s'agit des caroubes et des graines de pin pignon.

Les graines de pin d'Alep constituent le produit le plus recherché par les usagers et par les exploitants individuels. Le nombre d'exploitants engagés dans la récolte de ce produit, est de **2334 exploitants**. Les recettes de l'administration forestière, provenant des droits d'exploitation des PFNL par les entreprises, sont de l'ordre de 209.591 D/an (moyenne 1995/1998). Ces recettes proviennent principalement des droits d'exploitation des nappes de romarin et de myrte (78,3%) et de la chasse (13%).

#### **4-2-/ Perception des services régionaux**

Les principaux PFNL jugés importants sur le plan socio-économique, par les services forestiers régionaux et locaux, sont par ordre d'importance : les graines de pin d'Alep, les brindilles de romarin et de myrte (pour la distillation), le fourrage, les câpres et le miel.

#### **5-/ IMPORTANCE DES PFNL A L'ECHELLE COMMUNAUTAIRE ET FAMILIALE**

##### **5-1-/ Au niveau communautaire et familial**

###### **5-1-1-/ Produits utilisés comme aliments**

Au niveau communautaire, les principaux produits exploités par les usagers comme aliments sont par ordre d'importance : le miel, les champignons, les graines de pin d'Alep, les fruits d'azerolier, les baies de myrte, les arbrouses et les glands de chêne.

Les produits commercialisés sont: les caroubes, les câpres, les graines de pin d'Alep, les escargots, les fruits d'azerolier, les baies de myrte, les pignons et le miel.

###### **5-1-2-/ Plantes à usage médicinal et condimentaires**

Les plantes médicinales utilisées par les communautés forestières et qu'elles commercialisent en partie, sont : le romarin, le myrte, l'atractylis (*Atractylis gummifera*), les racines de noyer (*Juglans regia*), l'huile de lentisque (*Pistachia lentiscus*), l'essence d'églantine (*Rosa canina*), la menthe pouliot (*Mentha pulegium*), le thym et les feuilles de câpres.

D'autres plantes sont utilisées d'une manière très localisées telles que : le laurier sauce (*Laurus nobilis*), le genévrier de Phénicie (*Juniperus phoenicea*), la rute (*Ruta chalepensis*), les feuilles d'eucalyptus, la lavande (*Lavandula sp.*) et l'armoise blanche (*Artemisia herba - alba*).

##### **5-2-/ Importance socio-économique des PFNL**

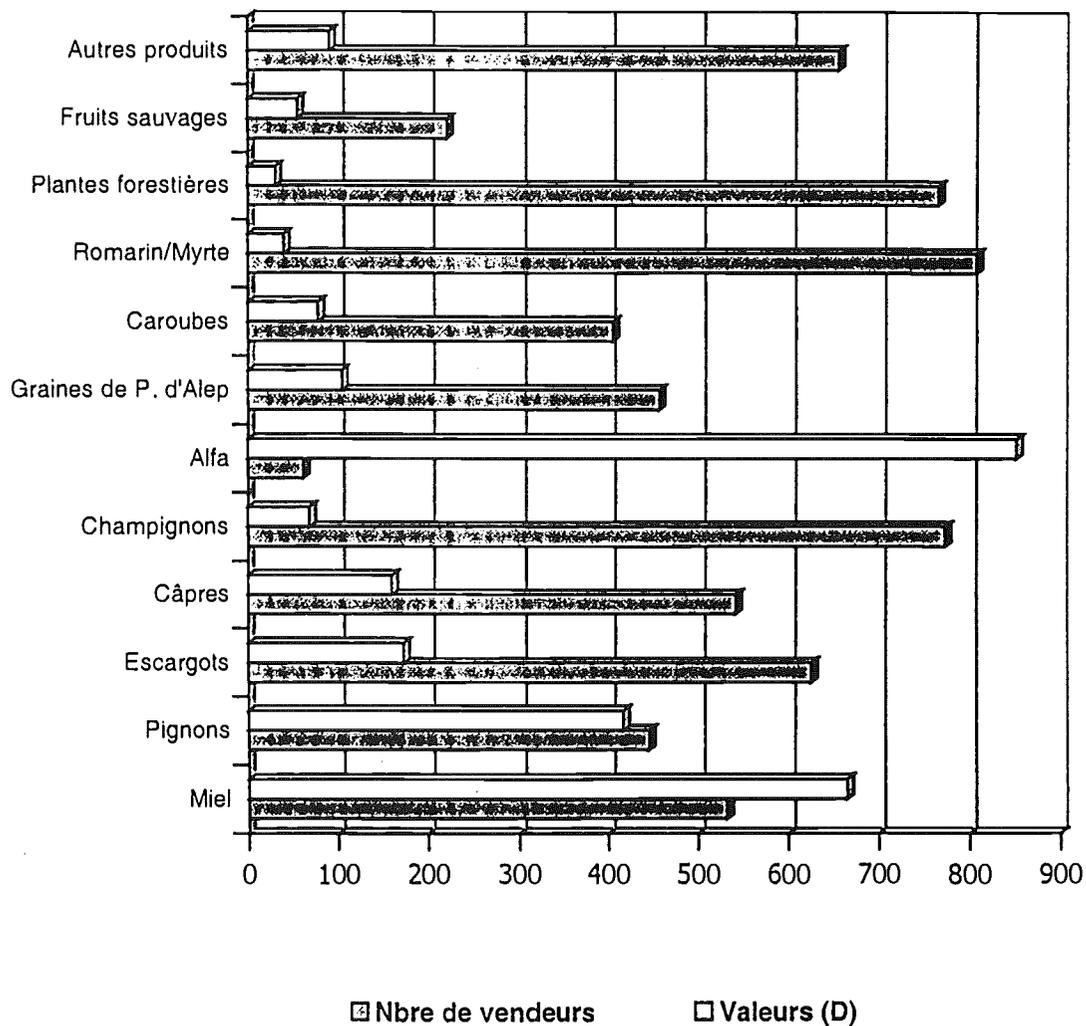
###### **5-2-1-/ Au niveau communautaire**

Les principaux PFNL qui ont une importance socio-économique ont été classés en fonction du nombre de ménages qui commercialisent ces produits et de la valeur commerciale de ces produits :

### 5-2-2-/ A l'échelle familiale

La contribution des PFNL au revenu des familles est en moyenne de 28% (364560 D, pour 620

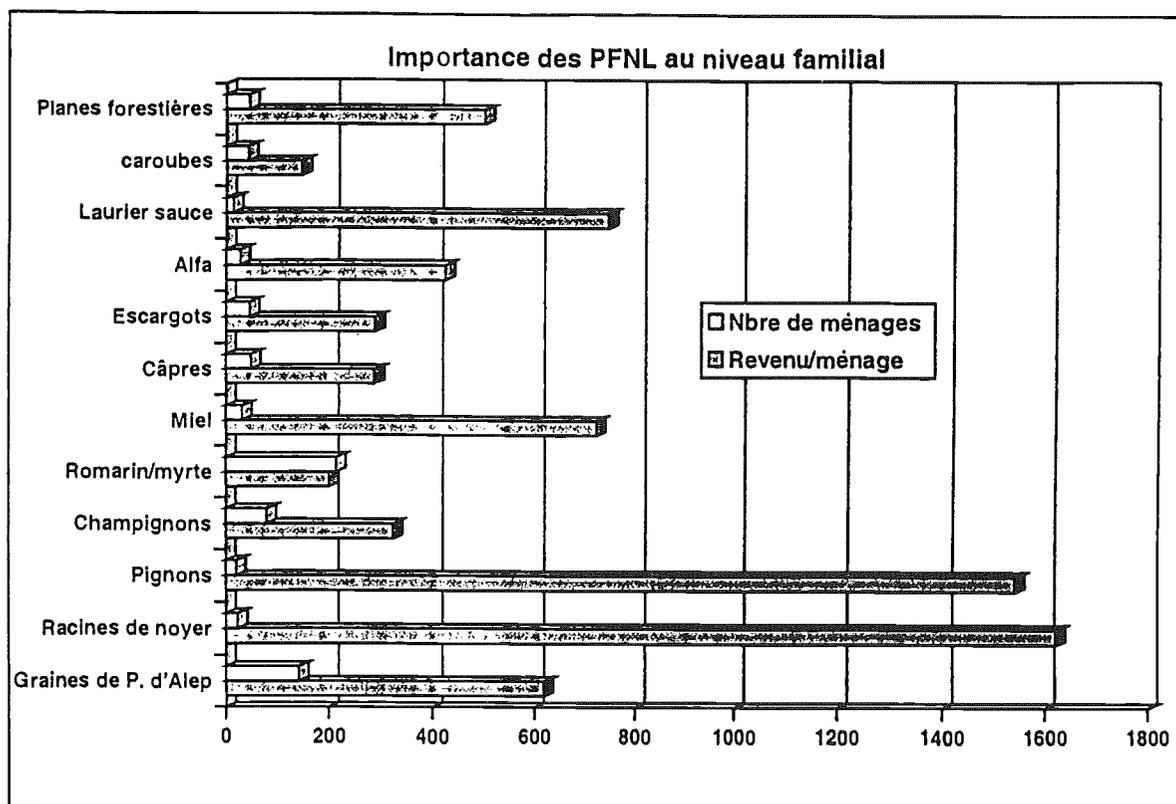
Importance comparative des PFNL au niveau communautaire



familles), soit un revenu moyen annuel par famille de 580 D. Cette contribution atteint 46% pour les familles n'exerçant pas d'autres activités économiquement significatives.

Pour les familles qui pratiquent des activités agricoles ou agro-forestières, la part des PFNL est de 23% en moyenne dans leur revenu global.

Les enquêtes auprès des usagers ont permis de recenser 41 produits commercialisés, dont 20 produits rapportent chacun plus de 1000 D par an.



Les produits les plus intéressants sur le plan économique pour les usagers, sont par ordre d'importance : les graines de pin d'Alep, les racines de noyer, les graines de pin pignon, les champignons, les brindilles de romarin, le miel, les câpres, les escargots, le laurier sauce, les glands de chêne, l'huile de lentisque, le thym et les caroubes.

La gamme des PFNL ainsi que leur classement par ordre d'importance socio-économique changent, si en plus de leur intérêt économique on prend en considération le nombre de familles exploitantes de ces produits.

Le classement devient comme suit : les graines de pin d'Alep, les brindilles de myrte, les brindilles de romarin, les champignons, les escargots, les caroubes, l'huile de lentisque, le miel, l'alfa, les racines de noyer, les pignons, le laurier sauce, les glands de chêne, le thym.

## **6-/ CONCLUSION GENERALE**

### **6-1-/ Identification des produits les plus prometteurs**

L'étude a permis d'analyser l'importance économique et sociale des PFNL aux différents niveaux (national, régional, communautaire et familial) ainsi que les facteurs qui agissent sur l'exploitation et la valorisation des ces produits.

Les résultats de cette analyse ont permis d'identifier les PFNL qui présentent un intérêt économique et social manifeste et qui sont susceptibles de jouer un rôle prépondérant dans le développement du secteur forestier :

- Les huiles essentielles de romarin et de myrte;
- Les champignons (truffes dans le sud et les divers champignons des forêts dans le nord);
- Les fruits des arbres forestiers (graines de pin pignons, graines de pin d'Alep).
- Le miel d'origine forestière (romarin, thym, eucalyptus et miel amer d'arbusier et de bruyère) ;

- Le miel d'origine forestière (romarin, thym, eucalyptus et miel amer d'arbousier et de bruyère) ;
- Les fruits des arbres semi-forestiers (caroubes, câpres, azerolier, cerisier, pistachier, oléastre greffé) ;
- Les racine de noyer et les feuilles de laurier sauce ;
- Les produits artisanaux de vannerie et de sparterie (doum, diss, filaire, saule, bruyère, arbousiers...).

### **6-2-/ Contraintes et perspectives**

Les ressources forestières offrent une gamme de PFNL très diversifiés, qui sont commercialisés sur le marché mondial. L'exploitation de ces ressources procure à la population forestière des sources de revenus importante.

L'impact socio-économique de cette filière est cependant tributaire du renforcement de la position des PFNL sur le marché mondial en garantissant la qualité et la régularité de l'approvisionnement.

Ces exigences ne peuvent être satisfaites que dans le cadre d'une stratégie globale d'aménagement et de gestion rationnelle des ressources forestières, qui intègrent systématiquement l'exploitation et la valorisation des PFNL (inventaire multi-ressources), en prenant en considération l'ensemble des facteurs écologiques et socio-économiques intervenant dans la filière de production et de commercialisation des PFNL.

La valorisation des PFNL nécessite aussi la promotion du marché national pour leur transformation et leur utilisation dans les industries. Les huiles essentielles de romarin et de myrte offrent des possibilités importantes pour les industries pharmaceutiques et de parfumerie au moins pour la fabrication de certains produits semi-finis.

La diversité des PFNL et leur importance socio-économique constituent des opportunités réelles pour la création de micro-entreprises locales, spécialisées dans l'exploitation et la valorisation des PFNL. L'établissement de liens commerciaux directs entre ces micro-entreprises et les exportateurs ou les entreprises spécialisées dans ce domaine est une condition nécessaire pour leur viabilité.

D'autre part, l'absence d'aménagement cynégétique limite considérablement l'impact socio-économique de la chasse en zone forestière :

- le rôle des associations régionales et de la fédération nationale de chasse, est très limité compte tenu de l'absence d'orientations et de programmes spécifiques visant le développement de la chasse ;
- la population forestière ne profite pas de cette activité malgré les potentialités offertes (disponibilités des ressources naturelles et humaines).

Le rôle social et économique de la chasse en forêt, peut être renforcé d'une manière significative à travers le développement du tourisme vert, en complémentarité avec les activités de chasse (visites des parcs nationaux, des réserves naturelles, aménagement des gîtes pour présenter des activités socioculturelles locales, promotion de l'artisanat local, aménagement de transects de reconnaissances pour découvrir la beauté et les caractéristiques naturels des paysages...). Une attention particulière doit être donnée à l'implication des usagers pour leur donner la possibilité de tirer profit de cette composante. L'implication des hôteliers et des associations des chasses dans la mise en œuvre de ces orientations est déterminante pour garantir la complémentarité entre les secteurs du tourisme et de la chasse, qui devraient constituer des facteurs de protection et de valorisation des ressources naturelles.

La stratégie de développement forestier, basée sur l'organisation des usagers en associations forestières d'intérêt collectif, et leur implication dans l'aménagement et la gestion des ressources forestières, constitue dans sa conception un cadre très favorable pour mettre en œuvre ces orientations, qui sont développées dans le plan d'action pour la promotion de la filière ci-dessous.

## **7-/ PROMOTION DE LA FILIERE DES PFNL**

### **7-1-/ Les orientations générales**

Les exportations des PFNL rapportent au pays un montant global de 6,2 millions de Dinars par an. Les PFNL, recensés comme menus produits, rapportent aux administrations forestières régionales des recettes d'environ 2060000 D/an (moyenne 1995/1998). Ils contribuent à raison de 85% des recettes totales enregistrées dans l'ensemble des arrondissements forestières.

Les PFNL procurent aux usagers de la forêt un revenu moyen annuel par famille de 600 D. Les enquêtes auprès des usagers ont permis de recenser 41 produits commercialisés, dont 20 produits rapportent chacun plus de 1000 D par an. La contribution des PFNL dans le revenu familial atteint 46% pour les familles n'exerçant pas d'autres activités économiquement significatives. Pour les familles qui pratiquent des activités agricoles ou agro-forestières, la part des PFNL est de 23% en moyenne dans leur revenu global.

La valorisation des PFNL, d'une manière rationnelle, est complexe compte tenu de la multiplicité des usages auxquels sont soumises les ressources fournissant ces PFNL et la diversité des intérêts des différentes parties prenantes (Etat, industriels, exportateurs, usagers).

Malgré les contraintes et les insuffisances liées au mode d'exploitation des ressources qui les fournissent et au mode de leur valorisation et de leur commercialisation, les PFNL présentent des intérêts économiques et sociaux certains et continuent à intéresser le marché extérieur.

Les perspectives de développement de la filière « PFNL » sont réelles compte tenu des possibilités de promotion des différentes filières, bien qu'un effort important reste à accomplir pour passer à une véritable intégration de cette composante dans les aménagements et dans le plan de gestion des ressources forestières.

La tendance pour les menus produits restent très prometteuse pour plusieurs raisons, d'une part à cause des problèmes de santé publique liés aux O.G.M. et à l'E.S.B, à titre d'exemples, et d'autre part à une exigence de traçabilité des produits et une meilleure rémunération des producteurs souhaitées par le consommateur. Les produits de qualité sont aussi de plus en plus recherchés par le consommateur.

- ☞ Parmi les huiles essentielles, l'huile de romarin qui a un marché important mérite une attention particulière en terme d'investissement pour réhabiliter les zones de production existantes. L'huile essentielle de myrte a un marché relativement stable et son prix élevé peut être dissuasif pour une utilisation plus large. L'huile d'armoise pourrait être un produit à développer dans les régions où l'armoise pousse de façon spontanée.
- ☞ Les champignons sont une ressource sous-exploitée et une meilleure gestion de leur cueillette permettrait d'augmenter les quantités exportées à contre-saison notamment en France qui reste le principal pays consommateur. Cependant, un important travail de formation des populations dans la cueillette, le stockage et le calibrage est nécessaire en même temps que la réforme du système de vente par adjudication qui reste un frein au développement de ce produit. Les truffes de Tunisie restent tributaires des conditions climatiques, il s'en suit des difficultés d'assurer une régularité d'approvisionnement du marché mondial. Cependant, un investissement pourrait être rentable ; il s'agit de l'introduction expérimentale de la truffe noire *melanosporum* dans certains terroirs propices à son développement.
- ☞ Deux produits alimentaires : les câpres et les caroubes sont sans doute intéressants à développer car le marché reste déficitaire pour ces produits. Il ne s'agit pas de produire des quantités très importantes, uniquement à partir de nouvelles plantations, mais de restaurer les capacités productives des nappes existantes afin d'obtenir des qualités optimales et vendre des quantités acceptables. Si la caroube a un marché mondial, les câpres ont surtout une importance en Europe du Sud. Avec les conditions du marché tunisien, l'augmentation de la production de ces deux produits permettra d'être plus compétitif.

- ☞ Les pignons, compte tenu de leur prix de vente actuel sur le marché tunisien, restent un produit très difficile à exporter. De ce fait, seule une augmentation des quantités produites pourrait amener des possibilités d'étendre ce marché à d'autres pays.
- ☞ Les miels de Tunisie sont des miels de spécialités qui n'ont pas un marché très développé en Europe. Leur consommation est surtout locale et régionale. Seuls les miels de romarin et amers peuvent avoir des possibilités de vente en Europe à condition d'avoir une qualité optimale. Le miel de thym est trop spécifique pour obtenir des débouchés importants et le miel d'eucalyptus est en situation de forte concurrence avec les miels d'Australie, de Chine et d'Argentine.

La stratégie de développement forestier, basée sur une gestion participative et durable des ressources naturelles, en impliquant les usagers et les industriels privés, constitue un cadre très favorable pour mettre en œuvre le présent plan d'action.

Les orientations proposées pour la promotion de chacune des filières retenues, permettent de dégager des orientations générales pour le développement de la filière PFNL. Elles s'articulent autour des objectifs, ci-après, en indiquant les résultats attendus pour chaque objectif et en donnant un aperçu des principales activités pour chaque résultat. Ces objectifs s'intègrent dans le Plan Directeur de Développement Forestier et Pastoral.

### **7-2-/ Objectifs, Résultats et Activités du plan d'action**

- Objectif global du Plan d'action : Contribution au développement du secteur forestier en promouvant la filière PFNL, dans le cadre d'une gestion intégrée et durable des ressources naturelles.
- Objectif immédiat du Plan d'action : Promotion de la filière des PFNL et son intégration dans le développement du secteur forestier

**Résultat 1 : Valorisation des PFNL dans le cadre d'un aménagement et d'une gestion concertée et durable des ressources forestières**

#### **1.1. Modalités et procédures d'adaptation à une gestion participative et durable des ressources fournissant des PFNL**

- ✓ Garantir aux industriels et aux usagers l'accès aux ressources : C'est une condition sine qua non, pour un engagement réel des parties prenantes (usagers et industriels), dans la promotion de la filière. Il s'agit d'opter pour des concessions de longue période d'une durée de 7 à 10 ans (en moyenne), en fonction du produit ;
- ✓ Appliquer des critères liés à la professionnalisation des industriels pour leur autoriser l'accès aux ressources et à la valorisation des PFNL, à savoir :
  - i) être implanté dans la région et disposer d'un personnel qualifié sur place, habilité à représenter l'entreprise en tant qu'interlocuteur direct avec les services forestiers et avec les groupements des usagers, pour participer aux efforts de développement de la filière (à convenir dans un contrat de gestion avec les services forestiers et avec les groupements d'usagers),
  - ii) disposer d'un équipement approprié (en conformité avec les normes) pour l'exploitation / transformation des ressources, ainsi que pour le conditionnement, le stockage et le transport des produits, afin de garantir la qualité des produits destinés à l'exportation (en particulier pour l'extraction des huiles essentielles, et l'exploitation des champignons sylvestres).

#### **1.2. Usagers et industriels impliqués dans l'aménagement et la gestion des ressources produisant des PFNL (valorisation, protection et réhabilitation des ressources)**

- ✓ Appuyer la mise en place des groupements d'usagers en exploitant la loi récente concernant la création des Groupements de Développement Agricole (GDA), en relation avec les autres actions

de développement du secteur forestier, en se référant par exemple aux expériences des OPDI ;

- ✓ Etablir des mécanismes de partenariat entre industriels, groupements d'usagers et services forestiers ;
- ✓ Assurer la formation et l'encadrement technique des usagers et des industriels impliqués dans les différentes filières ;

Impliquer les industriels opérationnels, dans la conception et le financement de certaines actions liées à la promotion des filières (à définir dans les cahiers de charge en fonction de la filière et sur la base du plan de gestion des ressources).

### **1.3. Connaissances approfondies des potentialités des PFNL et leur prise en compte dans les plans d'aménagement et de gestion des forêts acquises**

- ✓ Appliquer une méthodologie d'inventaire multi-ressources et de connaissance de potentialités (localisation et quantification) des ressources forestières, fournissant des PFNL, et des usages auxquels elles sont soumises ;
- ✓ Mettre en place un dispositif de suivi régulier de l'évolution des ressources/produits sur le plan quantitatif et qualitatif (réseau de placettes fixes). Ce suivi régulier permettra de disposer des indications indispensables pour définir le rythme et les conditions d'exploitation des ressources.

### **1.4. Techniques d'aménagement des ressources et technologies de valorisation des PFNL maîtrisées**

- ✓ Entreprendre des recherches-développement pour augmenter la production des ressources et améliorer la qualité de leurs PFNL : conduite sylvicole des peuplements de pins d'Alep et de pins pignons, techniques de réhabilitation et de multiplication des espèces (câpriers, champignons sylvestres), régénération des nappes de romarin et de myrte... ;
- ✓ Former les cadres concernés par la gestion des ressources et la mise en œuvre des plans de gestion ;
- ✓ Initier la création de pépinières spécialisées dans les productions des plants d'arbres et d'arbustes fournissant des PFNL (câprier, laurier sauce, plants de pins, mycorhizes... ) ;
- ✓ Initier l'osiericulture, en exploitant les acquis des expériences dans d'autres pays ;
- ✓ Etablir des échanges d'expériences dans les domaines relatifs à la valorisation des PFNL.

## **Résultat 2 : Renforcement de la position des PFNL sur les marchés national et mondial**

### **2.1. Filière des PFNL professionnalisée**

- ✓ Développer un système d'information accessible aux parties prenantes concernées par la filière (création d'une cellule d'information au niveau de la RÉF, chargée aussi du suivi de l'exploitation et de la valorisation des PFNL), en se branchant notamment sur le réseau d'information internationale concernant la filière « PFNL » ;
- ✓ Initier l'organisation de la profession, en collaboration avec l'UTAP et d'autres partenaires ;
- ✓ Mettre en place un système de contrôle de qualité des PFNL ;
- ✓ Organiser le circuit de commercialisation, pour superviser le contrôle de qualité ;
- ✓ Elaborer un programme de formation et d'encadrement au profit des industriels, en collaboration avec la profession et l'API.

### **2.2. Mécanismes de concertation et d'échange d'information entre industriels établis**

- ✓ Renforcer et coordonner les actions de marketing (en collaboration avec le CEPEX, l'APIA et l'API et d'autres Ministères, de rencontres entre industriels tunisiens et étrangers) ;
- ✓ Mettre en place un échange régulier entre industriels/exportateurs des pays maghrébins œuvrant dans la filière, pour harmoniser le positionnement des PFNL sur le marché mondial et faire face à la concurrence des autres régions ;
- ✓ Intégrer la filière PFNL dans les composantes des foires régionales, nationales et internationales, en encourageant les groupements d'usagers et les industriels à y participer, en organisant lors de ces foires des ateliers d'échange régulier d'information sur les perspectives de développement de la filière.

## **Résultat 3 : Revenus des usagers impliqués dans la valorisation des PFNL améliorés**

### **3.1. Emergence de jeunes promoteurs dans les différentes filières :**

- ✓ Introduire des modules de formation à l'ISPT et à l'INAT, traitant les divers aspects techniques, économiques et sociaux de la filière et les méthodes CEFÉ, pour ouvrir des perspectives aux diplômés d'exploiter ce créneau, en tant que jeunes promoteurs en exploitant les encouragements de l'Etat dans ces domaines (stratégie nationale d'emploi des cadres) ;
- ✓ Encourager l'émergence des groupes d'intérêts spécialisés dans la valorisation des PFNL, en exploitant les acquis et les opportunités de financement des divers projets et programmes de développement en zones forestières (PDF, ODESYPANO, PGRN), engagés dans la mise en œuvre d'une stratégie de développement basée sur une gestion participative et durable des ressources naturelles.

### **3.2. Système d'appui financier pour la promotion des filières PFNL, opérationnel :**

- ✓ Impliquer les intervenants en zones forestières dans la conception du système ;
- ✓ Lier l'accès aux financements / encouragements à la formation pour concrétiser les orientations en matière d'émergence des jeunes promoteurs dans les différentes filières ;
- ✓ Impliquer les groupements des usagers dans la gestion de ce système en exploitant le cadre juridique, qui donne la possibilité aux groupements de gérer des crédits.

### **3.3. Formation et encadrement des usagers dans les domaines de valorisation des PFNL, assurés :**

- ✓ Initier la formation de cadres spécialisés en vulgarisation forestière, notamment dans le domaine des PFNL (formation et recyclage des cadres) en intégrant des modules dans le programme de formation à l'ISPT et en créant des modules de formation complémentaires à l'Ecole de Rimel (Bizerte) pour les cadres déjà opérationnels ;
- ✓ Concevoir un programme de formation et d'encadrement, en fonction des besoins spécifiques pour chaque filière ;
- ✓ Mettre en œuvre le programme, en synchronisation avec les autres actions de promotion des filières ;
- ✓ Impliquer les industriels et les jeunes promoteurs (cadres) dans ce programme de formation et d'encadrement technique.

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# **NON-WOOD FOREST PRODUCTS (NWFP) AS A COMPONENT OF THE TOTAL ECONOMIC VALUE (TEV) OF MEDITERRANEAN FORESTS**

## **First results of ongoing research**

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### **Summary**

*(No translation in French & Russian available)*

This paper introduces MEDFOREX Project launched by European Forest Institute and Solsona Forest Technology Centre in January 2000 and highlights the first results of its preliminary task: an inventory of MEDiterranean FOREst public goods and EXternalities, here referred to as MEDFOREXs.

MEDFOREXs, as well as the other forest outputs, are related to the Total Economic Value (TEV) of forests. It is a concept where direct and indirect use-values, option and bequest-existence values are considered. Another way to see the TEV is given by market, potential market and non-market values. The distinction between private, local, club and public goods can also be mentioned.

Non-Wood Forest Products (NWFP) are generally intended as private goods remunerated in the market and represent tangible outputs such as berries, resin, and mushrooms. Thus, NWFP exclude the more traditional wood based products such as timber or fuel wood. However, non-market public goods and externalities can also be transformed into NWFP, remunerated in the market once appropriate institutional (laws, regulations, property rights, etc) and management/marketing means are adopted. There are also non-market public goods and externalities, by definition not remunerated in the market, which can also be included amongst NWFP. Some of these are potentially marketable and can be valued by various economic methods derived from traditional land appraisal to the most recent environmental valuation.

In order to highlight the dynamic evolution of NWFP in the context of the overall forest outputs, a specific questionnaire based on the TEV concept was developed for surveying the value of Mediterranean forests as far as possible at country level. The questionnaire aims firstly at collecting basic forest information related to area, types of forests, degradation, income and employment. It then focuses on developing a list of the main wood and NWFP that should be quantified according to national official statistics for each Mediterranean country.

The questionnaire has been completed for Italian forests. The initial results demonstrate the growing importance of NWFP in terms of market values as well as the potential for new NWFP to be transformed into real market products. Similar questionnaires are presently being completed in France, Greece, Portugal, Spain and Tunisia. The work should be accomplished in all the other Mediterranean countries during the next two years.

Key words: MEDFOREXs, non-wood forest products, externalities, total economic value.

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<sup>1</sup> The responsibility of the paper must be equally distributed amongst the three authors. Section 4 should be attributed to Croitoru, sections 3 and 5 to Gatto and sections 1 and 2 to Merlo. Information about the questionnaire and the ongoing research can be provided under request to this E mail: merlo@agripolis.unipd.it

## 1. Introduction: scope and contents

Among the various outputs provided by MEDiterranean FOREsts, there is a wide range of public goods and EXternalities, positive and sometimes negative, here referred to as MEDFOREXs. Information and quantification of MEDFOREXs is however scarce within and between Mediterranean countries. There is a need for data collection, processing and exchange, together with dissemination of existing knowledge. For these reasons, in January 2000 the European Forest Institute (EFI) and Solsona Forest Technology Centre launched a three-year Regional Project Centre called MEDFOREX.

The project aims to survey and inventory MEDFOREXs. The outcome should help forest management and policy formation/implementation (EFI, 1999). The survey (or inventory) of all MEDFOREXs is the preliminary task of the whole project. Its main objectives are the identification and, whenever possible, quantification/valuation of MEDFOREXs at the national level in each Mediterranean country. The scope of the task is:

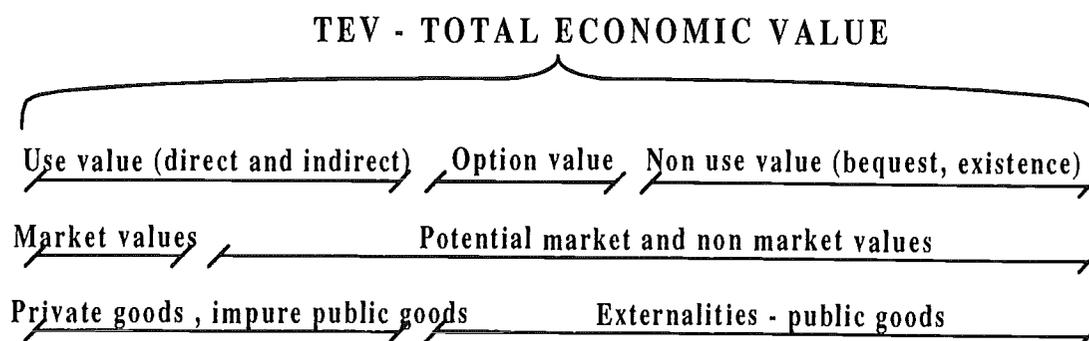
- inform forest policy makers and stakeholders;
- inform forest management and participation;
- complete forest information systems;
- improve accountability and accounting of forestry.

Participants from Italy, France, Greece, Portugal, Spain and Tunisia are presently cooperating on the survey - inventory. Up to now 10 forest research units, members of EFI, have agreed to co-operate. Other countries and units are expected to join soon.

## 2. Approach: Total Economic Value

MEDFOREXs as well as the other forest outputs are related to the Total Economic/Environmental Value (TEEV) of forests. The TEV (Total Economic Value) has been introduced in economic theory following development of environmental economics (Campos, 1998). Some authors tend to make a distinction between the proper Total Economic Value (rather anthropocentric value) and the so-called non-anthropocentric Primary Value (Turner, Pearce and Bateman, 1994). The Total Economic Value comprises direct and indirect-use values, option values and non-use bequest and existence values. While there is a widespread consensus on the TEV concept, the boundaries between its various components remain somewhat less clear (Randall, 1991; Bateman 1994). Overlaps, if not double counting, as well as missing certain components, are rather common. This paper has tried to adopt Turner, Pearce and Bateman (1994) classification. Therefore use values are those that 'derive from the actual use of the environment'. Option values are considered as a component of use or non-use values, depending on whether the present generations choose to use the environment. Bequest values have been included within the non-use category and refer to future generations' options. Existence values are 'unassociated with actual use, or even the option to use the thing' (Turner, Pearce, and Bateman, 1994), therefore non-use values.

Figure 1. Possible pragmatic approaches to the Total Economic Value - TEV



Within the rather theoretical concept of the TEV, the entire range of forest outputs can be more practically seen as market, potential market and non-market values. In addition the classic distinction made by public economics between private and public goods with all the intermediate categories of local and club goods can be recalled. Adopting a somewhat pragmatic approach, Figure 1 puts together the various possible perspectives. The result though debatable is thought to be rather useful for classifying forest outputs particularly in Mediterranean forests where public and non market items are the most important.

Figure 1 can also be seen as the starting point for classifying Non-Wood Forest Products (NWFP) as a component of TEV. NWFP are basically intended as private goods remunerated in the market. They comprise berries, truffles, medicine plants, etc. that are part of direct use values and generally have a market price. However, in addition, non-market public goods and externalities, typically the MEDFOREXs, can be transformed into NWFP and remunerated in the market once appropriate institutional means (laws, property rights, regulations, etc.), as well as management or marketing means are adopted. Evidence of this market transformation and development is given by recent research undertaken in four European countries including Mediterranean regions<sup>2</sup>. A 'marketability arrow' has been singled out and drawn in Figure 2 based on the real world case studies evidence.

**Figure 2. Transformation/Development of Public Goods and Externalities into Recreational-Environmental (RE)-Products**

**Transformation/Development of Public Goods and Externalities into Recreational-Environmental (RE)-Products**

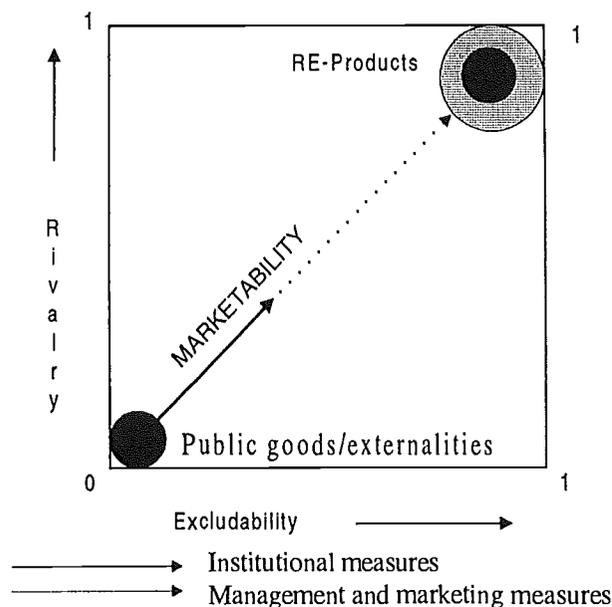


Figure 2, essentially derived from Samuelson's (1954 and 1955) description of public and private goods as 'polar' cases, shows in the left hand corner the range of public goods/externalities that are characterised by non-rivalry and non-excludability in consumption. The public good connotations can be linked to their intrinsic nature (e.g. indivisibility like a landscape enjoyable by everybody) as well as to

<sup>2</sup> EU financed research on 'Niche Markets for Recreational and Environmental Services – RES' (FAIR – CT95-0743) undertaken in collaboration with the University of Hamburg (co-ordinator Prof. Udo Mantau), the University of Vienna (Prof. Walter Sekot), University of Padova (Prof Maurizio Merlo) and IBN – DLO- Wageningen (Dr. Kees Van Vliet). The task of Padova University was to identify the transformation/development paths. The outcome of the research has recently appeared as Merlo, M., Milocco, E., Panting, R. and Virgilietti, P. (2000). As shown by recent research covering 100 case studies in various European countries including the Mediterranean region.

ill- defined, assigned or enforced property rights (e.g. access for berry picking) leading to collective consumption. The upper right hand corner of Figure 2 shows the private goods that are characterised by full excludability and rivalry in consumption, typically timber and other market products.

Most of the forest outputs however, are not pure public or private goods. They can be regarded as 'mixed impure public goods' with various degrees of rivalry and potential excludability. An example of the dynamic view of public goods and externalities when excludability is increased or decreased according to property rights, is demonstrated by Buchanan (1965) in his 'theory of clubs' where, incidentally, he gives an example rather linked to forestry: hunting rights. Previously also Tiebout (1956) has introduced 'local public goods' restricted to those living or getting access to a certain area as is often the case for various forest outputs. The 'marketability arrow' of Figure 2 illustrates the dynamic evolution of public goods to remunerated private products, or at least local/club products.

Some of the most accepted and important forest outputs like those linked to indirect use values such as watershed management, carbon storage, etc, the so called 'off site' but 'near market' effects, can be rather easily included amongst NWFP, as it is currently done by investment analysis based on Cost Benefit (Gregersen and Contreras, 1979 and 1992). Amongst NWFP, other non-market public goods and externalities could also be included that are not remunerated in the market as option, bequest and existence values. This view is, however, far from current conception of NWFP, rather linked to technological and material aspects.

### **3. Method: the questionnaire to survey MEDFOREXs and all other Mediterranean forest outputs** (blank questionnaire available by request to the authors)

In order to achieve the objectives of the survey-inventory task a specific questionnaire has been developed to be completed in all the various Mediterranean countries. It concerns the following areas:

- basic forest data: area, types of forests, degradation, main forest functions, ownership, average size of properties or management units;
- macroeconomic forest indicators: contribution to Gross Domestic Product (GDP), employment and income in forestry and timber-based industries, distribution between national/imported wood, processing timber industries;
- availability of statistics on market and non-market forest outputs;
- a list of forest outputs as tentatively developed by Table 1 in order to guide those filling the questionnaire and ensure consistent responses for every Mediterranean country with the possibility to include new items or delete others;
- distinction among various direct use values according to the valuation/quantification methods;
- distinction among various indirect use values according to official statistics and available research reports;
- availability of estimates regarding option, existence and bequest values;
- evaluation of other externalities that negatively affect TEV, if previously not considered<sup>3</sup>;
- list of sources of official/unofficial information on forest outputs available for each Mediterranean country.

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<sup>3</sup> It could be argued that theoretically, negative externalities should be valued as loss of positive outputs within TEV. In reality, as confirmed by the first country questionnaire, negative externalities can't be considered within use and non-use values estimation. Moreover, some of them must be estimated by using other valuation methods.

Table 1: Outputs of Mediterranean forests according to the TEV (tentative approach)

**TOTAL ECONOMIC VALUE**

**PRIVATE GOODS, PUBLIC GOODS INCLUDING POSITIVE EXTERNALITIES**

**1. USE VALUES**

*1.1 Direct use values*

- 1.1.1. Timber, firewood, cork, resin, sparto grass, decorative plants, mushrooms, medicine plants, berries, truffles, etc
- 1.1.2. Grazing, honey etc
- 1.1.3. Hunting, mushrooms, recreation, etc.

*1.2 Indirect use values*

- 1.2.1 Watershed management: soil conservation, avalanche prevention, flood prevention, etc
- 1.2.2 Micro-climate regulation
- 1.2.3 Water quality and purification (including capture of nutrients and pollutants)
- 1.2.4. Carbon storage
- 1.2.5. Landscape

**2. OPTION VALUES**

- 2.1.1 Personal future recreation and environmental interests
- 2.1.2 Potential source of energy and raw materials
- 2.1.3 Potential unknown source of bio-diversity, medicine plants, etc
- 2.1.4 Potential use of unused landscape resources

**3. NON USE VALUES**

*3.1. Bequest values*

- 3.1.1 Landscape, recreation, energy and raw material availability, bio-diversity, environmental conditions e.g. related to carbon storage, affecting future generations

*3.2. Existence values*

- 3.2.1 Bio-diversity, environmental conditions e.g. related to carbon storage, affecting other species, respect for the right or welfare of non-human beings including the forest ecosystem

**OTHER EXTERNALITIES THAT NEGATIVELY AFFECT THE TEV  
(IF PREVIOUSLY NOT CONSIDERED)**

- Erosion, floods and avalanches due too poor management
- Loss of landscape value due to excessive expansion of forest land use
- Risk of damage by forest fires
- Loss of bio-diversity, landscape value due to plantation forestry
- Loss of recreation opportunities due to intensive plantation forestry and poor management
- Pollen and other allergic factors

Source: adapted from M. Merlo and E. Rojas Briales (2000)

A key issue in filling the questionnaire is the use of the most recent data expressed in annual flows.

In case data at national level are not available, any information provided at local level can be taken into account. Another point is the type of forest related to the questionnaire. In principle it should be real Mediterranean forest located in Mediterranean countries. In reality, statistics do not always allow a clear-cut and satisfactory distinction between Mediterranean and other forest typologies often part of Mediterranean countries. For this reason the questionnaire suggests considering all forests of Mediterranean countries.

#### 4. First results of the Italian survey (filled questionnaire available under request to the authors)

##### 4.1 Valuing Wood Forest Products

Timber, firewood and cork were identified as Wood Forest Products (WFPs) and valued according to their market price as reported by Italian official statistics (ISTAT, 1997). Of course these values are part of direct use values (Table 2).

Table 2. Estimated WFPs of Italian forests, 1994

TEV categories	WFPs	Value (000 EURO)
Direct use values	Timber	209 475
	Firewood	227 183
	Cork	4 181
	<b>Total WFPs</b>	<b>440 839</b>

Source: ISTAT, 1997

##### 4.2. Valuing Non Wood Forest Products (NWFP) and other forest outputs

NWFP as usually defined are reported and valued in Table 3. A more comprehensive view of NWFP including other forest outputs is reported in Table 4, which in addition to direct and indirect use values, includes option, bequest, existence values. In order to complete the picture negative externalities are also included.

Table 3. Value of traditional NWFP of Italian forests, 1994

	NWFP	Value (000 EURO)
	Direct use values	Mushrooms*
Truffles		8 628
Chestnuts		55 648
Pine kernels		3 040
Hazelnuts		16 266
Bilberries		1 200
Strawberries		389
Raspberries		288
Acorns		1 811
Grazing*		60 000
Honey*		22 500
Hunting*		71 250
<b>Total</b>		<b>326 491</b>

Source: ISTAT, 1997 except for \* items which represent our estimations or results of other surveys

Traditional NWFP as reported in Table 3 are part of direct use values and include mushrooms, truffles, chestnuts, pine kernels, hazelnuts, bilberries, strawberries, raspberries, acorns, grazing, honey and hunting. The above items have been valued, whenever possible, according to market prices as

reported by official statistics (ISTAT, 1997). A first exception is grazing and honey where imputed prices have been used. A second one is represented by mushrooms and hunting valued by means of users' benefits (consumers' surplus), though some prices are available but only partially.

**Table 4. Value of NWFP and other outputs of Italian forests, 1994**

TEV categories	NWFP	Value (000 EURO)
Direct use values	Mushrooms*	85 471
	Truffles	8 628
	Chestnuts	55 648
	Pine kernels	3 040
	Hazelnuts	16 266
	Bilberries	1 200
	Strawberries	389
	Raspberries	288
	Acorns	1 811
	Grazing*	60 000
	Honey*	22 500
	Hunting*	71 250
	Recreation*	(min) - 120 000
		(max) - 420 000
Indirect use values	Watershed management*	1 321 500
Option values	Carbon storage*	60 000
Non use values		Not available
Negative externalities previously not considered		Not available
	Erosion*	-119 044
	Risk of damage by forest fires	-60 655
	Losses of natural quality due to illegal actions	-1 680
	Losses of landscape value due to illegal actions	-128
	<b>Total NWFP</b>	<b>1 646 484</b>

Source: ISTAT, 1997 except for \* items which represent our estimations or results of other surveys

The reference to users' benefits is clearly linked to the legal status of these items under Italian property rights system. The amount of mushrooms sold in the market, and collected by professional pickers, was valued according to their market price at 25 471 000 EURO (ISTAT, 1997). Mushrooms were also collected by non-local hobby pickers paying for a permit or a ticket to the local authorities. Other mushrooms were picked without paid picking permits because either they were not requested by local authorities or people did not comply with the rules. Therefore with reference to various survey pickers' benefits, the value is estimated at 60 000 000 EURO<sup>4</sup>.

<sup>4</sup> Generally, picking of mushrooms and small fruits growing spontaneously in woodlands was once considered as part of the access right, everybody is entitled by natural rights, and as such, was free. However, high pressure on natural resources and land owners reactions, have pushed to regulation. Legislation has been recently issued. Maximum quantities of small fruits and mushrooms to be picked per day and per person were established. Mushroom picking is now also regulated by National Legislation (National Law 352/1993), which has assigned mushroom property rights to the Local Authorities. Provinces, Mountain Communities and Municipalities can, and do, sell mushroom picking permits on their territory, often with different prices for residents and non-residents.

Hunting, even if corresponding to permit prices paid to national and local authorities has been valued on users' benefits according to various surveys employing contingent valuation method (Battisti et al, 2000). It is important to mention that game is traditionally public property in Italy as well as shooting/hunting rights. The State sells shooting/hunting permits and generally identifies the hunting areas at regional/local levels. Enforcement and control is delegated to Regions and Provinces. Hunters have free access to private properties except when these are fenced or enclosed '*fondi chiusi*'. Recent legislation (LN 157/92) has created a market for shooting/hunting; landowners can now sell access and shooting rights from private estates and game-farms: Aziende Faunistico-Venatorie and Aziende Agrituristiche Venatorie. These areas still represent the exception rather than the rule as it is the case with neighbouring countries like Austria and others adopting Anglo-Saxon property rights.

The extended view of NWFP as reported in Table 4 includes recreation amongst use-values. Though in several cases it is paid by consumers, the overall value has been calculated according to the estimated number of day-visits/year and consumer benefit/visit (2.5 EURO) as resulting from several surveys and case studies where consumers are obliged to pay a price to get access to the forests or, generally speaking, to services that help the recreation in the forests (footpaths, guides, car parks, etc) as shown by the already mentioned survey on possible marketing of public goods and externalities linked to forestry (Merlo et al, 2000). A minimum 120 000 000 EURO<sup>5</sup> and a maximum 420 000 000 EURO<sup>6</sup> values are reported to give an idea of the recreation value of Italian forests.

Among the *indirect use values*, potentially part of NWFP, only watershed management and carbon storage could be estimated. Watershed management, broadly including soil conservation and land protection against landslides, floods, erosion, water conservation and purification<sup>7</sup> within catchment areas, etc, was valued by employing Public Expenses (Ministero dell'Ambiente, 1997) for 'watershed management' as reported by national accounts, amounting in 1997 to 1 321 000 000 EURO. The criterion of avoided costs due to good forest management has been adopted according to the following arguments: the magnitude of watershed management carried out by forests can be deduced by comparing data on actual and potential erosion as published by the Ministry of the Environment (1997); it can be estimated that about 5 millions hectares of land would be at risk if present forest land use was changed; given the size of the country (30 millions hectares) and forest land use (around 9 millions hectares of which only some 30% are object of forest planning, and some 50% reasonably well managed), it can be deduced that the National Expenditures must be principally imputed to areas poorly managed, therefore the area well managed allows society to save the amount of money spent in areas not so well managed. It is a very rough, and certainly debatable estimation. Nevertheless it must be recalled that the water-related functions of forests have been estimated by distinguished foresters like Patrone (1971) - updated by Codemo (1986) - some 40% higher at around 2 000 000 000 EURO.

Estimation of carbon storage was done at 60 000 000 on the basis of the opportunity cost per additional ton of carbon fixed in the forest biomass and in the soil (Cesaro et al, 1994). Of course it is another questionable method that, however, is internationally accepted as the basis for negotiation amongst interested parties as an outcome of Kyoto protocol.

Regarding *option*, *bequest* and *existence* values, Italian official statistics provide little information. In fact, only one local example regarding existence value, reports a benefit of 10 EURO/person (Signorello, 1990). The estimate was not extrapolated at national level, taking into account that the peculiarities of the surveyed region are not similar to those characterising the main national forest area.

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<sup>5</sup> Calculated using a number of 48 000 000 day-visits/year in mountainous and hilly areas (ISTAT, 1998).

<sup>6</sup> Obtained when employing an estimate of 168 000 000 day-visits/year (G. Scrinzi et al 1996).

<sup>7</sup> Concerning the water functions the fact can be remembered that some water authorities have started to sign collective agreements with forest owners at least in countries like Austria.

Concerning the *negative externalities*, erosion due to poor forest management has been valued by employing the estimated average soil loss/year – calculated on the basis of Benini (1990) valuation, and the costs for soil transportation for returning to the original situation. The replacement cost method was applied for estimating the damage by forest fires whereas the losses of natural quality and landscape value due to illegal actions were quantified on the basis of the fines paid.

In conclusion, the estimates of the WFPs (440 839 000 EURO) and NWFP (1 646 484 000 EURO) lead to an overall TEV of 2 087 323 000 EURO, of course excluding as already underlined, option and non-use values. Taking into account the various shortcomings of official statistics, the poor knowledge and quantification of forest functions and the lack of reliable information about option, existence and bequest values, the overall figure can certainly be regarded as a minimum estimate of the annual TEV of Italian forests.

The application of the questionnaire to Italian forests suggests the following classification of WFPs and NWFP according to valuation methods used:

- WFPs
  - valued by means of market price: timber, firewood, cork.
- NWFP
  - valued by means of market price or imputed market price: mushrooms, truffles, chestnuts, pine kernels, hazelnuts, bilberries, strawberries, raspberries, acorns, honey, grazing;
  - valued by means other than market price (consumers' benefit): hunting and other items where consumer surplus measures are corroborated by strong and credible market evidence where a market is possible and developed.
- Extended NWFP or other outputs
  - valued by means other than market price (consumers' benefit or loss, opportunity costs, etc.): recreation, watershed management, carbon storage, erosion, damage by forest fires;
  - valued by means other than market price (consumers' benefit or loss): natural quality, landscape, biodiversity for the present generation where, however, it is difficult to make market references and even to simulate a market;
  - not valued: option, bequest and existence values.

## 5. Some conclusions

It is clear that NWFP, when broadly interpreted including near market value, represent a substantial part of the TEV of the Italian forests, and this appears to be true even if important issues like option, bequest and existence values are not accounted for. As shown by Figure 3 some 67% of the TEV is represented by NWFP or potentially marketable NWFP. The survey-inventory has also shown that the potential for market remuneration, after the transformation/development, is not a remote option as is certainly the case with hunting and, to a large extent, with recreation. Other important functions like those concerned with water (watershed management, moisture conservation, purification, etc) present important potential for transformation and development, this looks particularly true in the Mediterranean context where water is a key economic and social issue. The valuations in Figure 4 underscore this fact, showing that watershed management alone could represent some 4/5th of the total value of the NWFP and potential NWFP.

Figure 3. An attempt to estimate the TEV of Italian forests

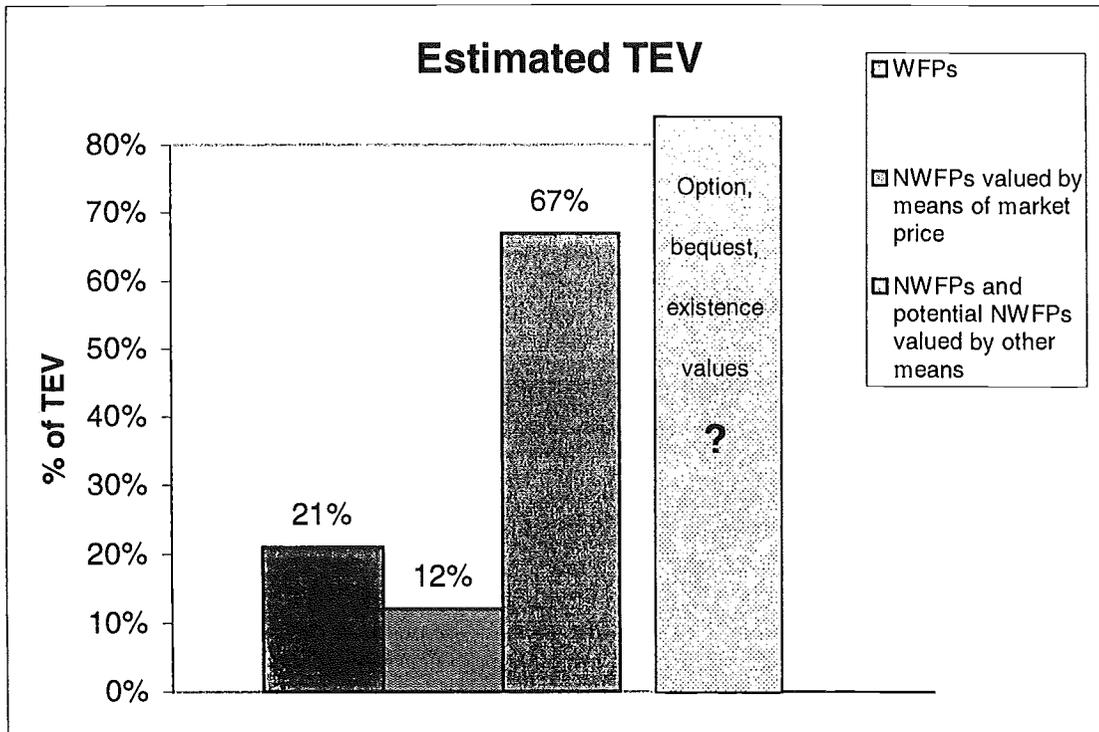
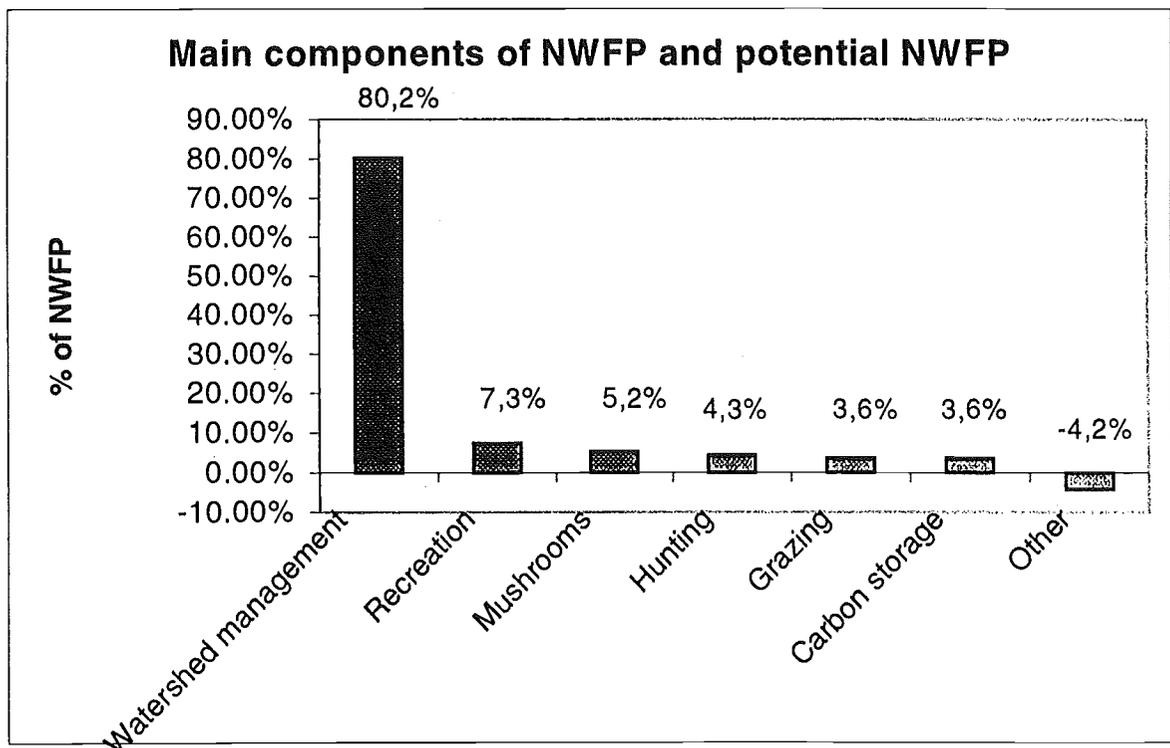


Figure 4. Components of WFPs and NWFP



The option, bequest and existence values, even though not valued, should also be taken into account as paramount components of the TEV of Mediterranean forests. Of course any attempt to value

them raises serious objections and question marks, given the state of the art of social and economic sciences.

Notwithstanding the above various shortcomings, the ongoing research aims to make an accurate review of existing information on the overall Mediterranean forest outputs including public goods and externalities that is the MEDFOREXs. Dissemination of the acquired information among Mediterranean countries is needed. It is clear, and well demonstrated by the survey, that valuation of MEDFOREXs and all the other outputs, including the various NWFP broadly intended, represents an essential step in improving forest accounting, therefore local planning and forest policy formation and implementation at regional/ national/ global levels.

## References

- Bateman J. (1994) *Research methods for valuing environmental benefits* in A. Dubgaard , I. Bateman and Merlo M. (eds) 'Identification and valuation of Public benefits from Farming and Countryside stewardship', Wissenschaftsverlag, Vauk, Kiel.
- Battisti R., Val A., Rosato P.(2000) *Il valore economico della caccia nella montagna veneta, Habitat*, January
- Benini G. (1990), *Sistemazioni Idraulico Forestali*, UTET.
- Campos Palacin P. (1998) *An agroforestry accounting system : towards the measurement of social income*, in 'Institutional Aspects of Managerial Economics and Accounting in Forestry', IUFRO Symposium, Groups 4.04.02 and 4.13.00, Rome
- Centre Tecnologic Forestal de Catalunya & Universitat de Lleida (2000) *EFI Regional Project Centre on Mediterranean Forest Externalities: MEDFOREX*, Draft Project, p.3.
- Cesaro L. and Pettenella D. (1994) *Un'analisi degli effetti delle politiche forestali nella prevenzione dei cambiamenti climatici*, Rivista di Economia Agraria n. 11.
- Codemo L. (1986) Economia Forestale, in 'Aspetti evolutivi delle aree montane in Italia dopo il 1970' INEMO, Roma
- EFI (1999) *Regional Project Centre on Mediterranean Forest Externalities*, Centre Tecnologic Forestal de Catalunya & Universitat de Lleida, Solsona, October, 1999 (internal document).
- Gregersen H. and Contreras A. (1979) Economic Analysis of Forestry Projects Impacts, FAO Forestry papers, (17), FAO, Rome.
- Gregersen H. and Contreras A. (1992) Economic Assessment of Forestry Projects Impacts, FAO Forestry papers, (106), FAO, Rome.
- ISTAT (1997) *Statistiche forestali*, Roma, p. 68.
- ISTAT (1998) *Annuario delle Statistiche del Turismo*, Roma, 1998, p. 56.
- Ministero dell'Ambiente (1997) *Relazione sullo Stato dell'Ambiente*, Roma.
- Merlo M., Briaies E., (2000) *Public Goods and Externalities linked to Mediterranean Forests: Economic Nature and Policy*, Land Use Policy p. 5, 39.
- Merlo, M., Milocco, E., Panting, R. and Virgilietti, P. (2000) *Transformation of Environmental Recreational Goods and Services provided by Forestry into Recreational Environmental Products*, Forest Policy and Economics, n. 2.
- Ministero dell'Ambiente (1997), *Relazione sullo Stato dell'Ambiente*.
- Patrone G. (1970) Economia Forestale, Tip. Coppini, Firenze, p. 506
- Randal A., (1991) Total and non-use value, in J. B. Braden and C.D. Kolsatd (eds) 'Measuring the Demand for Environmental Quality', Amsterdam: North Holland.
- Samuelson P. (1954) *The pure theory of public expenditure*, 'Review of economics and statistics', Vol. 36, pp. 387-389.
- Samuelson P. (1955) *A diagrammatic exposition of a theory of public expenditure*, 'Review of economics and statistics', Vol. 37, 350-356.
- Scrini G., Tosi V., Agatea P., Flamminj T. (1996) *Coordinate quali-quantitative dell'utenza turistico ricreativa in Italia*, Genio Rurale 3, p. 53-76.
- Signorello G. (1990) *La stima dei benefici di tutela di un'area naturale: un'applicazione della contingen valuation*, 'Genio rurale', n.9.
- Turner R., Pearce D., Bateman I. (1994) *Environmental Economics – An Elementary Introduction*, Harvester Wheatsheaf, p. 113.

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# **INVOLVING LOCAL PEOPLE: REVIEWING PARTICIPATORY APPROACHES FOR INVENTORYING THE RESOURCE BASE, HARVESTING AND UTILIZATION OF NON-WOOD FOREST PRODUCTS**

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## **Abstract**

Non-Wood Forest Products (NWFP) are important though an underestimated part of the economy of many countries, and also an effective incentive to conserve forests, woodlands and other ecosystems. The use of NWFP by rural people in making a living has developed to involve assets, income generating activities and entitlements, contributing to their total livelihoods. Hence the need to meaningfully and genuinely integrate them into any activities involving the management of NWFP. To sustainably manage the ecosystems that support these NWFP and to reduce the vulnerability of those people entirely dependent on these, there is the need to evaluate losses in harvesting these resources against the potential benefits accruing from them. Moreover, the need to demonstrate their availability in promoting sustainable harvesting is paramount, and underscored by stock taking through inventories.

This presentation is not meant to provide an in-depth analysis of various inventory techniques but to re-visit some of them, which are inevitable where human consumption of biological resources matters. The most fundamental pieces of information that may be required for a sustained management of NWFP are the estimates of the distribution, abundance and the rate of regeneration of the resource base or the species involved. A knowledge of these estimates in no doubt, form the baseline for studying the population dynamics of the different species, subsequently providing adequate information for assessing and monitoring the impacts of harvesting.

To be able to come up with a sustainable management strategy for the harvesting of NWFP, it is suggested that inventory studies are designed to encapsulate the question of how much of the products are being harvested to sustain the resource base in face of continuous harvesting. It is therefore significantly appropriate to recognize regeneration surveys and harvesting assessments as part of inventories rather than treating them as separate ingredients of promoting sustainability. As part of inventory, various mapping techniques ranging from physical landscape features, ecological and political boundaries as points of references to more sophisticated methods have been used. The sophisticated ones include aerial photographs, GIS and remote sensing, and geographical co-ordinates specifically Global Positioning Systems are being used to map distribution and other features of forest products.

This paper looks beyond the traditional methods of inventory taking which are themselves neither adequate nor participatory and used only by "outside researchers", and reviewing the involvement of local resource dependents at all levels, and recognizing indigenous knowledge using a case study from sub-Saharan Africa. This is more crucial for sustainable management of NWFP outside protected areas, and also for the perpetuation of most species in protected areas especially when their life cycle characteristics are linked to species outside the protected area. The rationale for this presentation is therefore to review and propose various Participatory Learning and Action (PLA) methods for inventorying NWFP. The emphasis will be on Participatory Rural Appraisal (PRA) and Hierarchical Valuation Scheme (VHS) techniques, and how they complement ecological and other techniques.

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## Background

Conventionally, inventory has been used in the study of forest products to take records and produce catalogues of density and size-class structure data of species under investigation. This is a term commonly used by Foresters and Ecologists. Nevertheless, this description of an inventory provides the fundamental information required for management strategies. However, if one is working towards sustainability in cases of utilization, an inventory should further examine species density and size-class structure in addition to harvest and yield related surveys as well as regeneration data.

Inventory of NWFP should therefore be seen as a complex process beyond just scientific or ecological understanding if one acknowledges that these products have been shaped by human activities directly or indirectly for many centuries. From the ecological point of view, one will be more interested in looking at the distribution of the population of species involved with respect to size-class, structure or growth stages (difficult to define). Other factors include populations prone to harvesting and parts harvested; life cycle characteristics and type(s) of usable parts produced; the rate of production (regeneration) and quantitative measures of usable part(s). In addition are species richness, composition, abundance and density.

However, an approach to holistic inventory promises to evaluate socio-cultural and economic dimensions of the resources in context. These are captured by the history of exploitation, addressing issues such as status of collecting and harvesting locations; time and seasonality of exploitation; stakeholders involved in the harvesting; and the impacts of the degree of exploitation. Adding to these are information about previous inventories and other environmental activities in the area; local identification and values of products; specific types of resources used; and efforts to perpetuate the resource (planted, domesticated or selected). Inventory of existing and future demand for products, operational information as well as tenure and institutional matters are worth knowing. With these topical issues, local or indigenous people's involvement is crucial, further easing problems that might be associated with mapping and border demarcation exercises. This involvement can be achieved through Participatory Action Research (PAR); Participatory Rural Appraisal (PRA) or paraprofessional training, or a combination of these whichever is appropriate.

## Harvesting NWFP and Livelihoods

Non-Wood Forest Products are important and are a significant part of the economy of many countries especially in sub-Saharan Africa, providing an effective incentive to conserve ecosystems through involvement of local people in conservation outside of Protected Areas. Though underestimated in national economies and resource accounting, it is an acknowledged fact that rural people have relied on NWFP for centuries yet we know little about the extent of use, availability and sustainability of the products (Godoy & Bawa, 1993; Hammett & Chamberlain, 1998).

For many decades, the utilization of NWFP has only been associated with the "poor", undermining investigations to assess and protect these resources. Though botanical, zoological and anthropological studies have touched on people's use of NWFP for many years, the issues of sustainable harvesting and implications for management and livelihoods have emerged only in recent times. Many studies and investigations have demonstrated that these resources are important over a wide range of systems, and they have been incorporated into the livelihood strategies of most rural people (Scoones *et al.*, 1992; Chihongo, 1994; Emerton, 1996; Statz, 1997; Campbell *et al.*, 1997; Cunningham, 1997; Shackleton, *et al.*, 1999).

Among the many forest products utilized, the most common uses are for food, fodder, and medicine. Other uses include, household baskets, sleeping mats, pillows, sponges and brooms (Falconer, 1992; Arnold, 1995). Food from forests and woodlands includes fruits, leaves, seeds and nuts, tubers and roots, fungi, gum and sap. Bee-keeping for honey is often a forest-based activity and wildlife is an important source of food (Falconer, 1990). In parts of Africa, "bushmeat" referring to meat from smaller animals and invertebrates are more important food sources than larger game because they are readily available, providing a major source of protein to people's diets (FAO, 1995). Food from NWFP often

provides essential vitamins, minerals, carbohydrates and proteins, further serving as sources for variety and taste.

## **The State and Knowledge of NWFP**

Locally or regionally consumed secondary forest products and NWFP account for the great majority of forest species collected and used, and a very significant percentage of the potential and actual value of forests (Padoch, 1992; Godoy & Bawa, 1993). In the last decade resource valuation studies have been superimposed on inventories for understanding the context of resource use and livelihoods (Campbell, 1987; Peters *et al.*, 1989; Chopra, 1993; Phillips & Gentry, 1993; Chihongo, 1994; Shackleton, 1996; Campbell *et al.*, 1997).

Major initiatives are underway locally, regionally and internationally to develop appropriate strategies for a balance between various land and resource uses. Though a sensible approach, it must be recognized that sound management depends on reliable information, and that not enough is known about either the current state of NWFP in many countries, or how the situation has changed over time. Without more and better information, it is far from certain that any strategies designed to improve matters will succeed hence the need for an inventory beyond the traditional methods in science.

It has been argued that if commercial cattle farms, state and private conservation areas and unplanted areas under the control of plantation forestry companies in South Africa were to encourage sustainable harvesting of resources (mostly NWFP) from their lands, it could have positive benefits. These benefits could be in terms of reducing pressure on the resource base within communal lands, promoting jobs and economic activity (Shackleton, 1996). Locally in South Africa, values of NWFP compare favourably to returns from other land uses in the immediate vicinity, hence Shackleton (1996) made a case for the broad-scale harvesting and commercialization of these resources in such areas. He argued for this as a vehicle towards meaningful development, rather than to simply support a subsistence livelihood, through increased income generating opportunities or employment that would result in increased cash flows within the local communities. This has also been argued for in other areas (e.g. FAO, 1996; Leaky & Simons, 1998).

Linked to this has been an on-going debate on different ways to attain a balance between conservation, socio-economic development and political rights. A market approach maintains that improving prices to producers, adding value locally, and organizing people to achieve these aims can lead to the goals of long-term economic and political rights (Leslie, 1987; Nepstad, 1992; Stiles, 1994; Perez & Byron, 1999). It has been further established that lack of regulation regarding the harvesting of non-timber forest products could negatively impact on the industry, leading to over-harvesting, degradation of the resources, and increased tension among stakeholders (Chamberlain *et al.*, 1998).

## **The Paradigm of Local Participation**

### ***The origin and practice of Participatory Learning & Action***

The use of Participatory Learning & Action (PLA) processes embraces several techniques used mostly in the social sciences to involve local people in formal research and development projects. One of these is PRA with methods evolving from Rapid Rural Appraisal (RRA). The difference is that PRA emphasizes processes that empower local people, providing a window into the relationship between them and their environment. RRA is mainly seen as a means for outsiders to gather information quickly and the information provided is restricted to the researcher (FAO, 1990; Chambers, 1992, 1997; Pretty *et al.*, 1995; IDS, 1996).

## **Understanding PRA**

The development paradigms of the 1960s and 1970s, derived from the legacy and dictatorship of colonial rule, involved the conception of a top down approach. There was little involvement of those for whom the development was intended. The failure of stakeholder involvement in forest management has undermined sustainable utilization and aggravated poverty in the developing world. Participatory development and associated strategies arose as a reaction to this realization of failure and disappointment, and was made popular by Park (1989) and Chambers (1992).

In the past decade, several research and development methodologies have evolved for assessing rural community needs quickly and with their participation as a result of criticism of survey methods which tend to isolate beneficiaries and resource dependents from the process. These include Diagnosis and Design, Participant Observer, PAR, Participatory Technology Development, Rapid Rural Appraisal and PRA, together now regularly referred to as Participatory Learning and Action (FAO 1990; 1994; Whyte, 1991; Chambers, 1992, 1997; Pretty *et al.*, 1995; Brace, 1995; Wetmore & Theron, 1998; Guijt & van Veldhuizen, 1998). Ford *et al.* (1992) noted that it is important to assume the following when carrying out a PRA exercise:

- that these people have knowledge and information which ought to be organized;
- villagers have local resources but need to be mobilized; and in
- attracting outside help, outside resources are available, but they need to be defined in the context of the identified priorities of the village.

## **Techniques and Practice of PRA**

There are several techniques used in the implementation of PRA, some of which are Time Lines; Mapping (Resource, Tenure & Control); Product or Resource Flow Diagrams; Skits & Role Plays; Transect or Systematic Walk; and Seasonal Calendars. There are others such as Linkage Diagrams; Pairwise and Matrix Ranking; Venn & Network Diagrams; Triangulation as well as Interviews among others (Fielding & Fielding, 1986; Chambers, 1992; FAO 1990, 1994; Guijt & van Veldhuizen, 1998).

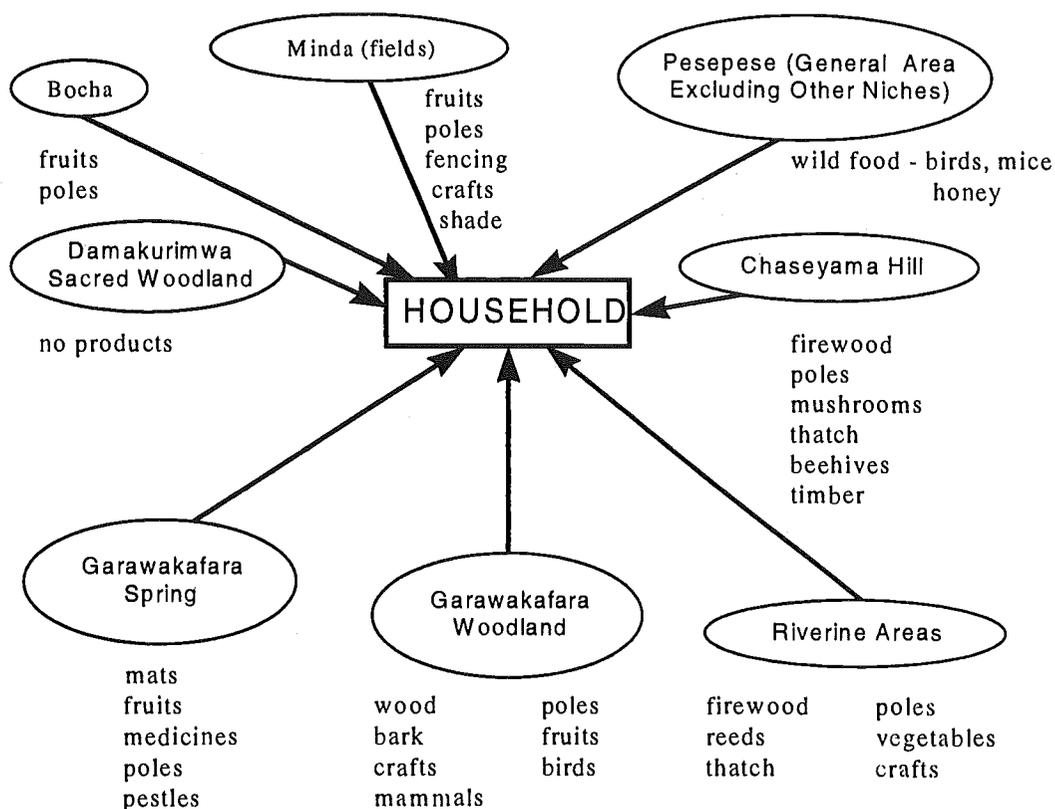
In an attempt to identify problems experienced by traditional healers in accessing medicinal plants and to involve them in an Integrated Conservation and Development Project of the Kruger National Park (KNP) in South Africa, a PRA exercise was conducted to identify areas where resources were harvested. With a map of KNP and the position of the village, members identified various areas of the park where specific herbs can be obtained, something new to the rangers and scientists of the KNP (Botha, 1998). Similarly in a survey to provide local valuation of savanna resources in Zimbabwe, Campbell *et al.* (1997) used PRA to trace the availability of products including non-wood resources with respect to specific seasons as perceived by the local people all year round (Fig 1). In another exercise, other techniques to determine major resource units through a product (resource) flow diagram (Fig. 2), resource maps and aerial photographs were carried out.

Fig. 1: The results of a Seasonal Calendar derived from PRA exercise

Activities	Nov	Dec	Jan	Feb	Mar	Apr	Ma y	Jun	Jul	Aug	Sep	Oct
Planting Crops	■											
Weeding		■	■	■								
Harvesting Crops					■	■	■	■				
Selling Crops										■	■	■
Gardening												
Cattle Herding	■	■	■	■	■	■						
Termites	■	■	■									
Mushrooms		■	■	■	■							
Honey	■	■	■	■	■							
Wild Fruits		■	■	■	■							
Caterpillars					■	■	■					
Locusts							■	■	■			
Thatching Grass						■	■	■	■			
Making Mats							■	■	■			
Firewood/Poles							■	■	■	■		
Home Building									■	■		
Drums/Mortars									■	■		
Bricks											■	■
<b>Season</b>	Wet				Coo l				Dry		Hot Dry	

Source: Campbell et al. (1997)

Fig. 2: Resource Flow Diagram Showing Inventory of Sources of Products



Source: Campbell et al. (1997)

## ***The challenge of using PRA for NWFP inventory and mapping***

Sampling techniques that provide representative measures of species diversity and abundance are often used to generate results even where different microenvironments are involved. General inferences drawn from such qualitative work might not auger well for understanding types and patterns of distributions of economically important species undergoing harvesting due to differences in microenvironmental impacts. A useful inventory should therefore take advantage of local knowledge and skills (Redford *et al.*, 1995; Hammett & Chamberlain, 1998; CEP, 1999).

Martin (1995) noted that in making surveys of useful plant products in a communal land, one has to decide and choose to focus on a particular resource or product for measuring the overall abundance in that particular environment. Alternatively, measuring individuals of the same species in different size classes provides an understanding of the species population dynamics. These further provide an impetus for assessing harvesting levels and impacts, an effort being made by ethnobotanists in recent years through the establishment of permanent utilizable plots.

The inclusion of local people in a team of researchers is appropriate because they have a long history of harvesting or extraction and unique traditional use in the area, blended with their strong perception of identification and location of resources. Inventories are noted to be expensive especially when many specialists referred to in this paper as "outside researchers" have to be consulted, and often marred by a lack of respect for local knowledge. This is however better in well-defined plantations.

Moreover, inventories become tedious when there are no clear-cut boundaries to resource location, absence of harvesting history and intensity, parts used by people and at what time and seasons. Self-seeking interests that tend to ignore the rules of use and population dynamics can undermine inventories, resulting in unsustainable harvesting. A properly constituted team of researchers with the highest representation of local resource users is paramount for a successful inventory of forest products. This further provides checks on researchers under pressure and eager to publish as soon as possible so that both parties can compromise on what information should be widely published (Milliken & Albert, 1996).

In the NWFP sector, inventory information can lead to complex exploitation situations which might in turn propel a mismatch between community and scientific aspirations as this is likely to betray traditional knowledge and awaken the greed of outsiders (Dove, 1993; Statz, 1997; Gyllenhaal, 2000). Local involvement is therefore an important part of a process to empower user and harvesting groups to have the political will to determine how to promote and manage these resources. A follow-up is to provide technical assistance to the user groups, focusing on the provision of methodological skills (Statz, 1997; Aumeeruddy-Thomas *et al.*, 1999).

### **Why Involve Local People and Resource User Groups in Inventories?**

There have been instances where PAR has been used to involve local people in formal research projects with harvesters and user groups serving as assistants in a similar fashion to PRA techniques. This has been noted to provide in-depth knowledge for managing natural resources, and more beneficially, providing local residents the opportunity to learn to design, administer and interpret identifiable community specific problems (Tuxill & Nabhan, 1998). This strategy has been used by a group of researchers where young adults were recruited from villages in Zimbabwe to take part in a study to value savanna resources (Fig. 1 & 2, Box 1), (Campbell *et al.*, 1997).

Many traditional and local communities possess long experience in the harvesting and use of biological resources (Garcia-Brokhausen, 1997) and non-wood forest resources as sources of livelihoods. The new conservation science recognizes first and foremost the historical importance of local people as having the knowledge and skill to manage biodiversity through their bio-cultural diversity (McNeely, 1992). Historically, it has been argued that what we see today has been protected by traditional knowledge, indigenous technology and cultural factors such as taboos which place limitation on resource use by people (Berkes, 1989). Rural people who live in intimate contact with their major resources could provide much of the intellectual raw material for the present call for harvesting and managing non-wood forest resources whether or not in plantations or natural stands.

It is also an opportunity to tap into useful knowledge that might be required for future management practices because people's interactions with nature have been mediated through judgement structures often referred to as indigenous knowledge (Larson, 1998; CEP, 1999). This forms the basis for local level decision making in aspects of livelihoods and resource management, with women playing major roles. This knowledge, embracing a system of organization and self-management that directs the course of resource use and principles of empirical perception about local people's environment and survival, provides a confidently supportive role to inventories.

Including local people in surveys is a form of motivation as they receive training in several modern and orthodox techniques; becoming acquainted with compasses and clinometers, learning to interpret and read topographic maps, measuring tree diameters and canopy sizes, laying out transects and plots (Tuxill & Nabhan, 1998). Though this may appear to be time wasting, the long term benefits are significant not only for giving them the opportunity to acquire some skills and knowledge but also having another view of the resources available to them. In addition, it provides a challenge towards the development of a sense of responsibility and accountability in managing their resources.

Where inventories touch on resources harvested from areas such as traditional reserves and sacred groves, local involvement is useful because these areas are usually demarcated on cultural grounds based on site-specific traditions and economies. These reserves refer to ways of life and resource utilization that have evolved in place and representing the direct expression of the relationship between communities and their habitats, revered and protected by custom. These are guarded by a council of elders who decree the use of the area and permissible species and products (Wilson, 1993; Kleymeyer, 1994). At a local level, sacred groves are similar to National Parks at national level.

#### Box 1: Local Participation in NWFP Study in Eastern Zimbabwe.

The utilization of baobabs in Africa is not a new phenomenon as this has been in existence for several years and used for various purposes especially in traditional settings. In eastern Zimbabwe, there is a remarkable dependence of communities with baobab for non-wood resources. These are fibre, fruits, source of green vegetable, medicine and organic fertilizer. The finished products of the fibre obtained from harvested bark are baskets, bags and hats; woven blankets, ropes, whips and sewing thread; plaited mats and rugs. The fruit shell is a source of a locally prepared snuff and receptacle for households' foodstuff. The pulp of the seed popularly referred to as monkey bread is consumed by humans and largely traded in the region. The seeds would normally be roasted, and turned into powder for preparing beverage as a substitute for exotic beverages. The green fresh and tender fruits considered as vegetables are a delicacy for the local people.

The multiple-use values are a clear indication of the possibility of overharvesting, evidenced in recent studies on the impact of human use on sustaining the population of the baobab in Zimbabwe (Mudavanhu, 1998; Mukamuri & Kozanayi, 1999). However, the implications of commercializing baobab products on the long-term usage of the resource base have not been fully investigated. The harvesting of bark is done from various size classes of trees mainly in the dry season when there is little activity in the agricultural fields. A workshop was therefore organized to understand the market chains involved in tree-based products with a focus on baobab. As part of the issues that were addressed, the state of the resources, in this case baobab, was investigated to determine whether the current marketing arrangement was ecologically sustainable.

The workshop drew on few individuals from the target communities to join the team of researchers to plan and execute the various activities among which inventory was important for the bark products. In addition, several enumerators from the communities were mobilized and trained to administer questionnaires whilst some helped to facilitate PRA exercises and provided guidance for field surveys. The locals, who prior to the activities had no professional insight, became very conversant with the issues at stake. Coupled with their traditional knowledge, they assisted in integrating socio-cultural, economic and ecological assessments. Some of the questions that answers were sought for included:

- How much baobab bark is harvested annually?
- How do the trees regenerate and how this is affected by the consumption of reproductive parts such as fruit and seed?
- What is the rate of bark regeneration and how this is correlated with age and size of harvested parts (scars)?
- What the impacts of other products from the baobab on bark production are?
- What is the impact of bark harvesting on tree vigour?
- What is the relationship between sustainability of the resource base and harvesting rate?
- What are the tenure and institutional arrangements?

## Defining the Involvement of Local People

The term involvement or participation has been interpreted in many ways, ranging from passive participation where people are included in a project merely by being told about the said activity, through to self-mobilization, where people take initiatives and responsibilities without or with limited external influence (Pimbert & Pretty, 1995; Pretty, 1994). Pretty (1994) defines seven important types of participation required for conservation, useful for inventories but for the purpose of this paper, three are listed below:

- **Functional Participation:** People participate by forming groups to meet pre-determined objectives related to the project, which can involve the development or promotion of externally initiated social organization. Such involvement tends not to be at early stages of project cycles or planning but rather after major decisions have been made. These institutions tend to be dependent on external initiators and facilitators, but may become self-dependent.
- **Interactive Participation:** People participate in joint analysis, which leads to action plans and the formation of new local groups or the strengthening of existing ones. It tends to involve interdisciplinary methodologies that seek multiple perspectives making use of systematic and structured learning processes. These groups take control over local decisions, so people have a stake in maintaining structures or practices.
- **Self-Mobilization:** People participate by taking initiatives independent of external institutions to change systems. Such self-initiated mobilization and collective action may or may not challenge existing inequitable distributions of wealth and power.

Participatory approaches are mostly human centred hence require caution and bearing in mind, central concepts of empowerment, respect, localization of resources, enjoyment and inclusiveness of people (Pretty *et al.*, 1995).

## Beyond PRA

Participatory Rural Appraisal techniques have mostly featured at higher levels of peoples' perception and experiences, gathering members of a community in small, large or peer groups presented with a topic to discuss. Notwithstanding the problem of domineering by some members of the group coupled with disagreements which might tend to defeat the purpose of the exercise, it is recommended that results from this should not be seen as the ultimate goal. Further down the process of involving local people, household interviews and key informant interviews are carried out as complements. In a study to value the utilization of woodland resources in South Africa, an approach similar to PRA was used at the household level (Dovie, *in prep.*).

Though the main method for data collection was household interviews, the individual or key informant being interviewed is asked to perform exercises characteristic of PRA, such as resource mapping and product flow diagrams, as well as seasonal calendars. Where there were doubts and uncertainties, other members of the household jointly contributed to the discussion and a compilation of

these represents another dimension of participation. It has therefore been realized that most of the weaknesses associated with PRA at the higher level could be resolved by building a hierarchy of categorized participatory inventory activities and results integrated into those of a PRA at communal level. This leads to a further complement to participatory appraisal methods known as a "Hierarchical Valuation Scheme" (HVS), (Dovie, *in prep*). The HVS adequately caters for the concern that information generated through PRA portrays public knowledge and associated researchers have limited access to knowledge held by individuals (Stadler, 1995).

## Conclusions

Involving local people in inventories is not an easy task especially when they have little technical expertise or experience. Even where communities have no professional expertise about the resources they exploit, researchers have in the past used and continue to adopt Rapid Rural Appraisal techniques for undertaking inventories when they talk about grassroots involvement. To whose detriment, or advantage? It has been argued that if researchers wish to use RRA, then it should only serve as a baseline method for a background search for available knowledge and literature and not producing results by itself (Dovie & Witkowski, 1999). They further noted that when using PRA, issues that appear to be dissociated from the subject matter can still be captured as these may serve as indicators of the extent of resource use, citing examples of nutrition, land tenure, conflicts and agriculture.

A more formal way of promoting local participation will be to provide them with the opportunity to acquire some knowledge and skills through paraprofessional training workshops and exercises. Such training can expose them to ecological field techniques, mapping exercises, regeneration, yield and harvest studies. They can also form a fulcrum for facilitating PRA activities, providing better perceptions into the dynamics of PRA tools and local people's use of resources. In cases where tenure of forests is controlled by diverse groups of people as observed in community extractive reserves, we recommend the use of the Hierarchical Valuation Scheme as a complement to PRA. The HVS seeks to bring together people with common socio-cultural values and norms to provide insights into their stakes in a resource.

Finally, we argue that involving local people in inventories and mapping of NWFP is inevitable in quantitative surveys, a process which must be given time to develop. Above all, local involvement for undertaking inventories should not be seen as a means of cost effectiveness, cheap labour or the opportunity to tap 'free' knowledge but a sound foundation for partnership development, introducing new operations and opportunity for conflict resolution. This should be seen as a process to promote benefit sharing, enhance the socio-economic lives of the people and in the long term, provide opportunities for accountability for improved and acceptable rural development.

## References

- Arnold, J.E.M. (1995). *Socio-economic benefits and issues in non-wood forest products use*. In Report of the expert consultation on non-wood forest products, Yogyakarta, Indonesia, 17-27 January 1995. Non-Wood Forest Products 3. FAO, Rome.
- Aumeeruddy-Thomas, Y.; Saigal, S.; Kapoor, S. & Cunningham, A.B. (1999). *Joint management in the making: Reflections and experiences*, People & Plants Working Paper 7, UNESCO.
- Berkes, F. (ed) (1989). *Common property resource: ecology and community-based sustainable development*, Belhaven Press, London.
- Botha, J. (1998). *Developing an understanding of problems being experienced by traditional healers living on the western border of the Kruger National Park: foundations for an integrated conservation and development programme*. Development Southern Africa 15(4): 621-634.
- Brace, S. (1995). *Participatory Rural Appraisal-a significant step forward in understanding relationships between poor people and their environment*. In Binns, T. (ed), *People and Environment in Africa*. John Wiley & Sons Ltd.
- Campbell, B. M. (1987). *The use of wild fruits in Zimbabwe*. Economic Botany 41: 375-385. Campbell, B. M., Luckert, M. & Scoones, I. (1997). *Local level valuation of savanna resources: A case study from Zimbabwe*. Economic Botany 51(1): 59-77.
- CEP (1999). *Indigenous knowledge systems, Zambezi River Basin Series No. 9*. Communicating the Environment Programme, Harare, Zimbabwe.
- Chamberlain, J.; Bush, R. & Hammett, A. L. (1998). *Non-timber forest products: The other forest products*. Forest Product Journal 48(10): 10-19
- Chambers, R. (1992). *Rural Appraisal: Rapid, relaxed and participatory*. Discussion paper No. 311. Sussex: Institute of Development Studies.
- Chambers, R. (1997). *Whose reality counts? Putting the first last*. Intermediate Technology Publications, London.
- Chihongo, A. W. (1994). *Non-wood forest products of Tanzania*. In Malimbwi, R.E. & Luoga, E.J. (eds), *Information acquisition for sustainable natural forest resources of Eastern, Central and Southern Africa*. Workshop proceedings Arusha, Tanzania.
- Chopra, K. (1993). *The value of non-timber forest products: an estimation for tropical deciduous forests in India*. Economic Botany 47(3): 251-257-257.
- Cunningham, A.B. (1997). *Review of ethnobotanical literature from eastern and southern Africa*. Bulletin of the African Ethnobotany Network, 1: 23-88.
- Dove, M.R. (1993). *A revisionist view of tropical deforestation and development*. Environmental Conservation 20(1): 17-24,56.
- Dovie, B.D.K. & Witkowski, E.T.F. (1999). *Reviewing participatory approaches in data collection for studying forest and woodland resource utilisation, valuation and livelihoods*. A presentation at the 2<sup>nd</sup> Symposium on natural forests and woodlands, Knysna, South Africa. DWAF. Proceedings in preparation.
- Dovie, B.D.K. (in prep). *Woodland resource utilisation, valuation and rural livelihoods in the lowveld, South Africa*. Msc Research Report, University of the Witwatersrand, Johannesburg.
- Emerton, L. (1996). *Valuing the subsistence use of forest products in Oldonyo Orok Forest, Kenya*. Rural Development Forestry Network. Summer 1996. ODI, London.
- Falconer, J. (1990). *The major significance of "minor" forest products: the local use and value of forests in the West African humid forest zone*. Community Forestry Note No. 6. FAO, Rome.
- Falconer, J. (1992). *Non-timber forest products in southern Ghana: a summary report*. ODA forestry Series No. 2. UK Overseas Development Authority, London.
- FAO (1990). *The community toolbox: the idea, methods and tools for participatory assessment, monitoring and evaluation in community forestry*. Community Forestry Field Manual 2.
- FAO (1994). *The Group Promoter's Resource Book*. FAO, Rome, pp 101-107.
- FAO/Food and Nutrition Division. (1995). *Non-wood forest products in nutrition*. In *Non-wood forest products for sustainable forestry*, Yogyakarta, Indonesia, 17-27 January 1995. Non-Wood Forest Products 3. FAO, Rome.
- FAO (1996). *Domestication and commercialization of non-timber forest products in agroforestry systems*. FAO, Rome.
- Fielding, N.G. & Fielding, J.L. (1986). *Linking Data, Qualitative Research Methods Series No. 4*, Beverly Hills, Sage.
- Ford, R.; Kabutha, C.; Mageto, N. & Manneh, K. (1992). *Sustaining development through mobilisation: a case study of participatory rural appraisal in the Gambia*, ACTIONAID, The Gambia.
- Garcia-Brokhhausen, S. (1997). *Genetic Resources – Biodiversity is the tropical forest's "greatest treasure"*, GATE, technology & development 2: 18-22.
- Godoy, R.A. & Bawa, K.S. (1993). *The economic value and sustainable harvest of plants and animals from the tropical forest: assumptions, hypotheses and methods*. Economic Botany 47(3): 215-219.
- Guijt, I. & van Veldhuizen, L. (1998). *What tools? Which steps?: Comparing PRA and PTD*. IIED Issue Paper No. 79.

- Gyllenhaal, C. (2000). *Ethics. Plants & People*, Society for Economic Botany Newsletter 14: 5,8.
- Hammett, A. L. and Chamberlain, J. L. (1998). *Sustainable use of non-timber forest products: alternative forest-based income opportunities*. In J. S. Kay, G. R. Goff, P. J. Smallidge, W. N. Grafton & J. Parkhurst (eds), Conference proceedings: natural resources income opportunities on private lands University of Maryland cooperative extension service, pp. 141-147.
- IDS (1996). *The Power of Participation*. IDS Policy Briefing Issue 7. Sussex, UK.
- Klerymeyer, C.D. (1994). *Cultural traditions and community-based conservation*. In Western, D.; R.M. Wright & S.C. Strum (eds.), *Natural Connections: Perspectives in community-based conservation*, Island Press, Washington D.C., USA. pp 323-346.
- Larson, J. (1998). *Perspectives on Indigenous knowledge systems in southern Africa*. Environment Group, Africa Group World Bank Discussion Paper No. 3.
- Leaky, R.R.B. & Simons, J. (1998). *The domestication and commercialization of indigenous trees in agroforestry for the alleviation of poverty*. Agroforestry Systems 38: 165-176.
- Leslie, A.J. (1987). *The economic feasibility of natural management of forests*. In Mergen, F. & Vincent, J.R. (eds.), *Natural Management of Tropical Moist Forests*. Yale University, New Haven, Connecticut.
- Martin, G.J. (1995). *Ethnobotany: A methods manual*. A People and Plants Conservation Manual No. 1. Chapman & Hall, London.
- McNeely, J. (1992). *Nature and Culture: conservation needs them both*, Nature 28(3): 37-43.
- Milliken, W. & Albert, B. (1996). *The use of medicinal plants by the Yonamami Indians of India*, Economic Botany 50(1): 10-25.
- Mudavanhu, H.T. (1998). *Demography and population dynamics of Baobabs (Adansonia digitata) harvested for bark in southeastern Zimbabwe*. Unpublished MSc Thesis, University of Zimbabwe, Harare.
- Mukamuri, B.B. & Kozanayi, W. (1999). *Commercialisation and institutional arrangements involving tree species harvested for bark: the case of Warburgia salutaris, Berchemia discolor & Adansonia digitata in Zimbabwe*. IES Report, Institute of Environment Studies, Zimbabwe.
- Nepstad, D.C. (1992). *The challenge of Non-Timber Forest Product Extraction*. In D.C. Nepstad and S. Schwartzman (eds.), *Non-Timber Forest Products from Tropical Forests: evaluation of a conservation and development strategy*. Advances in Economic Botany 9: 143 - 146.
- Padoch, C. (1992). *Marketing of non-timber forest products in Western Amazonia: General observations and research priorities*. In D.C. Nepstad and S. Schwartzman (eds.), *Non-Timber Forest Products from Tropical Forests: evaluation of a conservation and development strategy*. Advances in Economic Botany 9: 43 - 50.
- Park, P. (1989). *What is Participatory Research? A Theoretical and Methodological Perspective*. University of Massachusetts: Amherst.
- Perez, M.R. & Byron, N. (1999). *A method to analyse divergent case studies of non-timber forest products and their development potential*. Forest science, Vol. 45, No. 1: 1-14.
- Peters, C.M.; Gentry, A.H. & Mendelsohn, R.O. (1989). *Valuation of an Amazonian rain forest*. Nature 339: 655-656.
- Phillips, O. & Gentry, A.H. (1993). *The useful plants of Tambopata, Peru: I. Statistical Hypotheses tests with a new quantitative technique*. Economic Botany 47(1): 15-32.
- Pimbert, M.P. & Pretty, J.N. (1995). *Parks, people and professionals – Putting “participation” into protected area management*. UNRISD Discussion Paper DP 57.
- Pretty, J.N. (1994). *Alternative systems of inquiry for sustainable agriculture*, IDS Bulletin 25(2): 37-48.
- Pretty, J.; Scoones, I.C.; Guijt, I & Thompson J. (1995). *A Trainers guide for participatory learning and action*. IIED, London.
- Redford, K.H., Godshalk, R., and Asher, K. (1995). *What about the wild animals?: wild animal species in community forestry in the tropics*. Community Forestry Note 13. FAO, Rome.
- Scoones, I. C.; Melnyk, M. & Pretty, J. (eds), (1992). *The Hidden harvest: wild foods and agricultural systems*. A literature review and annotated bibliography. 111.1, London.
- Shackleton, C. (1996). *Potential stimulation of local rural economies by harvesting secondary products: a case study from the Transvaal Lowveld, South Africa*. Ambio 25(1): 33-38.
- Shackleton, S. E.; Shackleton, C. M. & Cousins, B. (1999). *The Economic Value of Land and Natural Resources to rural livelihoods. Case Studies from South Africa*. Keynote Paper presented at the national conference on Land & Agrarian Reform in South Africa, Broederstroom. Proceedings in preparation.
- Stadler, J. (1995). *Development, research and participation: Towards a critique of participatory rural appraisal methods*. Development Southern Africa 12(6): 805-814.
- Statz, J. (1997). *Non-Timber Forest Products: A key to sustainable tropical forest management? GATE, technology and development, 2: 4-11*.
- Stiles, D. (1994). *Tribals and Trade: A strategy for cultural and ecological survival*. Ambio 23: 106-111.
- Tuxill, J. & Nabhan, G.P. (1998). *Plants and Protected Areas – A guide to in situ management*. A People & Plants Conservation Manual No. 3. Stanley Thornes (Publishers) Ltd.
- Wetmore, S. B. & Theron, F. (1998). *Community Development and Research: Participatory learning and action-a development strategy in itself*. Development Southern Africa Vol. 15( 1): 29-54.
- Whyte, W. F. (1991). *Participatory Research*. Sage Publications, Inc: New Delhi.

Wilson, A. (1993). *Sacred Forests and the Elders*, In Kemf, E. (ed), Protecting indigenous people in protected areas – the law of the mother. SIERRA Club Books, San Francisco. pp. 244-257.

## **Definitions of Technical Terms Used**

**Community Extractive Reserves:** These are conservation areas of high level of biodiversity, demarcated through the efforts of traditional populations to guarantee their rights of access to resources such as non-timber forest products.

**Hierarchical Valuation Scheme (HVS):** This is a system of participatory approach to research, drawing on some techniques of PRA at lower levels such as key informants, and households with common socio-cultural and economic attributes, conducted at various levels of a community to form a hierarchy of results from which one makes an inference.

**Indigenous Knowledge:** This defines a body of knowledge and beliefs nurtured and handed down generations by groups of people but without written records, in understanding the relationship between humans and the environment through oral tradition and action.

**Inventory:** A detail listing of resources, in this case NWFP, their sources and all other factors influencing harvesting and the resource base.

**Livelihoods:** Means of living or of supporting life to meet individual and community needs.

**Microenvironment:** This refers to smaller units of an environment, constituting a landscape within the context of similar but distinguished characteristics often detectable through long-term acquaintance. It may also be considered as patch mosaic.

**Non-Wood Forest Products (NWFP):** These are biological resources derived from forest, woodland and agroforestry systems having no woody products.

**Outside Researchers:** These are researchers considered to have little or no knowledge about an area or a resource and yet resistant to accepting the realities of the ground situation.

**Paraprofessional Training:** It is the training of local resource users, giving them the opportunity to acquire skill and knowledge similar to that of professionals through various training exercises.

**Participatory Rural Appraisal (PRA):** This can be described as a variety of techniques, methods and behaviours that enable people to elucidate and analyse the realities of their status of living, plan for themselves what actions to take, monitor and assess the results.

**Secondary Forest Products:** Natural resources available from a given piece of land, coincidental to the primary management objectives. Thus management can still adhere to its primary objective such as maintaining wild animals, but at the same time harvest thatch grass, wild fruits, medicinal plants and fodder.

**Stakeholders:** These are local residents and users of a resource, social actors, administrative authorities, the business community, governmental and non-governmental organizations, as well all other institutions whose activities directly or indirectly affect the resource.

**Sustainable Harvesting:** Within this context, it is the situation whereby one ensures that harvesting does not deplete the resource base, and allowing the resource to recover.

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## ASSURER LA PARTICIPATION DES POPULATIONS LOCALES : MODES D'APPROCHE PARTICIPATIFS POUR L'INVENTAIRE DE LA BASE DE RESSOURCES, LA RÉCOLTE ET L'UTILISATION DES PRODUITS FORESTIERS AUTRES QUE LE BOIS

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### RÉSUMÉ

Les produits forestiers autres que le bois représentent une part importante mais sous-estimée de l'économie de nombreux pays et constitue une incitation efficace à la préservation des forêts, des terres boisées et d'autres écosystèmes. L'utilisation de ces produits par les habitants des zones rurales qui peuvent en vivre s'est développée et est devenue une véritable activité génératrice de revenus, avec des actifs et des droits, qui contribue à leur subsistance. Il est donc important de faire participer de façon réelle et authentique les populations rurales à toute activité concernant la gestion des produits autres que le bois. Pour aménager de façon durable les écosystèmes qui recèlent ces produits et réduire la vulnérabilité des personnes qui en sont totalement tributaires, il est nécessaire d'évaluer les pertes dues à l'exploitation de ces ressources par rapport aux avantages qui peuvent en être retirés. De plus, il est essentiel de démontrer la possibilité de les associer à la promotion d'une exploitation durable et cet élément n'est pas suffisamment pris en compte avec les relevés de stocks réalisés par inventaire.

L'exposé ne vise nullement à analyser en détail les diverses méthodes d'inventaire mais vise simplement à en revoir certaines, indispensables quand la consommation humaine de ressources biologiques est importante. L'information la plus fondamentale qui peut être nécessaire pour assurer une gestion durable des produits forestiers autres que le bois est l'estimation de la répartition, de l'abondance et du taux de régénération de la ressource ou de l'espèce. Il ne fait aucun doute que la connaissance de ces estimations représente le fondement de l'étude de l'évolution des stocks des différentes espèces, et fournit par la suite des renseignements utiles pour évaluer et suivre les incidences de la récolte.

Pour pouvoir élaborer une stratégie d'aménagement durable pour les produits forestiers autres que le bois, il est suggéré de concevoir les études d'inventaire de façon à inclure la question du volume de produits qui doit être récolté pour assurer la durabilité de la ressource dans le cas d'une récolte continue. Il y a donc lieu de considérer les études de régénération et les évaluations des volumes à récolter comme faisant partie intégrante des inventaires et non pas de les traiter comme des éléments séparés de l'exploitation durable. Dans le cadre de l'inventaire, on utilise diverses techniques de cartographie - allant du relevé des paysages et des limites écologiques et politiques jusqu'à des méthodes plus élaborées comme les photographies aériennes, le Système d'information géographique et la télédétection, et les coordonnées géographiques, tout particulièrement le système mondial de localisation - pour établir la carte de la répartition des produits forestiers et d'autres caractéristiques.

Le document examine d'autres méthodes d'inventaire que les méthodes traditionnelles, qui ne sont pas adaptées et ne sont pas participatives, et ne sont utilisées que par des "chercheurs extérieurs"; la participation des personnes qui dépendent de la ressource à tous les niveaux y est examinée et les connaissances autochtones y sont reconnues; une monographie portant sur une région de l'Afrique subsaharienne est utilisée. Il s'agit de facteurs essentiels pour garantir la gestion durable des produits forestiers autres que le bois à l'extérieur des zones protégées et aussi pour assurer la perpétuation de la plupart des espèces dans les zones protégées, en particulier quand les caractéristiques de leur cycle de végétation sont liées à des espèces extérieures à la zone protégée. L'objet du document est donc d'examiner et de proposer plusieurs méthodes d'action et d'apprentissage participatifs pour inventorier les produits forestiers autres que le bois. L'accent sera mis sur les techniques d'évaluation rurale participative et sur la façon dont elles complètent les techniques écologiques et autres.

**Mots clés :** Inventaire; source de revenus; participatif; chercheurs extérieurs; exploitation durable; produits forestiers autres que le bois.

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# ВОВЛЕЧЕНИЕ МЕСТНЫХ ЖИТЕЛЕЙ: ОБЗОР МЕТОДОВ ИНВЕНТАРИЗАЦИИ РЕСУРСНОЙ БАЗЫ, ЗАГОТОВКИ И ИСПОЛЬЗОВАНИЯ НЕДРЕВЕСНЫХ ЛЕСНЫХ ТОВАРОВ, ОСНОВАННЫХ НА ШИРОКОМ УЧАСТИИ МЕСТНОГО НАСЕЛЕНИЯ

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## РЕЗЮМЕ

Недревесные лесные товары (НДЛТ) являются важной, хотя и недооцениваемой частью экономики многих стран, а также фактором эффективно стимулирующим принятие мер по сохранению лесов, перелесков и прочих экосистем. Использование НДЛТ сельскими жителями в качестве источника средств к существованию расширяется, ассоциируясь с такими понятиями, как активы, доходная деятельность и субсидии, что способствует повышению общего уровня их жизни. Именно по этой причине необходимо вовлекать местное население в деятельность, связанную с управлением НДЛТ. Чтобы устойчиво управлять экосистемами, поддерживающими НДЛТ, и уменьшить уязвимость людей, полностью от них зависящих, необходимо оценить потери, происходящие при заготовке этих ресурсов и потенциальные выгоды от использования этих товаров. Кроме того, огромное значение для стимулирования устойчивых заготовок имеет определение наличия НДЛТ, что также подчеркивает важность инвентаризации их запасов.

Настоящий доклад не предполагает глубокого анализа различных методов инвентаризации. В нем заново рассматриваются лишь те из них, без которых нельзя обойтись, когда речь идет о потреблении человеком биологических ресурсов. Важнейшей информацией, которая может потребоваться для устойчивого управления НДЛТ, являются оценки распределения, обилия и темпов восстановления ресурсной базы или соответствующих видов. Знание этих оценок, несомненно, формирует базу для изучения динамики популяций различных видов, что позволяет впоследствии иметь адекватную информацию для оценки и мониторинга воздействия заготовок.

Чтобы выработать стратегию устойчивого управления заготовками НДЛТ, предлагается поставить в центр инвентаризационных исследований вопрос о том, какой объем товаров заготавливается, имея в виду обеспечить устойчивую ресурсную базу при непрерывных заготовках. В связи с этим следует признать, что обследования регенерационной способности и оценки заготовок являются частью инвентаризации, а не подходить к ним как к отдельным компонентам обеспечения устойчивости. В качестве составной части инвентаризации используются различные методы картографирования, начиная картированием характерных черт физического ландшафта, экологических и политических границ как точек отчета и кончая более сложными методами, такими, как аэрофотосъемка, СГИ и дистанционное зондирование, а также географические координаты, а именно глобальные системы определения координат, что позволяет картографировать распространение и прочие характерные особенности лесных товаров.

Настоящий документ выходит за рамки традиционных методов инвентаризации, которые сами по себе не являются адекватными и не предусматривают широкого участия местного населения, а используются только "внешними исследователями"; в нем на основе тематического исследования по африканским странам, расположенным к югу от Сахары, рассматриваются вопросы привлечения лиц, зависящих от местных ресурсов, к работе на всех уровнях и признается важность знания местного населения. Это имеет более важное значение для обеспечения устойчивого управления НДЛТ за пределами охраняемых зон, а также для обеспечения сохранения большинства видов в охраняемых зонах, особенно в тех случаях, когда характеристики жизненного цикла связаны с видами, произрастающими за пределами охраняемых зон. Таким образом, цель настоящего документа состоит в том, чтобы провести обзор и предложить различные методы привлечения местных жителей к инвентаризации НДЛТ. Основное внимание уделяется методам оценки с участием сельского населения и тому, как они дополняют экологические и прочие методы.

**Ключевые слова:** Инвентаризация, средства к существованию, участие населения, внешние исследователи, устойчивые заготовки, НДЛТ.

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# **NEEDS AND CONSTRAINTS FOR IMPROVED INVENTORY AND HARVESTING TECHNIQUES FOR NON-WOOD FOREST PRODUCTS**

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## **Summary**

Non-wood forest products (NWFP) provide a wide range of human needs including food, medicines and construction materials. Many of these NWFP are important sources of income and employment for rural people and some NWFP are even traded at the international level.

In order to determine a sustainable level of subsistence use or any commercial utilization of a given NWFP, accurate information is needed on the status and regenerative capacity of the resources and on the harvesting techniques used to provide the product, in addition to information on the socio-economic and cultural aspects affecting the use of the NWFP.

Practical methodologies for inventorying forest resources providing NWFP and for assessing their harvesting impact are under development, but still not yet fully elaborated neither widely available for implementation by resource managers.

This paper analyses the factors to be taken into consideration when planning an assessment of the forest resources providing NWFP. Some examples of NWFP inventory and harvesting impact methodologies are described and current knowledge gaps and needs are analysed.

**Keywords:** NWFP, forest inventory, harvesting.

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## **Introduction**

Non-wood forest products (NWFP) are often proposed as an environmentally friendly and socially equitable way of using forest resources; however, many examples exist where over- or inappropriate harvesting of NWFP has led to serious forest degradation, including threatening the survival of the species used.

The purpose of this paper is to raise awareness among forest resource managers on the desirability of sound NWFP assessment and on the need to incorporate inventory and harvesting impact assessments for NWFP as a full component of their forest management strategy. The paper describes first some key considerations regarding inventory and harvesting of NWFP, followed by an overview of some methodologies used, and a presentation of the main issues which are currently debated in this field.

The paper is largely based on the report by J. Wong (Wong 2000), and the outcome of a workshop entitled "Developing needs based assessment methods for non-wood forest products". The workshop, which was held in FAO HQ, Rome, was organized by the UK Department for International Development (DFID) and the European Tropical Forestry Research Institute (Baker 2000).

## **Key considerations regarding NWFP inventory and harvesting**

NWFP provide a wide range of human needs including food, medicines and construction materials. Many of these NWFP are important sources of income and employment for rural people and some NWFP are traded at the international level. For many types of NWFP, such as mushrooms, berries, nuts, fruits,

edible leaves, herbs and medicinal plants and which are gathered on forest lands or from trees outside the forests, no specific forest management plans or silvicultural treatments are applied. The availability of NWFP in a forest is often taken for granted and many people assume that as long as the forest is simply protected or managed for timber, the supply of NWFP will be automatically guaranteed. This is a false assumption, in order to determine the sustainable level of use of a given NWFP (be it for subsistence or for commercial utilization), accurate information is needed on the status and regenerative capacity of the resource and on its harvesting levels and techniques. In addition, information on the socio-economic and cultural aspects affecting the use of the NWFP is also required.

For the purposes of this paper, the following definition of NWFP is used: "Non-wood forest products are goods of biological origin other than wood derived from forests, other wooded lands and trees outside forests" (FAO 1999).

The assessment of NWFP, and the forest resources providing them, is an essential tool for the sustainable management of these resources.

Various approaches exist to carry out NWFP assessment: those drawing on indigenous knowledge and ethnobotany, and those drawing on quantitative inventory. However, the range of assessment methods used so far in tropical moist forests is limited and more attention should be given to ensuring that quantitative inventory assessments are biometrically valid.

Forest inventories increasingly aim to expand their traditional tree-based focus to include the assessment of key NWFP as a way to obtain the baseline resource information required to maximise their contribution to livelihoods of people and to national economies. However, it is generally agreed among forest resource managers that there is a need for practical methodologies on: (1) how to determine the sustainable level of NWFP utilization; (2) what is the status and regenerative capacity of the resource/species; and (3) what are the socio-economic and cultural aspects affecting/governing the collection and use of NWFP?

Assessing NWFP resources and their harvesting impacts is still a difficult task because of the multitude and variety of species and life forms; the many interests (often conflicting) and disciplines involved; the lack of commonly recognised terms and definitions; and organizational and financial constraints in view of their perceived "low economic value". Meanwhile sociologists stress that at the community level, methods need to be devised that can be carried out by the community and respond to their management needs. It is argued that these need to be very simple.

## **NWFP resource assessment and harvesting methods**

Resource inventories and harvesting impact assessment for NWFP is relatively new and has received little formal study; consequently methodologies have been developed by individual researchers in response to local circumstances and the peculiarities of the resources under study.

There has however been a proliferation of studies into the potential of NWFP for income generation as a means of involving local people in forest management and benefit sharing. A basic premise of these initiatives is that the resources, be they animals or plants, should be exploited on a sustainable basis.

An ideal development process seeks to identify those products that can be marketed from a list which has already been shown to be sustainable, and progresses through market research, resource inventory, yield forecasting, determination of sustainable harvest practices and intensities, management planning and monitoring.

To be sustainable, harvest levels need to be based on a sound knowledge of the reproductive biology, distribution and abundance of the resource species. Such information can be obtained from a number of sources ranging from knowledge acquired by indigenous peoples to formal scientific enquiry. The study of NWFP is represented by initiatives arising from varied fields of disciplines such as forestry, ethnobiology, economic botany, social development, natural resource economics, conservation biology,

protected area management, agro-forestry, marketing, commercial development, ecological anthropology, cultural geography and human ecology.

Resource assessment of NWFP can take place on a wide range of scales from research studies on permanent sample plots to supra-national studies of species distributions. In her comprehensive report entitled "The biometrics of non-timber forest product resource assessment: a review of current methodology", Wong (2000) reviewed the most used methodologies for approaching NWFP assessment.

These methodologies range from biodiversity listings; to social science techniques (ethnobiology and anthropological approaches to human-natural resource interactions); economic methods (market and income studies), to the classical forest inventories (single or multiple resource inventories, with yield assessments, growth and productivity studies).

Table 1, based on the above cited report summarizes some of these approaches and their characteristics and relevance to NWFP assessment. For a detailed analysis see the complete report (also available on Internet at: [www.etfm.org/etfm/workshop/ntfp/index.html](http://www.etfm.org/etfm/workshop/ntfp/index.html)).

**Table 1: Types of assessment for NWFP**

Type	Description	Relevance to NWFP
Biodiversity inventories	a checklist of the taxa identified at the sample locality or plot presented by family and genera	Species lists are a useful source of information on the distribution and ecology of NWFP, but provide little or no information on abundance
Social sciences techniques /anthropological methods (local knowledge, participatory approaches to data collection; classic and quantitative ethnobotany)	Ethnobotany deals with the inventory of the traditional uses of plants by peoples. Classic ethnobotany techniques require a substantial investment in time, often years and are generally beyond the time frame of development projects and assessments.	Anthropological work and ethnobotany in particular are both highly relevant to the study of NWFP. They often provide a useful overview of the plants used by a local community. They range from an exhaustive listing of all plants and uses to those focused on domains of use such as medicinal plants, food plants or for specific life-forms
Economic methods (market and income studies, cost-benefit and evaluation studies)	Economic assessment of the actual and potential contribution of NWFP to local and macro economies and of studies into the marketing and value addition of NWFP; evaluation of the costs and benefits of including NWFP in the management plans; household surveys; market research	Economic methods are used to estimate the gross raw material availability. A range of survey methods at local or national markets can be used to estimate the quantities of raw material and products circulating in the NWFP trade network which cannot be traced to forest sources (for example like for tree exudates such as gum arabic or pine resins). Market-focussed product surveys however do not consider the abundance of the resource supply or the potential for sustainability
Forest inventories (single resource inventory; single purpose multi-resource inventory; multi-purpose resource inventory-MRI)	1- single resource inventories aim at the quantification of the abundance and distribution of a single product 2- Single purpose multi-resource inventories provide management information on several NWFP in a given area. 3- MRI have been defined as data collection efforts designed to meet all or part of the information requirements for two or more products, functions (such as timber management and watershed protection) or sectors (such as forestry and agriculture).	1- The NWFP has to be either very valuable, or subject to legislation for it to justify a species-specific inventory (high value medicinal plants, bamboo-, rattan- or palm-products..) 2- It can be a sound and pragmatic means of studying the distribution, abundance and NWFP management potential of the area to be logged. 3- Many NWFP assessments take place in MRI. NWFP is often a small component of the inventory and the development of protocols can be constrained by the need to compromise with the needs of the other components.

As already mentioned, most NWFP are used and managed by local people. Therefore, an aspect of particular interest is the involvement of local people in NWFP assessment work. There is often a great amount of local knowledge regarding the use of forest resources. Collecting this local knowledge is a quick way of obtaining basic information about resources and harvesting patterns. Tools for information gathering and analysis include a range of interview types, meetings with communities, different games, visual aids or activities.

**Table 2: Examples of areas of local knowledge and their possible uses in NWFP inventory and harvesting**

Local knowledge	Use in inventory
Species identification.	Local tree/plant spotters can be useful in the field
Important economic species	Species to include in inventory , rapid vulnerability assessment
Vegetation classification, Micro-climate types and distribution, Soil types and distribution	Can be used for stratification
Harvesting techniques and frequency	Affect enumeration methods and frequency
History of availability , Current estimation of availability	Prioritise species to include – influence decision on whether inventory is necessary.
Ecology and distribution of species	Sampling method
Human interaction with environment (e.g. existing management)	Influence inventory objectives & design
Forest and resource value	Influence management objectives and hence inventory objectives.
Socio-economic factors affecting NWFP management	Influence decision to have an inventory and its objectives. Influence interpretation of inventory and harvesting impact assessment results.

(from Wong, 2000)

Rapid vulnerability assessment is another method which makes use of indigenous knowledge, combined with published literature and casual observation to assess the potential sustainability of an NWFP harvest, which can be used as a basis for selecting NWFP for further assessment work.

### Forest inventories

Although at a first glance NWFP inventory methodologies may look very different, they all have the same underlying structure. This structure is envisaged as a hierarchy of design features. At the highest level is the sampling design itself, whether the plots are to be located using random or systematic, stratified or uniform layouts etc. The next level down is the plot scale at which decisions about plot dimensions have to be made. Within each plot the enumeration that is undertaken is dependent on the target and product being investigated.

**Table 3: Overview of assessment structures**

a) Sampling design

Sampling design	Summary	Target NWFP examples from review
Cruise	Rapid survey of large area e.g. by air	Tree (single spp)
Census	100% enumeration of small area (e.g. as in forestry stock survey)	All useful plants and animals
Simple random sampling	Selection of plots using random number tables (probability of sampling any plot equal)	Useful plants
Systematic sampling	Location of plots on a fixed grid, normally with randomly selected origin. Line-plot sampling – Plots located at fixed distances along a transect line	Tree (single spp) Mushrooms Perennial herb, Saplings
Stratified sampling	Area divided into strata and sampling undertaken independently in each strata	Bamboo, Mammals
Multi-stage sampling	Hierarchy of nested sample plots: sample of largest plots selected with further selection of smaller plots within chosen plots.	Shrub, Rattan

b) Plot configuration

Plot configuration	Description	Target NWFP examples
Measured plots with fixed dimensions	Square, Rectangular, Circular	Insect larvae,
	Fixed volume, or 2-D area	Liana, rattan
Plotless sampling	Point-centred quarter method	Trees, Palms
	Sample fixed number of individuals closest to sample point or within sample area	Shrub
	Individuals sampled within timed walk from house	Palm
Cluster sampling	Systematic group of sub-plots in fixed pattern used at each plot location.	Rattan
Point and line transects (variable width transects)	Observations are made while standing on the point or walking along the line. Perpendicular distance from point or line to observed individuals measured.	Mammals
Line-intercept transects	Observations made of intercepts (tracks, signs, plant clumps) with a line or plan projected above line.	1991 Large mammal (single spp)
Strip transects	Narrow, very long transects treated as a fixed sample area.	Mammals
Torus	Strip arranged around geometric shape (square etc. - space inside not enumerated)	Tree , insect (single spp)

c) Enumeration method

Method	Description	Target NWFP examples
Presence/absence	Record occurrence of target in plot	Useful plants
Tally	Counts of target individuals in plot	Useful plants
Size measurement	Measure size of all individuals in plot	Herb (single spp)
Cover	Record percentage of plot covered by target species	Herb (single spp)
Subjective scores	Score features of target into subjective classes	Tree bark (single spp)
Mark-recapture	Capture individuals, mark, release and re-capture, use numbers re-captured to estimate population size	Palm fruit
Indirect / Index methods	Record observable signs of occurrence and use regression methods to estimate size of target population.	Mammals

(Wong 2000)

### Current issues in NWFP assessment

NWFP inventory and harvesting impact assessment are important at the *macro* level (national and international); at the *community/local area* level, and at the *product/species* level. At the above-mentioned DFID/ETFRN workshop, for each of these levels some research needs and areas of actions were identified.

Table 4: Research issues in NWFP assessment at various levels

<p>Macro level</p>	<p>Links / integration with/to existing surveys          Optimisation of methods for particular product groups. E.g. gum arabic, bamboo, rattan, bark, etc.          Classification of NWFP in terms of inventory needs and methods          Development of models and identification of indicators – that would help to characterise distribution and abundance of NWFP. Thinking of planning at a national level and how one would stratify sampling and assessment methods.          Linking market information to the resource.          What are the information needs for certification/commercial/ international reporting – what measurable variables or indicators of changes in abundance of the needs of these stakeholders.</p>
<p>Community level</p>	<p>Documentation of existing local knowledge on sampling, assessment, monitoring and analyses.          Documentation of information needs to which communities have to respond to (e.g. local needs, government, trade).          Evaluate local knowledge against information needs and identify gaps (level of rigour required and appropriate, replicability etc.).          Address the gaps through development of methods that build on local knowledge and meet the legitimate requirements of external interests.          Field testing of methods developed.          Dissemination of successful protocols and experience.</p>
<p>Product/species level</p>	<p><b>Assessment</b>          Evaluation of the relative efficiency (costs, time, relative precision etc.) of new sampling designs (adaptive protocols) in the field for a range of resources and product types.          Evaluation of the potential utility of rank set sampling for utilising indigenous or prior knowledge in the selection of sampling locations.          Investigate the use of local knowledge for generating sampling designs in a way that is biometrically acceptable.</p> <p><b>Monitoring</b>          Collation and evaluation of forest monitoring systems for potential applicability to NTFP resource species. Desk study followed by pilot studies. Pilot studies should test efficiency of different methodologies.          Examination of the linkages between biometric methods that monitor growth and yield and those that monitor extraction.          Investigation of the linkages between assumed indicators (e.g. market data, photographs) and resource condition for a range of products and contexts.          Preparation of guidance on the selection of the monitoring protocols for NTFPs in the form of a decision-support system.</p> <p><b>Sampling</b>          Evaluation of the relative efficiency (costs, time, relative precision etc.) of new sampling designs (adaptive protocols) in the field for a range of resources and product types.          Evaluation of the potential utility of rank set sampling for utilising indigenous or prior knowledge in the selection of sampling locations.          Investigate the use of local knowledge for generating sampling designs in a way that is biometrically acceptable.</p>

(Baker, 2000)

## Conclusions

A number of biological characteristics have a key impact on the elaboration, selection and improved of inventory and harvesting techniques for NWFP species. Foremost among these are: the specific life-form of the resource species – be them trees, scrubs, annual plants, climbers, fungi, insects, animals or birds. The seasonality of the occurrence of the resource and/or the products to be harvested. Whether a part or the whole species is harvested, and whether this harvesting is fatal or not. The mobility of the resource as different techniques are required for mobile and sessile resources; as well as the distribution and scale of dispersal of the resources.

The above mentioned DFID/ETFRN workshop identified major difficulties with NWFP quantification such as for example (Baker 2000): the variety of life forms and distributions represented by NWFP; the lack of properly researched NWFP-specific sampling designs; the little guidance available on development of appropriate NWFP measurement techniques; or the lack of theoretical models to determine the sustainability of NWFP harvesting. The workshop further recognized that is necessary to increase the awareness of the desirability of sound assessment of NWFP populations and dynamics when

considering utilisation of these resources and on the importance of including biometric analyses in the planning phase of any data collection exercise. Furthermore, there is a clear expressed need from field workers for NWFP inventory methods that are simple and easy to use but at the same time are adequate for the determination of harvest levels. This requires further work by inventory specialists on the development of inventory methods and protocols for NWFP, drawing on methods that currently exist in a variety of disciplines. In addition, when undertaking an inventory the issue of whom one is empowering with the resultant information must be considered.

Recognizing the importance of NWFP and harvesting impact assessment, FAO is involved in a number of activities aimed at partly filling the gaps in knowledge in these fields. In an ongoing partnership programme with the European Commission, FAO is working on increasing the capacity in sub-Saharan African countries in the field of NWFP assessment and harvesting.

## References

- Baker, N. 2000. Draft report of the workshop "Developing needs-based inventory methods for Non-timber forest products" held in FAO Rome, 4-5 May 2000. DFID-ETFRN .
- FAO, 1999. Towards a harmonized definition of non-wood forest products. *Unasylva* 50(198):63-64.
- WONG, J.L.G. (2000) The biometrics of non-timber forest product resource assessment: A review of current methodology. Report prepared for project ZF0077. Department for International Development, Forestry Research Programme, UK. 174 pp. [www.etfrn.org/etfrn/workshop/forum/ntfpwong.htm](http://www.etfrn.org/etfrn/workshop/forum/ntfpwong.htm)

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# AMÉLIORATION DE L'INVENTAIRE ET DES TECHNIQUES DE RÉCOLTE DE PRODUITS FORESTIERS AUTRES QUE LE BOIS : BESOINS ET CONTRAINTES

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## RÉSUMÉ

Les produits forestiers autres que le bois permettent de satisfaire divers besoins de l'homme, notamment l'alimentation, la production de médicaments et de matériaux de construction. Un grand nombre de ces produits représente une source importante de revenus et d'emplois pour la population rurale et certains sont même livrés au commerce international.

Pour déterminer quel est le niveau d'utilisation à des fins de subsistance ou à des fins commerciales qui garantit la durabilité d'un produit forestier autre que le bois quel qu'il soit, il faut disposer de renseignements exacts sur l'état et la capacité de régénération de ces ressources et sur les techniques de récolte employées, ainsi que des renseignements sur les aspects socioéconomiques et culturels liés à l'emploi de ces produits.

On a entrepris d'élaborer des méthodes pratiques pour faire l'inventaire des ressources en produits forestiers autres que le bois et pour évaluer les effets de leur récolte; toutefois ces méthodologies ne sont pas parfaitement au point et ne sont pas non plus disponibles assez largement pour pouvoir être utilisées par les professionnels de la gestion des ressources.

Le document contient une analyse des facteurs à prendre en compte pour planifier une évaluation des ressources forestières qui produisent des produits forestiers autres que le bois. Des exemples de méthodes d'inventaire et d'évaluation des effets de la récolte sont exposés et les lacunes et les besoins dans le domaine de l'information sont analysés.

**Mots clefs** : Produits forestiers autres que le bois, inventaire forestier, récolte.

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## **ПОТРЕБНОСТИ И ТРУДНОСТИ СОВЕРШЕНСТВОВАНИЯ МЕТОДОВ ИНВЕНТАРИЗАЦИИ И ЗАГОТОВКИ НЕДРЕВЕСНЫХ ЛЕСНЫХ ТОВАРОВ**

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### **РЕЗЮМЕ**

Недревесные лесные товары (НДЛТ) обеспечивают удовлетворение разнообразных человеческих потребностей, в том числе в продовольствии, лекарствах и строительных материалах. Многие НДЛТ являются важным источником дохода и занятости для сельского населения, а некоторые из них даже поступают в международную торговлю.

Чтобы определить устойчивый уровень использования того или иного НДЛТ для получения средств к существованию или в любых других коммерческих целях, требуется точная информация о состоянии ресурсов и их способности к восстановлению, а также о используемых методах заготовки, помимо информации о социально-экономических и культурных аспектах, влияющих на использование НДЛТ.

В настоящее время разрабатываются практические методики инвентаризации лесных ресурсов, обеспечивающих НДЛТ, и оценки влияния заготовок, но работа над ними еще не завершена и поэтому они не могут широко применяться специалистами в области управления ресурсами.

В настоящем документе анализируются факторы, которые следует учитывать при планировании оценки лесных ресурсов, обеспечивающих НДЛТ. В нем приводятся некоторые примеры методик инвентаризации НДЛТ и воздействия заготовок, а также отмечаются существующие пробелы и потребности в знаниях.

**Ключевые слова:** НДЛТ, инвентаризация лесов, заготовка.

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# **CONDITIONS IN COLLECTING AND PRODUCTION OF MEDICINAL HERBS IN THE REPUBLIC OF SRPSKA**

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## **Summary**

In Bosnia and Herzegovina and the Republic of Srpska, due to the favourable climate conditions, there are great floral resources of medicinal herbs. Thus, collection of medicinal herbs and self-medication has had a long tradition on our territories. But, this natural wealth is not adequately exploited. Plantation growing of medicinal herbs is quite a recent activity. The production is accompanied by a burden of problems, among others – an insufficient organization and undeveloped market. Taking into consideration such a situation in collection and production of medicinal herbs, we have established The Republic of Srpska Society for Medicinal Herbs, with its Statutes, aims and programme. The role of the Society is finding solutions for the said problems – in better organization of collectors and growers, as well as finding adequate markets, with the aim of increasing the level of production and achieving higher economic results. In that sense, the Society organizes lectures, scientific gatherings and other activities, aimed at providing education for collectors and producers, which will promote this kind of activity and generate income, without destroying natural ecological balance.

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## **Society for Medicinal Herbs**

In regard to the conditions in collecting and production of medicinal herbs in the Republic of Srpska, we have come to the conclusion that the interests of the individuals engaged in any activity related to medicinal herbs, could only be realized in an organized way. For that purpose, on 22 December 1999, the Republic of Srpska Society for Medicinal Herbs was established. The Society is a non-political, non-governmental and non-profitable association, where each member realizes his interest in the field of medicinal herbs.

The Society has two sections:

- Section of medicinal herbs collectors;
- Section of medicinal herbs producers-growers.

The Society's main tasks are the following:

- development and promotion of the activities in registering, preservation and collection of medicinal herbs
- development and promotion of production, processing and trading of medicinal herbs offering professional assistance to the members of the Society;
- encouraging the development in production of medicinal herbs in the Republic of Srpska;
- offering assistance in purchasing raw materials and equipment;
- offering assistance in controlling the quality of medicinal herbs;
- providing assistance in trading with medicinal herbs.

For the purpose of promoting and improving the Society's work, we have planned the following activities:

- provide education for collectors and producers of medicinal herbs, aimed at creating self-sustained; and
- controlled collection and harvest;

- design strategy for protection of medicinal herbs in the Republic of Srpska and Bosnia and Herzegovina;
- study bio-diversity;
- collect medicinal herbs in the Republic of Srpska;
- produce medicinal herbs in plantations;
- perform medicinal herbs selection and seed production;
- assist in passing legal regulations in the field of medicinal herbs;
- process medicinal herbs;
- perform marketing of medicinal herbs.

One of the first projects of the Society is education of collectors and producers of medicinal herbs, aimed at creating self-sustained and controlled harvest. The purpose of the Project is for the collectors and producers to master the knowledge that will help them in collecting and producing medicinal herbs in a way that will generate income, without destabilizing the ecological balance in the environment at the same time.

The subject of the education are the sorts of medicinal herbs that grow wild but can be grown in plantations, for example: *Matricaria chamomilla*, *Mentha piperita L.*, *Melissa officinalis L.*, *Anethum graveolens L.*, *Thymus vulgaris L.*, etc.

In Bosnia and Herzegovina and the Republic of Srpska, there are great floral resources of medicinal herbs, which make an important economic potential. Knowledge of medicinal herbs, including collection and production, provide for development of a series of activities, as well as creating employment for quite a massive labour force, which, from the economic point of view, has a great importance.

Thanks to its geographical position, soil and climate, the Republic of Srpska is particularly suitable for collecting and producing medicinal herbs.

Collection of medicinal herbs and self-medication has had a long tradition on our territories. Collection of herbs for commercial purposes is usually performed upon the current requests of the market, and it enables existence of several companies in the Republic of Srpska. But this way of collection is characterized by a non-organized, uncontrolled collecting, where the quality of medicinal herbs and their trading are not controlled.

In order to preserve what nature has given to us, it is necessary to organize collection of medicinal herbs in a way that will not influence the ecological balance in the environment.

Medicinal herbs are used as raw materials in food, pharmaceutical and cosmetics industries. In this regard, market needs for certain sorts of herbs increase, which causes an increase in their collection.

Excessive commercialization could have a detrimental effect to natural herb resources, thus ruining the existing ecological balance. Due to this fact, there emerges a need for plantation production of medicinal herbs. This way of growing herbs will solve not only the issue of supplying domestic industries with required quantities of medicinal herbs of appropriate quality and pharmacological characteristics, but will also influence the export of these healing raw materials.

Along with that stated above, medicinal herb growing has advantages in comparison with collecting, since it could provide a healing raw material of a stable quality, while, at the same time, quality and quantity of particular herbs could be influenced as well.

Medicinal herb growing is also a way of protecting natural resources from damaging exploitation, which is one of the main tasks of the Republic of Srpska Society for Medicinal Herbs.

Production of medicinal herbs is connected mostly with the activities of the private sector. Within

the Society, initial steps have been taken in plantation production of *Matricaria chamomilla* L, *Mentha piperita* L, and we plan to start with plantation production of *Hypericum perforatum*. We also perform distillation of certain herbs, such are *Juniperus communis*, *Abies alba*, etc.

Within the Society, the most often grown herb on the plantations is *Matricaria chamomilla*. Its production is performed in ecologically clean conditions, without any chemicals or fertilizers. This way of production of *Matricaria chamomilla* as a clean product is of great importance since it is used for tea in both folk and official medicine.

Since the Republic of Srpska has great coniferous forest resources, we have started test distillation and production of coniferous ether oils, primarily from *Abies alba* and *Juniperus communis*. Analysis and examination in the "Kurt Kitzing" Institute for Chemical Analysis and Quality Control in Germany on 18 December 1999, determined consistency and quality of these oils.

According to the evaluation of the Institute, these oils can go along with high quality coniferous oils, due to their pleasant smell and high concentration of typical components.

On the basis of these results, which have shown a high quality of the oils, and having in mind the quality raw material they are processed from, we can conclude that this is a case for a realistic possibility of starting production of ether oils for the world market. These results also encourage us for further production of oils from other wild-growing coniferous trees, as well as other aromatic herbs.

At this moment, the important thing for the producers and the Society is finding an adequate market for these products, better organization and networking of the producers, as well as increasing production of ether oils, in order to justify market research in this regard.

The greatest problem is lack of funds, since the members of the Society are not able to enhance and finance the production themselves, thus they work as much as their capacities allow them to organize the production of medicinal herbs and ether oils.

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## CONDITIONS DE COLLECTE ET DE PRODUCTION DES PLANTES MÉDICINALES DANS LA REPUBLIKA SRPSKA

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### RÉSUMÉ

En Bosnie-Herzégovine et dans la Republika Srpska, les conditions climatiques favorables font qu'il y a une grande richesse de ressources en plantes médicinales. La cueillette de ces végétaux et l'automédication ont toujours été pratiquées dans ces régions mais cette richesse naturelle n'est pas bien exploitée. La culture de plantes médicinales est une activité très récente. La production est entravée par un grand nombre de problèmes, dont l'organisation insuffisante de la production et du marché, lequel n'est pas assez développé. Cette situation a conduit à la création de l'Association des plantes médicinales de la Republika Srpska, qui a des statuts, des objectifs et un programme. Elle a pour rôle de rechercher des solutions aux problèmes évoqués plus haut - meilleure organisation des cueilleurs et des producteurs de plantes ainsi que recherche de débouchés, l'objectif étant d'accroître le volume produit et d'obtenir de meilleurs résultats économiques. À cette fin, l'Association organise des conférences, des rencontres scientifiques et d'autres activités visant à assurer une formation aux cueilleurs et aux producteurs de façon à promouvoir cette activité génératrice de revenus sans pour autant perturber l'équilibre écologique.

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## УСЛОВИЯ СБОРА И ПРОИЗВОДСТВА ЛЕКАРСТВЕННЫХ ТРАВ В РЕСПУБЛИКЕ СЕРБСКОЙ

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### РЕЗЮМЕ

Ввиду благоприятных климатических условий в Боснии и Герцеговине и Республике Сербской существуют значительные растительные ресурсы лекарственных трав. Поэтому издавна на нашей территории осуществляется сбор лекарственных трав и существует практика самолечения. Однако это природное богатство не используется должным образом. В последнее время получило развитие плантационное выращивание лекарственных трав. Их производство сопряжено с рядом проблем, в частности, таких, как недостаточно высокий уровень организации деятельности и неразвитые рынки сбыта. С учетом такого положения, сложившегося в области сбора и производства лекарственных трав, мы создали Общество лекарственных трав Республики Сербской, которое имеет свой собственный устав, цели и программу. Роль Общества заключается в поиске способов решения указанных выше проблем за счет более совершенной организации деятельности в секторе сбора и выращивания трав, а также в нахождении соответствующих рынков сбыта с целью повышения объема производства трав и достижения более высоких экономических результатов. В этой связи Общество организует лекции, совещания научных специалистов и другие мероприятия с целью повышения профессиональной подготовки лиц, занимающихся сбором и выращиванием трав, и, тем самым, содействия развитию этого вида деятельности и получения доходов без нарушения природного экологического баланса.

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# **MIOMBO WOODLAND UTILISATION BY SMALL SCALE FARMERS IN HANDENI / TANZANIA: BARK HARVESTING AS AN EXAMPLE FOR ETHNIC AND GENDER ORIENTED WORK**

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## **Summary**

### **Problem addressed, research question/hypothesis and objective of research:**

Within African dry lands the increasing displacement of Miombo woodlands is a special problem. The yield of traditional management of these ecosystems (frequent burning and shifting) is not longer sufficient to cover the needs for food supply and cash crop of the growing rural population.

The study is based on the controversial assumption that comprehensive woodland management with agroforestry systems, including timber as well as non-timber product utilisation, will positively influence the economic and social situation of the population, and thereby contribute to a higher valuation of these resources by the inhabitants themselves. The know-how about the multiple use of Miombo woodlands is a basis for further development of proper resource utilisation systems. These systems should not only guarantee the capability of the woodlands to fulfil the subsistence needs of local households, but also an ability to generate income through marketing of products from the woodlands. The use of bark from Miombo species will be given as an example for NTFP utilization.

The main objective of a study in Handeni District, North Eastern Tanzania was to improve the understanding about the situation of Miombo utilisation in the research area through descriptive analyses. Derived objective was to describe the potential development of the region for fulfilment of subsistence needs, income generation and ergonomic aspects such as labour organisation and qualification.

The investigation was focused on the inhabitants of four villages from two different ecological zones of the Miombo woodlands. Information related to the utilisation of forest-resources, especially the potential use of NTFP, based on the knowledge and experiences of local people and the local experts, was collected through individual interviews and group discussions as well as field observations and key interviews within and outside the research area. Most of the people in these villages belong to the Zigua- and Nguu-tribes. Both tribes basically depend on small-scale agriculture. Moreover, Maasai – a semi-nomadic cattle rearing tribe -live in this area at times. Because life style and diet of Zigua / Nguu are basically different from that of Maasai, different knowledge about useful NTFP on Miombo woodlands was to be expected.

The utilization of bark from Miombo tree species shows, as an example, how the amount and techniques of use of the same product differ between men and women and between people of different ethnic groups.

### **Methodology and workplan**

To get access to the traditional knowledge about woodland utilisation, tools of PRA were used to record the actually used NWFP and also the way of harvesting and use of these products, their contribution to subsistence and their economic means. The following research steps lead to the main objective:

1. Assessment of the role of forest utilisation in general, and especially of the role of non wood products, for the predominantly agrarian subsistence livelihood;
2. Identification of the present role of selected non wood forest products (NWFP) of Miombo woodlands, taking into account ecological, economical and socio-cultural aspects of land use;

3. Description and evaluation of the possibilities and constraints of diversification of the product range, and an increase in the direct utilisation of trees and shrubs of Miombo woodlands for the people, based on the carrying capacity of the ecosystem.

### **Results and conclusions and their relevance for development**

All three tribes consider woodlands first of all as a resource for agriculture and cattle grazing. Barks together with honey, mushrooms, other wild foods were identified as most promising NWFP in the region for subsistence households and income generation. In the research area the marketing of woodland products, also of NWFP, fundamentally can be considered as an incentive for the conservation of the woodlands. But today the marketing of forest products is already problematic, expanding the markets would become even more risky because of uncertain conditions of delivery and purchasing.

The example of bark and fibres shows the varieties of use for one product (e.g. medicine, food component, construction material, arts and crafts commodities, as a substitute for a range of products) and the technologies of harvesting (manual or use of tools like knife, axe, machete, or ladders and other) and the consequences for marketing and for the ecosystem, depending on the person harvesting the product. The acceptance levels for accelerating the utilisation and marketing of NWFP vary between and within communities. For subsistence economies a strengthened use of NWFP can be recommended in each case, except for bark splitting. On the contrary, strengthening commercialisation is only with caution recommended because of the high risks. The establishment of collaborative processing and marketing can favour the marketing possibilities of all product samples.

**Key words:** Miombo, bark and fibres, NWFP/NTFP, Social Forestry; Zigua, Nguu, Maasai.

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### **Background of the study:**

Miombo woodlands cover about 48 percent of Tanzania's land surface and are a settlement area for small-scale farmers and cattle-breeders. Although the population is sparse, the area covered by Miombo is decreasing rapidly. In many regions dominated by Miombo, deforestation is mainly caused by small scale farming together with the increasing activities of professional charcoal miners and the establishment of plantations (teak, tobacco, sisal, cotton and others), settlement areas or hydrology engineering projects. In the research area, Handeni, however, the degradation mainly results from forest fires connected with shifting cultivation, hunting and other factors.

This study is based on the controversial assumption that comprehensive woodland management with agroforestry systems, including timber as well as non timber products utilisation, will positively influence the economic and social situation of the population, and thereby contribute to a higher valuation of these resources by the inhabitants themselves.

Knowledge of the possible uses of Miombo woodlands is necessary for further development of appropriate resource utilisation systems. These systems must not only guarantee the capability of the woodlands to fulfil the subsistence needs of the local households, but also an ability to generate income through marketing of products from the woodlands.

### **Methods:**

Based on this assumption the principal objective of the study is to reach a better understanding about the utilisation of Miombo in the research area through descriptive analysis. A derived objective is to describe the potential development of the region to meet the subsistence needs, for income generation, and aspects such as labour organisation and training.

The following research steps lead to the main objective:

1. Assessment of the role of forest utilisation in general, and especially of the role of non-wood products, for the predominantly agrarian subsistence livelihood.
2. Identification of the present role of selected non-wood forest products (NWFP) of Miombo woodlands, taking into account ecological, economical and socio-cultural aspects of land use.
3. Description and evaluation of the possibilities and constraints of diversification of the product range, and an increase in the direct utilisation of trees and shrubs of Miombo woodlands for the people, based on the carrying capacity of the ecosystem.

The investigation was focused on the inhabitants of four villages from two different ecological zones of the Miombo woodlands. Information related to the utilisation of forest-resources, especially the potential use of NTFP, based on the knowledge and experiences of local people and the local experts, was collected through individual interviews and group discussions as well as field observations and key interviews within and outside the research area.

### **People and environment:**

The villages of Kangyata, Kwamagome, Kwediboma and Mafisa are not easily accessible. They are located in the Handeni District in the Tanga Region of Tanzania. Most of the people in these villages belong to the Zigua- and Nguu-tribes.

Both tribes basically depend on small-scale agriculture (with corn and beans as the main crops) for subsistence needs. Outside the habitats of the Tsetse fly they keep cattle and goats. Moreover, Maasai - a semi-nomadic cattle rearing tribe -live in this area at times. They depend on milk and other cattle products. Because life style and diet of Zigua / Nguu are basically different from that of Maasai, different knowledge about useful NTFP on Miombo woodlands was to be expected. All three tribes however consider woodlands first of all as a resource for agriculture and cattle grazing.

In fact, life at the subsistence level, and even survival in the woodlands, is only possible through utilisation of a diversity of products from the woodlands. Firewood is the only source of energy in the rural regions. For houses, huts and enclosures not only timber and poles from woodlands are used, but also branches for wall and roof constructions. Bark serves as a connecting element, grass is required for roofing. Wood and bark are processed to make furniture and simple transport vehicles. Wildlife and edible mushrooms offer an important source of protein rich nourishment, particularly where cattle husbandry is not possible (e.g. within the habitat area of the Tsetse fly). Honey from wild bees or from bee keeping is, among other things, an important basic material for brewing liquor and plays a major role in traditional culture. During extreme hunger periods, by which the rural region is haunted again and again, food from wild plants often provides a last chance for survival. Medicinal plants may be the only medicines available where there are no hospitals due to financial or technical reasons. Furthermore, the medicinal plants are important for health care of the livestock.

### **Main use of NTFP:**

During the study, four products or product lines from the woodland were identified jointly with the participants. These products are used by different sections of the population, and are seen as being suitable for sustainable use and possible marketing. Currently the utilisation of these products is limited and does not exceed the biological potential or meet the market demands.

**The example of bark:** Bark is used in large amounts as a construction material. Bark from selected tree species and bole forms is used for different purposes. Main uses are bark strings for construction and as ropes, smaller pieces for different household purposes and large pieces for containers. Houses constructed with bark connections can last for 8 years. De-barking of strings and smaller pieces can be practised without severe damage to the tree. Women from all tribes collect bark, Maasai men prefer to buy it rather than harvest it as Nguu and Zigua men do. In all villages Zigua, Nguu as well as Maasai

favour bark use of the following tree species:

Genus species	Family	Common name by tribe
<i>Julbernardia globiflora</i>	(Caes.)	(Mhangala, Mtondoro, zig.)
<i>Brachystegia spiciformis</i>	(Caes.)	(Miombo zig.; Olseleyayi, maas.)
<i>Brachystegia microphylla</i>	(Caes.)	(Mseni, zig.; Msane, Nguu; Olkirepori)

If these trees are no longer available in the surrounding area, the following species are chosen:

Genus species	Family	Common name by tribe
<i>Dombeya shupangae</i>	(Sterc.)	(Mluati, zig., Nguu; Emuluati, maas.),
<i>Acacia nigrescens</i>	(Mim.)	(Mkambara, Makambala, zig., Nguu)
<i>Grewia mollis</i>	(Tiliac.)	(Mkole, zig., Esiteti/Siteti, maas.)
<i>Dombeya rotundifolia</i>	(Sterc.)	(Msagusa, zig.)
<i>Obetia pinnatifida</i>	(Urtic.)	(Endameju, maas.)
<i>Sansevieria sp.</i>	(Draca.)	(Galama, ngu.; Oludupai/Oldurai, maas.)
<i>Agava sisalana</i>	(Agav.)	(Katani, Mkonge swa.)
<i>Terminalia catappa</i>	(Combr.)	(Mkungu, zig., swa.)
<i>Leuceana leucocephala</i>	(Mim.)	(Lucinia, zig., Mlusina, swa.)
<i>Ficus scassellattii</i>	(Mora.)	(Mchocho, Kivuguti, zig; Oloteti, maas.)

Men traditionally do the harvesting of the large pieces of bark used for containers or used as doors like boards. In the rainy season they select old *Julbernardia* or *Brachystegia* trees with straight bowls and few branches and use the long knives (panga) to cut the shape of the demanded piece and tear it off while splitting it slowly from the stem. For this work they often use ladders to reach the heights.

Smaller pieces of bark and strings are harvested traditionally by women and children. They do it occasionally during other work like collecting food plants, just when they need bark and find a suitable plant. They use bark for example to roll rings to carry baskets on their heads. Mainly women know the names of trees less often used for these and other special purposes. *Grewia* e.g. is used for very soft strings. Women and children often use no tools or only small knives to tear off long bark stripes together with a branch from the tree. Sometimes they use the long panga to cut larger pieces of bark to be used as seats, lids for pots and other household items.

Bark from different species and parts are used for several medicinal purposes by all tribes, by men and women, both for humans and livestock. Several possibilities to use bark are practised in different cultures but not now practised by Maasai or Zigua/Nguu people, such as bark clothes and paper making, although probably appropriate species (*Antiaris* ssp.; *Grewia mollis*; *Obetia pinnatifida*; *Leuceana leucocephala*; *Terminalia* ssp.; *Dombeya* ssp.) are available. Bark extracts were used by Maasai to prepare leather. Barks for strings normally get no special chemical treatment like soaking.

Bark strings are locally marketed in small quantities. Potential larger markets for bark are limited, since cheaper substitute materials are available in towns. Production of arts and crafts commodities like hand made paper and bark clothes from bark fibres might have a niche market. With appropriate guidelines in this job, men and women can generate income without much investment. A larger market for bark products, however, could lead to an increase in demand and destructive bark utilisation. Several authors have calculated the damages of miombo woodlands due to bark harvesting. Recommendations for bark use can only be expressed in the framework of the utilisation of the whole tree.

Honey is mainly used for subsistence consumption, generally in fermented form as a local beer. If properly stored, honey can be an important food during hunger periods. Honey can be collected in two ways: through an environmentally sound technique in the form of bee-keeping in hives or using destructive techniques in the form of honey hunting. Honey trade can be profitable for all members of the family as well as for the entire community. The harvesting and processing of honey and by-products can create jobs and income. Men traditionally and currently carry out bee-keeping and honey marketing; they

also get the earnings. In comparison with honey hunting, the revenue from bee-keeping is higher, with a small capital outlay required. The higher profits of bee keeping might encourage people to use resources in an environmentally friendly manner. First of all through the establishment of bee-keeping co-operatives women could also be involved in the process, which would give them the possibility of earning income.

Honey can be marketed locally and regionally. The entrance of Miombo honey in national and foreign markets is also possible, as examples of different neighbour countries show. A strengthened demand for honey and therefore a more intensified skilled bee-keeping, would not have any negative consequences for ecological functions.

Food from wild trees and bushes is used mainly during extreme dry seasons or to prepare certain local meals as an additional food. The collection of wild vegetables and fruits is done by women and children, without any cultural or technical conflict with the cultivation of agricultural crops or other household activities. Seeds of wild vegetables are cultivated to a limited extent around the courtyard and on the field. There is only a slight monetary value on the market for these products, therefore they are rarely sold and are available to fulfil the rural population's own needs. This is different from agricultural products (e.g. corn, beans, fruit and eggs) which are sold occasionally, even before the producer's own needs are satisfied, to meet financial requirements.

Hombo - a pulverised mixture of various aromatic herb leaves of different plant species -, presents a special case. It is storable for a long time and counts among the specialities of the region. Because of the abundance of useful species for Hombo, their use does not lead to a threat for any individual species. The marketing of Hombo can be expanded to a limited extent in local and regional markets, because the processing of the raw material involves no financial risk and the product is easily transported and not perishable. Women invest some extra time in the production of Hombo, therefore they could be the major beneficiaries. The profit margin is relatively low, because the product is only a locally demanded speciality, which can be replaced by other food ingredients.

Furthermore several different edible parts of plants could be preserved and then be stored through appropriate techniques. These would be useful as a food reserve or emergency food during hunger periods or for direct marketing. In order to get a higher profit, co-operatives for production and marketing should be established, through which experience and skills can be shared.

Edible mushrooms are represented on a broad spectrum in Miombo woodlands. The local people consume mushrooms only to a limited extent. People clearly show different personal preferences in quantities and species to be consumed. In the region surrounding the research area, dried mushrooms are infrequently marketed. A sustainable harvest of edible mushrooms under proper management is a possibility. In several Miombo countries, the enrichment of diet with mushrooms, and generating income through strengthening trade with mushroom products, are recognised as a good chance for the economic development of the rural and urban regions. The professional trade presents difficulties caused by the seasonality of mushroom fruiting; this problem can be alleviated to a limited extent through the application of appropriate preservation techniques. Other problems are the weak demand of the markets and the bottlenecks in work capacity. This is because during the fruiting season women are highly involved in agricultural activities. Recently, both women and men participate in collecting mushrooms. An expanded trade in mushrooms can only be recommended in specific cases, but an enrichment of diet with fungi is highly recommended. Comprehensive information about the proper preparation of edible species and about competent preservation is urgently needed; such information should be prepared by ecotrophologists in co-operation with the local specialists - the female users.

## **Results:**

Research results from the participating observation and the estimation of the local experts indicated some discrepancies between the extent of knowledge of the rural population about the potential values of the forest and its products and the extent of the actual use of the forest resources, especially for the selected products. Even though there is a large demand for income sources, the major part of NTFP serves

to cover the household needs. The marketing of these products must be analysed separately and correctly, although market expansion for several products is possible and these products are not harvested by destructive techniques.

In the research area the marketing of woodland products, also of NTFP, fundamentally can be considered as an incentive for the conservation of the woodlands; this frequently became clear during interviews and discussions. Likewise the decline of woodlands is identified as a cause of scarcities, which must be balanced through financial investment. Up to the present in rural areas there has been little marketing of products of the forest, mainly because of the poor infrastructure and lack of knowledge or special methods of post harvest management. As the marketing of forest products is already problematic, expanding the markets would become even more risky because of uncertain conditions of delivery and purchasing.

The acceptance levels for accelerating propagation of utilisation and marketing of NTFP vary between and within communities. It will only be convincing, if it takes place in connection with comprehensive introduction, training, demonstration and monitoring by local experts, and if corresponding pilot-projects are largely successful. For subsistence economies a strengthened use of NTFP can be recommended in each case, except for bark splitting. On the contrary, strengthening commercialisation is only cautiously recommended because of the high risks. The establishment of collaborative processing and marketing would favour the commercial possibilities of all product samples.

The essence of this study is the increment of knowledge and information about the actual utilisation of Miombo woodland and their social and ecological consequences. A specific research procedure to achieve detailed information about the research area was developed based on regionally and socially specific questions and set up following experiences during the preliminary research.

Due to the data collection method used, interesting discussions took place in the villages concerning the rank of the current use, the possibilities and perspectives as well as an effective sustainable woodland management. These discussions are an important step towards the increasing appreciation of the resources of the woodlands, as this investigation intended.

The recommendations derived from the knowledge about the possibilities and boundaries of an increase of the direct use of individual products from the woodland for the inhabitants bolster generally held ideas about integrated agroforestry management, therefore a consistent implementation is needed.

In general the recommendation is for environmentally sound utilisation of NTFP, with the primary aim of fulfilling the subsistence needs of the household, and a subsidiary aim of accelerating the commercial use of NTFP. Finally, a new system capable of achieving sustainable management of woodlands should be developed based on new theory and knowledge, coupled with results of integrated research (e.g. on yield regulation, marketing and ethnology.) Implementation of the system might positively change the economic and social condition of its inhabitants and people living in comparable ecosystems.

#### **Technical terms used:**

**NWFP:** Non Wood Forest Products: "NWFP are goods of biological origin, other than wood, derived from forests, other wooded lands and trees outside forests" (FAO / ICRAF 1996).

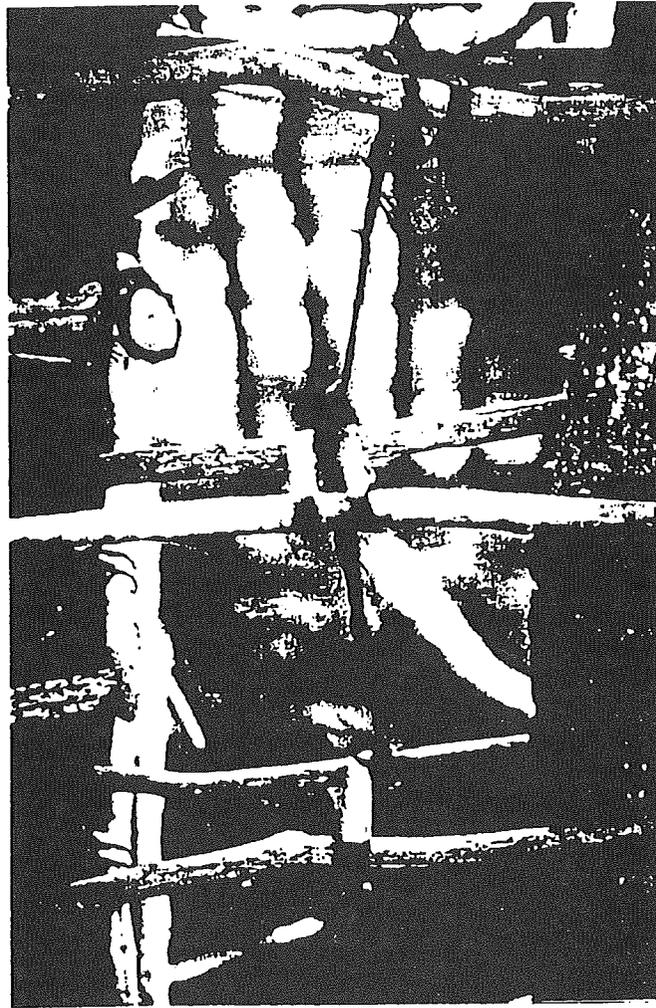
**NTFP :** Non Timber Forest Products (includes energy wood).

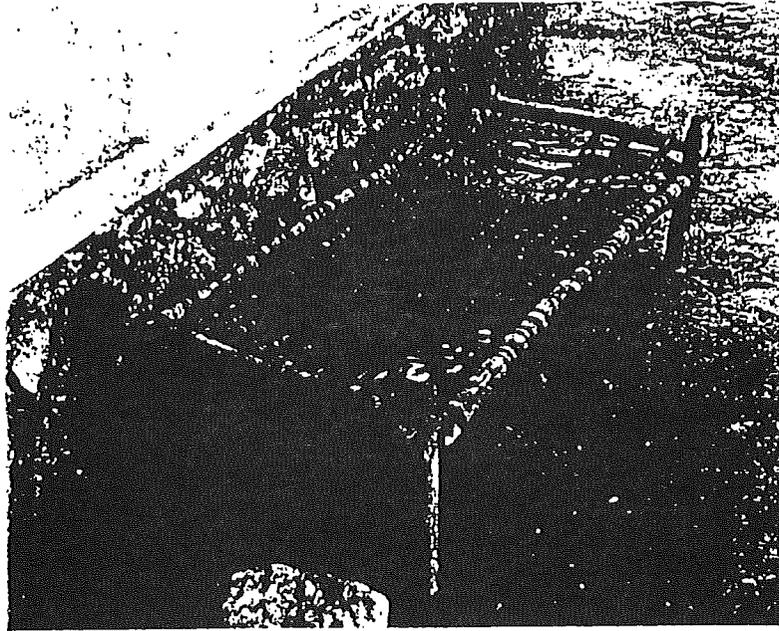
**Miombo:** Miombo comprises those ecosystems in the seasonal tropics dominated by trees of the closely related genera *Brachystegia*, *Julbernardia* and *Isoberlinia* (subfamily Caesalpinioideae, family Fabaceae - the legumes). Miombo woodland is the dominant vegetation type of the Central African plateau (Tanzania, D.R.Congo, Zambia, Malawi, Angola, Zimbabwe and Mozambique). Functionally similar ecosystems with *Isoberlinia* often dominant, but lacking *Brachystegia* and *Julbernardia*, occur in the Guinea savannas of West Africa. About 40 Mio people depend on Miombo woodlands directly, plus 15 Mio people indirectly on firewood. Human activities are pivotal in the dynamics of miombo. (Miombo Network; Campbell. Miombo).

### **Selection of References:**

- CAMPBELL, Bruce (Ed.): The Miombo in Transition: Woodlands and Welfare. Center for International Forestry Research. Bogor, Indonesia.
- Commonwealth Science Council / FAO 1993: Non Wood Forest Products - Proceedings of a Regional Expert Consultation. 17.-22.10.1993, Arusha, Tanzania; Commonwealth Science Council / FAO / Min. of Tourism, Natural Resources & Environment, Tanzania.
- DeBEER, Jenne H. & McDERMOTT, M. J. 1989: The Economic Value of Non-timber Forest Products in Southeast Asia. Netherlands committee for IUCN, Amsterdam.
- DESANKER, Paul V.: The Miombo Network. See: <http://miombo.gecp.virginia.edu/cd/MiomboCD.html>
- KARMANN, Marion 1998: Untersuchungen zur nachhaltigen Miombowald-Nutzung am Beispiel von vier Dörfern im Handeni-Distrikt, Tansania. (Investigations about sustainable Miombo woodland utilisation - example of four villages in the Handeni, Tanzania. (In German, english summary) IV, 302 S. Ill., Kt.; (dt.) Freiburg, Univ., Diss., 1998
- KARMANN, Marion 1999: Die Panga: Einsatz eines Vielzweck-Werkzeugs zur Holzernte in Tanzania aus forstlich-ethnologischer Sicht. Beschreibung des im ruralen Ostafrika gebräuchlichsten Werkzeugs. Beitrag zur 1. Zusammenkunft der Sektion "Forsttechnik" des Verbandes Deutscher Forstlicher Versuchsanstalten vom 22. bis 24. März 1999 in Freiburg.
- MUSHOVE, P. T.; SHUMBA, E. M. & MATOSE, F.: Sustainable management of indigenous forests in the dry tropics. Proceedings, Int. Conference; Kadoma, Zimbabwe, May 28.-June, 1.; Zimbabwe Forestry Commission & SAREC-SIDA, 238 p.
- MWIHOMEKE, Steven T. & MABULA, Charles K. 1994: An ethnobotanical survey for Mafisa, Gombero, Kwamagome and Kangyata Pilot Villages, Handeni D. Report for HIAP; TAFORI.
- LEAKEY, R.R.B., TEMU, A.B.; MELNYK, Mary; VANTOMME, P. (Eds.) 1996: Domestication and Commercialisation of Non Timber Forest Products in Agroforestry Systems. Non-Wood Forest Products Vol. 9, FAO, Rome 1996.
- ICRAF (Ed.) 1994: Regional conference on indigenous fruit trees of the miombo ecozone of Southern Africa, Mangochi, Malawi, January 23-27 1994, Proceedings. ICRAF, Nairobi.
- SLU / FAO Forest, Trees & People Programme, Newsletter. <http://www.trees.slu.se>.

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# UTILISATION DES FORÊTS CLAIRES DE MIOMBO PAR LES PETITS AGRICULTEURS À HANDENI (TANZANIE) : LA RÉCOLTE DE L'ÉCORCE, EXEMPLE ILLUSTRANT LES DIFFÉRENCES SELON QUE L'ACTIVITÉ EST MENÉE PAR LES MEMBRES DE CERTAINES ETHNIES, ET PAR DES HOMMES OU DES FEMMES

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## RÉSUMÉ

### Question traitée, recherche, hypothèse et objectif de la recherche :

Dans les terres sèches d'Afrique, le déplacement de plus en plus important des forêts claires de miombo représente un problème particulier. Le rendement des écosystèmes exploités selon les méthodes traditionnelles (rotation et brûlis fréquents), n'est plus suffisant pour couvrir les besoins en produits alimentaires et en cultures marchandes d'une population rurale toujours plus nombreuse.

L'étude repose sur l'hypothèse, controversée, qu'un aménagement des terres boisées intégrées avec des systèmes d'agroforesterie, y compris l'utilisation pour la production de bois et de produits autres que le bois, aura un effet positif sur la situation économique et sociale de la population et devrait faire que les habitants eux-mêmes attachent un plus grand prix à ces ressources. La connaissance des usages multiples des forêts claires de miombo est à la base de l'élaboration de systèmes bien conçus d'utilisation des ressources. Les systèmes devraient non seulement garantir la capacité des forêts d'assurer la subsistance des communautés locales, mais aussi permettre de générer des revenus par la vente des produits. L'utilisation de l'écorce de l'essence miombo sera donnée en exemple d'utilisation de produits forestiers autres que le bois.

Le principal objectif de l'étude menée dans le district de Handeni, dans le nord-est de la Tanzanie, était de bien comprendre l'état de l'utilisation du miombo, par des analyses descriptives. À titre secondaire, il s'agissait de décrire l'évolution potentielle de la région si les besoins en matière de subsistance et de génération de revenus étaient satisfaits et les aspects ergonomiques, comme l'organisation du travail, et les qualifications requises.

L'enquête a porté sur les habitants de quatre villages de deux sites écologiques différents de forêts de miombo. Les informations sur l'utilisation des ressources forestières, en particulier sur l'utilisation potentielle de produits forestiers autres que le bois, fondées sur les connaissances et l'expérience des villageois et des experts locaux, ont été recueillies en interrogeant individuellement les villageois et en procédant à des discussions de groupe ainsi qu'à des observations sur le terrain et à des interviews dans la zone sur laquelle portait la recherche et à l'extérieur. La plupart des personnes interrogées dans ces villages appartiennent aux tribus Zigua et Nguu, qui vivent principalement d'une petite agriculture. De plus, les Massaïs, une tribu d'éleveurs semi-nomades, vivent de temps en temps dans la région. Étant donné que le mode de vie et le régime alimentaire des Ziguas et des Nguus est foncièrement différent de celui des Massaïs, on s'attendait à ce que chacun ait une idée différente des produits forestiers utiles qu'ils peuvent trouver dans les forêts de miombo.

L'utilisation de l'écorce des essences de miombo illustre les différences dans le degré d'utilisation du même produit et dans les techniques employées, entre les hommes et les femmes et entre des groupes ethniques différents.

### Méthodologie et plan de travail

Afin d'avoir accès aux connaissances traditionnelles sur l'utilisation des forêts claires, on a appliqué les instruments de PRA pour dresser la liste des produits forestiers autres que le bois récoltés et effectivement utilisés et pour recenser les façons dont ils sont récoltés et utilisés, leur contribution à la subsistance et à la situation économique des communautés. Les étapes de recherche ci-après ont permis d'atteindre le principal objectif :

1. Évaluation du rôle de l'utilisation de la forêt en général et en particulier du rôle des produits autres que le bois dans un mode de subsistance à prédominance agricole;
2. Identification du rôle actuel de certains produits forestiers autres que le bois présents dans les forêts claires de miombo, compte tenu des aspects écologiques, économiques et socioculturels de l'occupation des sols.
3. Description et évaluation des possibilités et des limites de la diversification de la gamme de produits et intensification de l'utilisation directe des arbres et arbustes des forêts de miombo par les populations, compte tenu de la capacité limite de l'écosystème.

### **Résultats et conclusions de l'étude et utilité pour le développement**

Les trois tribus voient avant tout dans les terres boisées une ressource pour l'agriculture et le pâturage du bétail. Les écorces, ainsi que le miel, les champignons et d'autres produits sauvages pouvant être consommés, ont été considérés comme les produits forestiers autres que le bois les plus prometteurs dans la région, du point de vue de la subsistance et de la création de revenus. Dans la région sur laquelle a porté la recherche, la commercialisation de produits provenant des forêts, ce qui comprend les produits autres que le bois, peut être considérée fondamentalement comme une incitation à la préservation des forêts. Aujourd'hui toutefois, la commercialisation de produits forestiers pose déjà un problème et il sera encore plus risqué de développer les marchés en raison des conditions aléatoires d'approvisionnement et d'achat.

L'exemple de l'écorce et des fibres montre la diversité des utilisations possibles pour un même produit (par exemple, médicaments, aliments, matériaux de construction, fabrication de produits artisanaux, produits de substitution) et des techniques de récolte (à la main ou à l'aide d'outils - couteaux, haches, machettes, emploi d'échelles, etc.) et les incidences pour la commercialisation et pour l'écosystème selon la personne qui récolte le produit. Les seuils limites acceptables pour accélérer le développement de l'utilisation et de la commercialisation de produits forestiers autres que le bois varient entre les communautés et à l'intérieur d'une même communauté. Pour les économies de subsistance, une intensification de l'utilisation de produits peut être recommandée pour chaque cas, sauf pour l'écorçage. En revanche, l'intensification de la commercialisation ne peut être recommandée qu'avec prudence, parce qu'elle est trop aléatoire. La mise en place de systèmes coopératifs de transformation et de commercialisation peut favoriser la commercialisation de tous les échantillons de produits.

**Mots clefs :** miombo, écorces et fibres, produits forestiers autres que le bois, foresterie sociale; Ziguas, Nguus, Massaïs.

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# ИСПОЛЬЗОВАНИЕ СУХОГО ЛИСТОПАДНОГО РЕДКОЛЕСЬЯ (МИОМБО) МЕЛКИМИ ФЕРМЕРАМИ В ОКРУТЕ ХАНДЕНИ (ТАНЗАНИЯ): ЗАГОТОВКА КОРЫ КАК ПРИМЕР ЭТНИЧЕСКИ И ГЕНДЕРНО ОРИЕНТИРОВАННОЙ ДЕЯТЕЛЬНОСТИ

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## РЕЗЮМЕ

### Проблематика, гипотезы и цели исследования:

В засушливых районах африканских стран особенно остро стоит проблема неуклонного сокращения площади сухого листопадного редколесья (миомбо). Результаты традиционного использования этих экосистем (частое выжигание и смена видов использования угодий) более недостаточны для удовлетворения потребностей растущего населения в продовольствии и товарных культурах.

Настоящее исследование исходит из неоднозначно воспринимаемой посылки, что комплексное регулирование пользования редколесьем в рамках агролесного хозяйства, включая использование лесоматериалов и недревесных лесных товаров, положительно повлияет на экономическое и социальное положение населения и тем самым будет способствовать валоризации этих ресурсов самими жителями. Знание специфики многочисленных видов использования сухого листопадного редколесья (миомбо) является основой для дальнейшего развития систем рационального использования ресурсов. Эти системы должны не только гарантировать способность лесов удовлетворять потребности местных домашних хозяйств в средствах к существованию, но и возможность получать доход от сбыта лесных товаров. Использование коры древесных видов миомбо приводится в качестве примера использования нетрадиционных лесных товаров (НТЛТ).

Основная цель исследования, выполненного в округе Хандени (северо-восточная Танзания), заключалась в проведении описательного анализа с тем, чтобы лучше понять ситуацию с использованием сухого листопадного редколесья (миомбо) в этом районе. Дополнительная цель исследования состояла в том, чтобы описать потенциальное развитие района в случае удовлетворения потребностей в средствах к существованию и получении доходов, а также таких эргономических аспектов, как организация труда и квалификация.

Исследование охватывало жителей четырех деревень, расположенных в двух различных экологических зонах сухого листопадного редколесья (миомбо). Информация, относящаяся к использованию лесных ресурсов, особенно потенциальному использованию НТЛТ, и основанная на знаниях и опыте местных жителей и местных экспертов, собиралась посредством отдельных собеседований и групповых дискуссий, а также путем наблюдений на местах и ключевых опросов в пределах и за пределами исследуемого района. Большинство жителей этих деревень принадлежат к племенам зигуа и нгуу. Оба племени в основном зависят от мелкомасштабного сельского хозяйства. Кроме того, в этом районе временами проживают масаи, полукочевое скотоводческое племя. Поскольку образ жизни и питание зигуа и нгуу коренным образом отличаются от образа жизни и питания масаев, следовало ожидать, что их представления о полезном использовании НТЛТ в сухом листопадном редколесье будут различными.

На примере использования коры деревьев в сухом листопадном редколесье показано, как объем и методы использования одного и того же продукта различаются в зависимости от мужчин и женщин и в зависимости от различных этнических групп.

## Методология и план работы

Чтобы получить доступ к традиционным знаниям в области лесопользования, с помощью методов PRA регистрировались фактически используемые недревесные лесные товары (НДЛТ), а также способы заготовки и использования этих товаров и их значение как источника средств к существованию и некоторого дохода. Для достижения основной цели были предприняты следующие шаги:

1. оценка роли использования лесов в целом и особенно роли недревесных товаров в жизни населения, практически полностью зависящего от мелкомасштабного сельскохозяйственного производства;
2. определение роли отдельных НДЛТ в сухом листопадном редколесье (миомбо) с учетом экологических, экономических, социальных и культурных аспектов землепользования;
3. описание и оценка возможностей и трудностей диверсификации ассортимента товаров и расширения прямого использования местными жителями деревьев и кустарников в сухом листопадном редколесье (миомбо), исходя из допустимого уровня нагрузки на экосистему.

## Результаты и выводы применительно к развитию

Все три племени видят главное предназначение мелколесья в ведении сельского хозяйства и выпасе скота. Кора вместе с медом, грибами и прочими дикими растениями была признана наиболее многообещающим НДЛТ в данном районе с точки зрения ведения натурального хозяйства и получения доходов. В исследуемом районе маркетинг лесных товаров, включая НДЛТ, можно в целом рассматривать как стимул к сохранению лесов. Однако сегодня маркетинг лесных товаров уже является проблематичным, поскольку ввиду неопределенности заготовок и закупок дальнейшее расширение рынков может еще более осложнить ситуацию.

На примере коры и волокон показаны различные возможности использования одного товара (например, лекарства, продукты питания, строительные материалы, кустарные поделки и заменители целого ряда товаров) и технологии заготовок (ручная или использование таких инструментов, как нож, топор, мачете, лестницы и другие), а также последствия для сбыта и для экосистемы в зависимости от того, кто заготавливает конкретный продукт. Приемлемые темпы интенсификации использования и сбыта НДЛТ варьируются в зависимости от общины и в самой общине. Можно рекомендовать расширение использования НДЛТ для всех натуральных хозяйств, за исключением заготовки коры. Напротив, рекомендуется проявлять большую осторожность при расширении коммерциализации, поскольку она связана с высокими рисками. Кооперация в области переработки и сбыта может положительно сказаться на возможностях сбыта всех видов товаров.

**Ключевые слова:** миомбо, кора и волокна, НДЛТ, социальное лесоводство, зигуа, нгуу, масаи.

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# **WHO COUNTS MOST? – MANAGING NON-WOOD FOREST PRODUCTS OPERATIONS THROUGH THE “COMMUNITY CONSERVATION INTERFACE” MODEL**

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## **Introduction**

Management of Non-Wood Forest Products like most biological resources have experienced several drawbacks in the past due to perpetuation of pseudo-facts resulting from the pressure on researchers and resource managers to quickly deliver results. This has apparently resulted in undermining management and development objectives of the resources. As a result, local resource users and other stakeholders are excluded, and deprived of benefits due them, and ultimately reducing the role of sustainable management. It has however been observed that commitment and clarity, representation of all stakeholders, provision of skills, time and group dynamics through a participatory approach are important ingredients of management (Buchy & Hoverman, 2000). The challenge therefore is to develop consensus and understanding of NWFP operations and to promote and implement a sustained framework for merging scientific results with management goals in planning. This presentation proposes an interactive model of addressing the issue, interfacing management and scientific interests with other stakeholders through a Community Conservation Interface (CCI) model.

## **Understanding Community Conservation**

Community Conservation (CC) is an approach to managing biological resources and can be described as a derivative of Ecosystem-Based Management (EBM), similar to Integrated Conservation and Development Projects (ICDP) and Community-Based Natural Resource Management (CBNRM). Defined as a “new form of partnership development among all stakeholders directly or indirectly involved in the utilization and management of a biological resource”, community conservation has implications for resource planning and ecosystem science in development.

The knowledge of EBM may often engage the integration of various disciplines of socio-cultural and economic origins involving collaboration and focusing on the broader ecosystem at all levels (Slocombe 1993, 1998). However, operations of CC first recognize livelihood impacts on sustainable utilization as a baseline for integration and from which the CCI model has been developed. This is therefore a useful model for developing and implementing a framework for planning and managing NWFP operations.

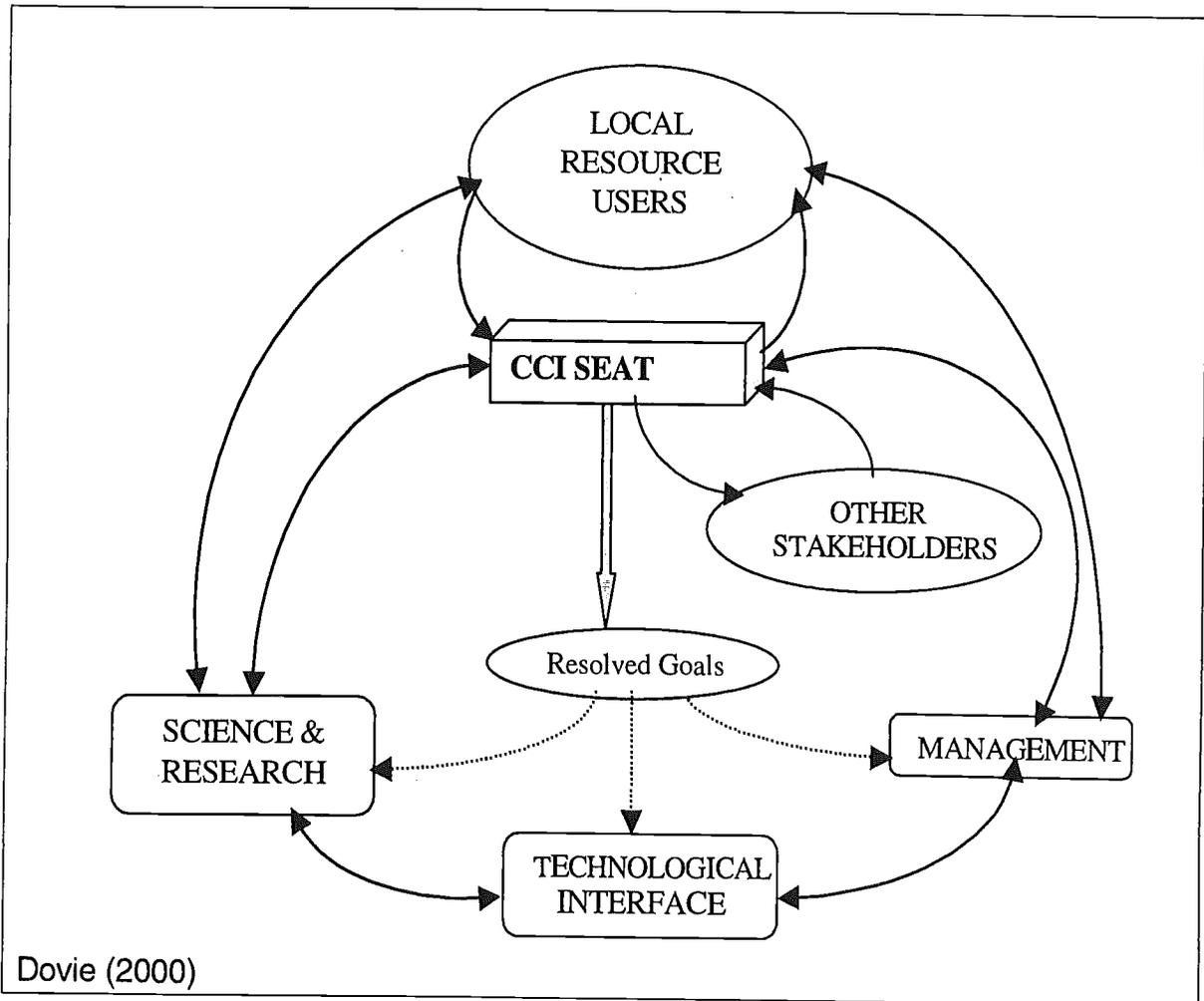
## **Operating the CCI Model**

The CCI model fully recognizes the difficulties and redundancies associated with scientists or researchers and managers in developing management strategies acceptable to both. Some of these handicaps have been noted to be lack of consensus building, degenerating into institutional territoriality; lack of partnership; absence of higher ethical principles; inadequate coordination of goals; lack of recognition of resources without formal markets and respect for local and indigenous knowledge (Slocombe 1998, Rogers & Biggs, 1998). The CCI initiative however promises to resolve most of these predicaments of management through a more interactive process of setting goals and objectives that are reasonable and achievable, and possessing ideal attributes.

The CCI model (Fig. 1) offers several opportunities of sharing ideas, accepting realities of issues, building consensus and developing sound partnership. These are broken down as follows:

- Allows incorporation of value system, indigenous skill and knowledge as well as livelihood adaptive strategies into management and research.
- Quick in identifying, assessing and minimizing conflicts in management.
- Properly equips management at higher levels (mostly political) of decision making.
- Equal opportunities are offered for stakeholders' empowerment.
- Facilitates the provision of skill and knowledge to diverse groups on management.

**Fig. 1: The Community Conservation Interface Model**



## **Vision at CCI Seat**

The seat of CCI is the coordinating body of all management operations with the aim of resolving differences in goals of all stakeholders, building and enhancing knowledge capital for effective and informed participation. Further adopting and integrating ethical and democratic principles, and values into policy frameworks of key actors and stakeholders, and finally enhancing information services and communication linkages for informed participation of local key actors, groups and networks.

## **Conclusions**

Managing natural resources without the virtues of multiplicity and diversity to link management rights and the role of local people who have lived with these resources for decades may undermine conservation objectives. The ultimate threat of this could be difficulty in attaining desired goals hence a potential flaw that can trigger unsustainable harvesting. The use of the CCI model through the community conservation concept promises a more pragmatic and adaptive strategy for managing these resources, and further enhancing the resolution of conflicts between researchers, managers and other stakeholders. Finally, the model represents a strong institutional amalgamation required for sustainable management of natural resources.

## **Literature Cited**

- Buchy, M. & S. Hoverman, 2000. Understanding public participation in forest planning: a review. *Forest Policy and Economics* 1: 15-25.
- Dovie, B.D.K. 2000. Who counts most? - Managing Non-Wood Forest Products operations through the "Community Conservation Interface" Model. *FAO/ECE/ILO Seminar on Harvesting of Non-Wood Forest Products*, 2nd-8th October 2000, İzmir, Turkey.
- Rogers, K. & Biggs, H. 1998. Integrating indicators, endpoints and value systems in strategic Management of the rivers of the Kruger National Park. *Freshwater Biology*. 41:439-451.
- Slocombe, D.S. 1993. Environmental Planning, ecosystem science, and ecosystem approaches for integrating environment and development. *Environmental Management* 17(3): 289-303.
- Slocombe, D.S. 1998. Defining goals and criteria for ecosystem-based management. *Environmental Management* 22: 483-493.



# **TOWARDS SUSTAINABLE HARVESTING OF NON-WOOD FOREST PRODUCTS IN INDIA: THE ROLE OF GENDER**

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## **Abstract**

*(not available in French & Russian)*

Harvesting of NWFP is considered as a major conservation strategy because it reconciles both conservation and development. Its concern is reflected in focus on **product, people, and forest**. The present Indian Forest Policy (1988) and the subsequent Government resolution on participatory forest management (1990) emphasize the need of people's participation in forest management. It has been widely recognised and accepted that under people-oriented forest management Non-Wood Forest Products (NWFP) play a significant role in sustaining interest and motivation of local people. Women and children constitute the majority of NWFP gatherers in India.

The present paper aims to improve our understanding about the role and potential of harvesting of NWFP in improved conservation management for livelihood of local people and sustainable forest management. To this end, the role of NWFP in sustainable forest management by facilitating participatory forest management is discussed. In this regard, the role of gender in harvesting of NWFP is illustrated through a case study. Finally, the paper provides a framework of integrated NWFP harvesting.

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## **1. Introduction**

Non-Wood Forest Products (NWFP) were formerly known as minor forest products, other forest products, other economic products and non-timber forest products because of their little contribution in the state and forest revenues. Agenda 21 and forest principles adopted at the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in 1992, identified forest products other than wood as an important area requires increased attention, as a source of environmentally sound and sustainable development. Over the past two decades, an increasing number and variety of organisations, such as government, non-government institutions as well as private sector have become involved with promotion and utilisation of NWFP and its effects on sustainability of products as well as forests. It is now widely recognised that NWFP plays an important role for local communities in and around forests. The focus of this paper is to improve our understanding about role and potentials of harvesting of NWFP in improved conservation and management for employment and income generation of local people. In this context, the central role-played by the women in sustainable harvesting of NWFP for increased socio-economic status is highlighted.

## **2. Background**

India supports about 16 percent of the world's population and 18 percent of world's livestock with nearly 2.5 percent of the world's geographical area (329 million ha) and only 1.8 percent of the world's forest area. Due to its physiographic and climatic conditions as well as its location at the confluence of three bio-geographic realms – the Indo-malayan, the Eurasian and the Afro-Tropical – India is a “mega diversity”, and has ten biographic zones: trans-Himalayan, Himalayan, India desert, Semi-arid, Western ghats, Deccan peninsula, Gangetic plains, North-east India, islands and coasts (Rodgers and Panwar, 1988). These biographic zones presents a broad range of ecosystems resulting in a variety of NWFP species.

### Box 1: Some facts and figures about NWFP in India

- There are over 3000 species of NWFP in India, which are integral components of local economy and culture.
- There are approximately 500 million people living in and around the forests whose survival can be said to be dependent on supplementary income from NWFP. Seventeen percent landless depend on daily wage related to collection of NWFP. Over 50 per cent of the revenue earned by the forest department come from NWFP. Its growth is generally 40 per cent higher than timber (ICFRE, 2000).
- At the National level over 50 percent of forest revenue and 70 percent of forest export revenue comes from NWFP mostly from unprocessed or raw material (Tewari and Campbell, 1997; Prasad, Shukla and Bhatnagar, 1996).
- On an average, over 40 percent of state forest revenues and 75% of net forest export income comes from NWFP (Sehgal, 1998)
- Seventy per cent of NWFP are collected from the five states of Maharashtra, Madhya Pradesh, Bihar, Orissa and Andhra Pradesh. These states also contain 65 per cent of tribal population (In Planning Commission, 1998).
- Small scale forest based enterprises many of which rely on NWFP, provide upto 50 per cent of the income for about 25 per cent of India's rural labour force.
- Sixty per cent of the NWFP collected are consumed as food or as a dietary supplement by forest dwellers. They serve as a crucial element in the livelihood system of forest dwellers. The percentage of income realised through sale of NWFP varies from state to state and is estimated to range from 5.4 per cent to 55 per cent (Khare et al, 2000).
- Women's employment in forest based enterprises is estimated to be approximately 571.533 million days annually of which 90 percent is in small scale enterprises using NWFP (Khare, 1987)
- The two main cash earners among NWFP, Sal (*Shorea robusta*) seeds and tendu (*Diospyros melanoxylon*) leaves, are collected primarily by women. It is estimated that more than 350,000 tonnes of tendu leaves are harvested annually by 600,000 women and children (Kaur, 1991).

### 3. Patterns of NWFP Harvesting/Collection and Trade

NWFP plays a dual role in forest dwellers livelihood and subsistence products to meet daily and seasonal needs and to cover demand in years of poor harvest. At the same time, commercial NWFP contribute to cash economy of household. Even though NWFP are largely seasonal products, returns from them are relatively continuous for marginal rural people and most importantly for women and children. The ecological survey indicates that there is considerable variation in distribution and density of specific species. Table 1 presents collection period of some of the common NWFP.

**Table 1 :** Collection/Harvesting period of some of the common NWFP  
(After Gupta and Guleria, 1982)

NWFP	Months of Collection											
	J	F	M	A	M	J	J	A	S	O	N	D
Grasses	■	■	■	■								
Fibres					■	■	■					
Mahua ( <i>Madhuca latifolia</i> )					■	■	■					
Neem ( <i>Azadiracta Indica</i> )						■	■					

NWFP	Months of Collection											
	J	F	M	A	M	J	J	A	S	O	N	D
Karanj ( <i>Pongamia Pinnata</i> )						■	■	■	■	■		
Kusum ( <i>Schleichera Olosa</i> )						■	■	■				
Sal seeds				■	■	■						
Khakan seeds				■	■	■						
Gums & resins			■	■	■	■						
Myrobalans	■	■	■									
Tendu Leaves ( <i>Diaspyros Melanoxyion</i> )				■	■	■						
Imli ( <i>Tamerindus Indica</i> )	■	■	■								■	■
Lac				■	■	■	■	■				
Tasar ( <i>Cocoon</i> )									■	■	■	■
Wild Fruits	■	■	■	■	■	■	■	■	■	■	■	■

Although the above table does not cover all the NWFP but it may be noted that people get multiple product throughout the year to meet their needs. Traditionally, the collections of NWFP have been by the local people and of low intensity. However, the increased economic significance may result in destructive harvesting. Therefore, a number of state governments have taken control over selected NWFP by nationalising, resulting in dual trading system of NWFP as depicted in Figure 1.

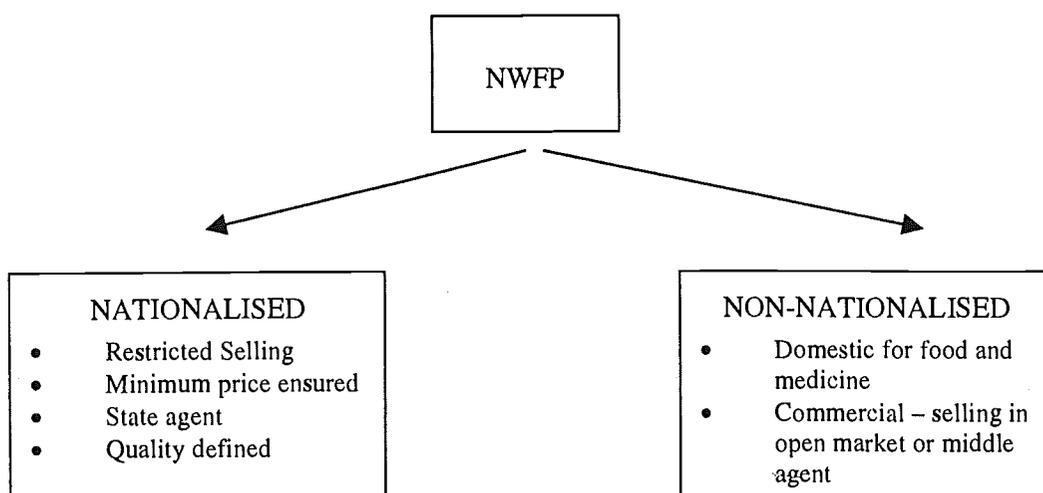


Figure 1 : Dual Trading System

A central hypothesis underlying the nationalization of NWFP is that commercial harvesting of NWFP may provide an incentive for destructive harvest. Therefore, the state governments have taken over the control of selected NWFP. For example, in Madhya Pradesh, tendu leaves (*Diospyros melanoxylon*), sal seeds (*Shorea robusta*), harra (*Terminalia chebula*) and gum are controlled by Madhya Pradesh Minor Forest Produce (Trade & Development) Federation through Madhya Pradesh Vanopaj Adhinyam, 1969. Similarly, in Rajasthan and Orissa, tendu leaves are controlled by state through Rajasthan Tendu Leaves Act, 1974 and Orissa Kendu Leaves (Control of Trade) Act, 1981, respectively. On the other hand, resin and resin produce are under the state control in Himachal Pradesh under Himachal Pradesh Resin and Resin Produce (Regulation of Trade) Act, 1981.

The broad objectives of state controlled NWFP trade (Prasad, 1999) are:

- to prevent unscrupulous intermediaries and their agents from exploiting NWFP collectors;
- to ensure fair wages to collectors;
- to enhance revenue for the state;
- to ensure quality;
- to maximize the collection of produce.

Before the nationalisation of NWFP, people could sell them to any one but under the new system, trading is controlled through state owned institutions such as state forest development corporations, federations, cooperatives tribal societies or state appointed agents only.

#### **4. NWFP for Forest Management**

The Indian Forest Policy of 1988, elaborated in the 1<sup>st</sup> June, 1990 notification on Participatory/Joint Forest Management (JFM) calls for a sharing of responsibilities and benefits with the local community living in and around forest land. Managing forests to promote NWFP offers a promising approach for meeting this community-based forest management. Forest management to achieve sustainable management requires to optimize multiple product to meet the objectives of various stakeholders. So far, only Madhya Pradesh has taken the step of ploughing back the entire revenue from the nationalised tendu leaves (*Diaspyros melanoxylon*) to primary cooperative societies of NWFP collectors and *Panchayati Raj* Institutions. Whereas, Andhra Pradesh has decided to share 50 per cent of such revenue with Van Samrakshana Samiti (VSS) formed for JFM.

NWFP are one of the keys to successful JFM (Prasad, 1999). In a study on analysis of success and failure cases of JFM in Madhya Pradesh, it has been found that in successful JFM committees, people perceive increase in NWFP as one of the major outcome of participatory forest management (Singhal, 1999). This increased NWFP provides them regular supplementary income and employment during lean agricultural period, thus play crucial role in maintaining and sustaining the motivation of the people in participatory forest management. Thus, in contrast to timber based approach, a non-destructive NWFP based approach may be more sustainable from ecological, economic, and social perspective for forest management.

#### **5. Investigating People – NWFP Relationship: The case of Sauther**

A detailed investigation was carried out to analyse the inter-relationship between people and NWFP in the village Sauther. The village Sauther is situated 48 kilometres away from Bhopal, the state capital of Madhya Pradesh. It is about 7 kilometres from Chiklod Forest Range Office. In 1994-95, JFM committee was constituted in the village Sauther. Following the Madhya Pradesh JFM Resolution, one male and one female member from each household became the members of the Village Forest Protection Committee. Gonds tribe predominantly inhabits the village with 144 households and total population of 799. There are 15 landless families and the average landholding for each family ranges from 2 to 3 hectares. The village is connected with muddy road for a distance of 3 kilometres from bus stand, hospital, market and other infrastructure facilities. The committee was allotted a total of 1065.8 hectares of forestland in three patches for conservation, protection and management.

Participatory rural appraisal methods were used for assessing used pattern, harvesting and socio-economic cultural traditions related to NWFP. There are three sources of livelihood for the people of Sauther, viz., agriculture, NWFP and occasional labour. The area is completely rain fed and therefore the agricultural productivity is at subsistence level. Traditionally, these villagers had been collecting NWFP from these forest patches. The commonly found and collected NWFP are given in Table 2.

**Table 2: Pattern of NWFP**

Vernacular name	Botanical name	Period of Collection	Method of Collection
Mahua	<i>Madhuca latifolia</i>	Mid March - Mid April	Gathering from forest floor
Achar	<i>Buchanania lanzanllatifolia</i>	April	Plucking with twigs
Tendu Leave & Fruits ( <i>Diospyros melanoxyion</i> )	<i>Diospyros melanoxyion</i>	May	Plucking
Safed Musli	<i>Chlorophytum tubersum</i>	August	Digging by Iron rod
Kullu - Gum	<i>Sterculia urens</i>	April - May	Gumosis
Grasses		September - January	Grazing and cutting

It may be noted that the NWFP are available to the people Sauther through the year and are collected and harvested by local people by different methods. Table 3 presents use pattern of NWFP in the village Sauther.

**Table 3: Use pattern of NWFP**

NWFP	Collected by	Used Pattern	Average collection per family
Mahua	<i>Mostly by women and children</i>	2/3 for selling and 1/3 for self-consumption	About 250 - 300 kg. annually
Achar	<i>Mostly by men</i>	Selling	10 kg. annually
Tendu Leave & Fruits	<i>Mostly by women and children</i>	Leaves for Selling and fruit for self-consumption	About 1800 bundles annually
Safed Musli	<i>Jointly by men and women</i>	Selling	8 - 10 kg. annually
Kullu Gum	<i>Mostly by men</i>	Selling	4 - 5 kg. annually
Grasses	Mostly by women	For cattle feeding	Approximately 10 kg. Per day

### 5.1 Resource Use Assessment

It was found that over the years, the collection of Achar (*Buchanania Lanzanllatifolia*) and Safed Musli (*Chlorophytum tubersum*) has reduced substantially over the years. However, the collection of Mahua (*Madhuca latifolia*) and Tendu (*Diospyros melanoxyion*) is relatively same over the period.

### 5.2 Socio-Economic Pattern

Following the cultural tradition of Gond tribes, the people of Sauther has a tradition of worshipping the tree before initiating collection of Mahua. This worshipping of tree is organised at the community level. As indicated earlier, due to lack of irrigation facility, the agricultural productivity is only at the subsistence level and hardly provides any cash income. The analysis of the income from various sources revealed that out of the annual cash earning per household, about 46 per cent cash income comes from selling of NWFP. However, in case of landless families, about 50 per cent annual cash income comes from sale of NWFP.

### 5.3 Gender Roles in Harvesting of NWFP

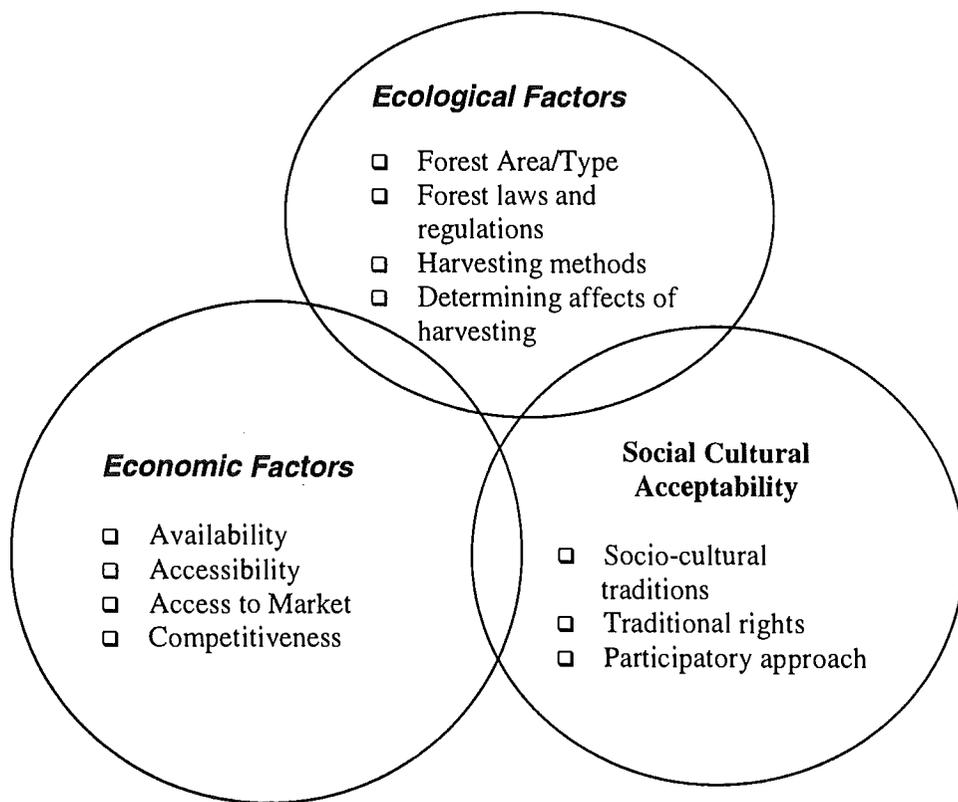
It was found that women play a dominant role in harvesting of NWFP. The most common method used by them is by sweeping and gathering from forest floor. It was estimated that out of total collection of NWFP, up to 80 per cent of the NWFP is collected by women alone. It was also noted that

productivity of NWFP collected by women and children is stable over the years.

In conclusion, it was found that NWFP is an essential resource for the people of Sauther for their survival as well as meeting socio-economic needs. Recent institutional changes through JFM activities have resulted in increased value and consciousness about method and level of NWFP harvesting. Although, there is an increasing pressure from neighbouring villages due to economic values of NWFP, but women are playing active role in setting of do's and don'ts related to harvesting of NWFP through JFM committee.

## 6. Towards Integrated Model Sustainable Harvesting

On the basis of experience of Sauther, it is apparent that besides ecological and economic factors, there is need to pay attention to the socio-cultural traditions (Figure 2). As stated earlier, sustainable harvesting of NWFP combines concern for product (value), people and forest (Figure 2).



**Figure 2: Integrated Model of Sustainable Harvesting of NWFP**

The above case demonstrates that women play the central role in household economies of local communities as well as non-destructive harvesting of NWFP. Consequently, efforts of achieving sustainable forest management through participatory forest management should focus on the scope of NWFP development by involving women. In this process, the identification of socio-cultural traditions should also be viewed as an essential step.

## Acknowledgements

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## References

- Anon (2000). *Draft National Forestry Research Plan*. Indian Council of Forestry and Research Education, Dehradun.
- Gupta, T. & Guleria, A. (1982). *Non-Wood Forest Products in India*. Oxford and IBH, New Delhi.
- Kaur, R. (1981). *Women in Forestry in India*. Working Paper, Women in Development, World Bank, Washington D.C.
- Khare, A. (1987). Small Scale forest Enterprises in India with special reference to the role of women. *Wasteland News*. Vol. V, No.2, November, 1989-January, 1990.
- Khare, A. (2000). In J. Mayers and E. Morrison (eds). *Joint Forest Management, Policy, Practice and Prospects*. New Delhi:WWF India and IIED, UK.
- Planning Commission (1998). *Leasing of degraded forest lands*. Working Groups' Report on the prospects of making degraded forests available to private entrepreneurs, Government of India.
- Prasad, R. (1999). Joint Forest Management in India and the Impact of State Control over non-wood forest products. *Unasylva*, 198 58-62.
- Prasad, R. ; Shukla, P.K. and Bhatnagar, P. (1996). *Leaves from the forest : a case study of tendu leaves in Madhya Pradesh, Jabalpur*. Madhya Pradesh, India, Centre for Environment and Sustainable Development.
- Rogers, W. A. R. and Panwar, H. S. (1988) *Planning a Protected Area Network in India*. Wildlife Institute of India, Dehradun
- Saigal, S. (1998). *Participatory Forestry in India : analysis and lessons*, MSc Theses, Oxford Forestry Institute, Oxford.
- Singhal, R. (1999). *Cases of Success and Failure of Joint Forest Management*. Report submitted to Regional Centre for National Afforestation and Ecodevelopment Board, IIFM, Bhopal.
- Tewari, D.D. & Campbel, J.Y. (1997). Economics of NTFP In : Kerr John et. al. (eds). *Natural Resource Economics, Theory and Applications*. Oxford IBH Publications Co., New Delhi.

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# **EFFECTS ON EROSION CONTROL AND CULTIVATION OF SWEET MARJORAM (*Origanum onites*), SAGE (*Salvia officinalis*), BALM (*Melissa officinalis*) ON THE MARGINAL AGRICULTURAL LANDS**

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## **Summary/Introduction**

Statistically, half of the rural population of Turkey has been living in and around the forest and mountainous lands. Income level of these people is low. They are in need of 1)-Agricultural land for raising crop and food, 2)-Construction material (timber and lumber) for building, 3)-Firewood for cooking and heating, 4)-Pastoral lands for livestock. Therefore, natural resources such as forests and pastoral lands are unconsciously exploited in Turkey.

In particular, marginal agricultural lands obtained by clearing of forestlands have many problems such as erosion and productivity degradation of soil due to continue cultivation, misusing of soil etc. Therefore, misuse of rural land mainly causes of deforestation, rural poverty, erosion and other degeneration of soil. It is observed that most of erosion occurs on marginal lands in Turkey. It should have given priority to the measures dealing with the target people who are living forests and mountainous lands in order to solve problems, conversation and sustenance of natural resources.

Turkey is particularly very rich in medical and aromatic plants. 347 species have commercial values. 30 percent of these plants are exported abroad about 30 000 ton/year. Turkey is third in ranking at world (4). Also, most of these plants have been faced with being endangered or extinct.

If these economic plants are cultivated and grown on villager's own lands, it can provide both income and sustenance of natural resources. As a result, it will decrease erosion problem and extinction of these plants in nature.

This study was carried out to determine the effects on erosion control of the cultivation of *Origanum onites*, *Salvia officinalis* and *Melisa officinalis* on the marginal agricultural land in our region.

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## **2. Material and Method**

**2.1. Characteristics of study site** - This study was conducted in degraded forest areas of Manisa, Sarigöl in Turkey. Aspect of the study area is north- west and west. Sloping of the area is between 20-40 percent. The altitude is 450 meters.

Soil characteristics of location: Topsoil has a structure of clay-sandy and sandy-clay. It contains 0.72 the percentage of CaCO<sub>3</sub>, 6-7 of pH, 0.803-2.946 the percentage of organic material, 0.040-0.140 the percentage of nitrogen (N), 2.3-13.8 the percentage of P<sub>2</sub>O<sub>5</sub>.

Climatic characteristics: The Averages of temperature are minimal 7o C, maximum 25 0C in 1997 and 1998. But it is minimal 1 0C and maximum 28 0C in 1999. The averages of relative humidity are 32.89 in 1997, 43.46 in 1998 and 35.60 in 1999. The averages of precipitation are 479.2 mm in 1997, 527.1 mm in 1998 and 326,7 mm in 1999.

**2.2. Material** - Used plant materials in study were grown from the seed in greenhouse conditions in 1996, then were taken tubes after taking roots. All plants were planted in area on February in 1997 at the same time.

**2.3. Method** - This study was established with two repetitions as random plot experimental design. There were total 8 plots included as control plots. Dimensions of a plot were 5 m X 20 m. The data of 1997, 1998 and 1999 were evaluated.

This area that was in degraded forest areas, was ready for the implementation of the study in 1996. All of plots were enclosed with concrete hedges. Concrete apron and flow holes were placed below. Under the flow holes barrels of 200 litre placed. All plots were first cultivated on the soil and removed living plant covers. About 171 saplings for each plot were planted at an interval of 0.5 m x 1 m in 1997. Cultivation was conducted without fertilisation and irrigation on ecological condition. Treatments are living percentage and height of plants, percentage of plant cover, erosion rate of plots and yield

### 3. Discussion

**3.1. The Living percentage of Plants:** In this study, It was observed that the highest living rate was about 93.3 percent in *Origanum onites* plots. *Origanum onites* are evergreen. It might be affected negatively from drought. If it seeds mature without cutting, plant might be dry. But if it is cut before maturing the seeds, it can continue living healthily by producing new shoots from root.

*Melissa officinalis* has a 84.2 percent living of saplings. It can show particularly maintain green colour and living rate in spring. However, living ratio can decrease and leaves becomes shrunk due to summer drought and sometimes shoots die. Leaves can become green to black colour and shoots on surface of soil dries in winter.

	1997 (number)			1998 (number)			1999 (number)			The Percentage Of living (%)
	Rep I	Rep II	Average	Rep I	Rep II	Average	Rep I	Rep II	Average	
<i>Origanum onites</i>	162	163	163	167	170	169	161	158	159,5	93,3
<i>Melissa officinalis</i>	134	145	140	162	166	164	146	142	144,0	84,2
<i>Salvia officinallis</i>	138	126	132	170	160	165	138	120	129,0	75,4

Figure 1: The Living Percentage of Plants (%)

*Salvia officinallis*, which is an evergreen, has a lower rate than others with a 75.4 percent. For this reason if it becomes seedy without mowing, it can dry and die. Drought has more negative effect on it than others do. When its shoot and roots become ligneous, it can need more water in summer. Therefore, early mowing is necessary to keep the plant live.

**3.2. The height of plants** - All plants have similar height average values. The height of plants rapidly increased with precipitates in spring and particularly had more height on April and March during going on seed and blooming. But after the fall of seeds, plant growth stopped and sometimes shoots become dried. *Salvia officinallis* had more height than others due to having a tendency to ligneous of stem did.

	1997	1998	1999	Average
<i>Origanum onites</i>	17,8	28,2	30,2	25,4
<i>Melissa officinallis</i>	17,7	31,8	31,4	27,0
<i>Salvia officinallis</i>	18,2	26,7	28,3	24,4

Figure 2: The height of plants (cm)

**3.3. The Percent of Plant Cover (%)** - Because of high percentage of living, *Origanum onites* and *Melissa officinallis* had more covering in plots in third year. Although cover of *Salvia officinallis* has rapidly increased after first year, it has appeared lessening the percent of plant cover due to damage by summer drought from second year on.

	Diameter of Crown (cm) 1997	The Percentage of Cover Plants in Plots 1997	Diameter of Crown (cm) 1998	The Percentage of Plant Cover in Plots 1998	Diameter of Crown (cm) 1999	The Percentage of Plant Cover in Plots (1999)
<i>Origanum onites</i>	22	6	38	19	40	18
<i>Melissa officinallis</i>	22	5	36	17	38	17
<i>Salvia officinallis</i>	17	3	31	12	29	8

Figure 3: The Percentage of Plant Cover in Plots (%)

**3.4. The Rate of Erosion of Plots (kg/100m<sup>2</sup>)** - Similar values obtained during the study from all of plants. As being perennial plants, they have similar growing and same planting intervals of saplings and as a result showed similar soil protection. It was also determined that the plots planted with these plants showed 3 times lower erosion rate than the control (empty) plots due to this rapid growth. This is a result of fast growing of plants and their covering of soil surface and accumulation of plant residues.

	1997			1998			1999		
	Rep I	Rep II	Average	Rep I	Rep II	Average	Rep I	Rep II	Average
<i>Origanum onites</i>	141,0	146,5	143,8	37,1	42,8	40,0	35,1	19,6	27,4
<i>Melissa officinallis</i>	143,5	154,6	149,1	40,7	48,3	44,5	28,4	16,3	22,4
<i>Salvia officinallis</i>	151,2	120,7	136,0	50,2	53,4	51,8	39,8	14,2	27,0
The Control Plots	244,7	215,7	230,2	108,0	113,3	110,7	97,9	91,2	94,6

Figure 4: The Rate of Erosion of Plots (kg/100m<sup>2</sup>)

**3.5. The Measuring of Yield** - All plants were planted in 1997, yield was not measured at first year. In this study, *Salvia officinallis* with a yield of 535 kg /Da. in 1998 and 945 kg /Da. in 1999, has the highest values of fresh herb than others. It can be explained with its big leaves and the half-ligneous structure. The fresh herb values of *Origanum onites* were about 430–590 kg /Da. in 1998 and 1999. The herbaceous *Melissa officinallis* has lowest values of fresh herb between 190 kg / Da. in 1998, 205 kg /Da. in 1999.

Although these values of marginal lands were 3 times lower than of productive agricultural lands, it might really be hopeful and very important for ecological agricultural.

#### Fresh Herbal Yields (Kg/da)

	1998			1999		
	Rep I	Rep II	Average	Rep I	Rep II	Average
<i>Origanum onites</i>	410	450	430	630	550	590
<i>Salvia officinallis</i>	460	610	535	580	1310	945
<i>Melissa officinallis</i>	200	180	190	210	200	205

#### Drog Herbal Yields (kg/da)

	1998			1999		
	Rep I	Rep II	Average	Rep I	Rep II	Average
<i>Origanum onites</i>	164,0	122,0	143,0	214,0	176,0	195,0
<i>Salvia officinallis</i>	170,0	207,0	188,5	197,0	419,0	308,0
<i>Melissa officinallis</i>	74,0	63,0	68,5	59,0	62,0	60,5

Figure 5: Yields of Fresh and Dried Herbal of Plants (kg/da)

#### 4. Conclusion

In this study, it was determined that these plants could be easily cultivated on marginal agricultural lands without applying any irrigation and fertilisation on conditions of Manisa–Sarıgöl region and can contribute to erosion control.

The cultivation of marginal lands can be economic because of low man power, costs of production, maintain, although yields of these plants on marginal agricultural lands have 3 times lower than those of the productive agricultural lands.

Turkey is very rich in medical and aromatic plants. They are collected from natural resources. Their cultivation on marginal lands will be very useful. This will stop erosion and make soil richer with nutritional materials. And also will provide an extra income for the forest villagers. These plants might be planted either single plant cultivation or mixed with trees and shrubs on marginal lands. All of plants are also ideal for Agriculture-Forestry mixed systems (Agroforestry Systems).

For widely acceptance of cultivation of these plants by forest villagers, some measures such as extension and training should be taken.

#### 5. Bibliography

- ACAR, C., GÜL, A., 1997. Vegetative Propagation of Some Plant Species Useable for Erosion Control in Ege Region. Ege Forestry Research Institute ISSN: 1300-9524 İzmir-Turkey.
- CEYLAN, A., 1987. Medicinal Plants II. E.Ü. Agriculture Faculty No: 481 Bornova-İzmir.
- CEYLAN, A., 1995. The Studies Agronomic on Medicinal and Aromatic Plants E.U. Agriculture Faculty, Tarla Bitkileri Bilimi Dernei Workshop Medicinal Aromatic Plants Page, 1: 17-19, Bornova-İzmir, Turkey.
- ÖZHATAY, N., KOYUNCU, M., ATAY, S., BYFIELD A., 1997, A Study About the Trade of The Wild Medicinal Plants of Turkey. The Society for the Protection of Nature (DHKD), Istanbul-Turkey.

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**IMPORTANCE POUR LA LUTTE CONTRE L'ÉROSION DE LA CULTURE DE LA MARJOLAINE (*Origanum onites*), DE LA SAUGE (*Salvia officinalis*) ET DE LA MÉLISSE (*Melissa officinalis*) SUR LES TERRES AGRICOLES MARGINALES**

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**RÉSUMÉ**

Les statistiques montrent que la moitié de la population rurale de Turquie vit dans des régions forestières ou montagneuses. Le niveau de revenu de ces populations est faible. Elles ont besoin 1) de terres agricoles pour cultiver et produire des denrées alimentaires, 2) de matériaux de construction (bois et bois d'œuvre), 3) de bois de feu pour faire la cuisine et se chauffer et 4) de pâturages pour les animaux. Les ressources naturelles, telles que la forêt et les pâturages, sont donc inconsidérément exploitées en Turquie.

En particulier, les terres agricoles marginales gagnées sur les forêts par essartage sont très dégradées, étant soumises à l'érosion et à une détérioration du rendement des sols dues à une mise en culture continue, à l'exploitation excessive des sols, etc. Donc, l'exploitation inconsidérée des terres rurales est principalement cause de déboisement, de la pauvreté rurale, de l'érosion et d'autres formes de dégradation des sols. On observe qu'en Turquie l'érosion se produit principalement sur les terres marginales. Il faudrait donner la priorité aux mesures visant la population qui vit dans les régions forestières et montagneuses, afin d'éliminer les problèmes, de préserver les ressources naturelles et d'assurer leur mise en valeur durable.

La Turquie est très riche en plantes médicinales et aromatiques. On dénombre 347 espèces qui ont une valeur commerciale; 30 % des plantes récoltées sont exportées, à raison d'environ 30 000 tonnes par an. La Turquie est le troisième producteur mondial. Toutefois, la plupart de ces espèces sont menacées ou sont en voie d'extinction.

Cultivées par les villageois sur leurs propres parcelles, ces plantes d'intérêt économique peuvent assurer des revenus aussi bien que la préservation des ressources naturelles. Il en résulterait une atténuation de l'érosion et du risque d'extinction des espèces sauvages.

L'étude a pour objet de déterminer l'importance pour la lutte contre l'érosion de la culture sur des terres marginales agricoles du pays de trois plantes aromatiques et médicinales : *Origanum onites*, *Salvia officinalis* et *Melissa officinalis*.

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## БОРЬБА С ЭРОЗИЕЙ ПОЧВЫ ПОСРЕДСТВОМ ВЫРАЩИВАНИЯ ДУШИЦЫ СЛАДКОЙ (*Origanum onites*), ШАЛФЕЯ АПТЕЧНОГО (*Salvia officinalis*) И МЕЛИССЫ (*Melissa officinalis*) НА МАЛОПРОДУКТИВНЫХ СЕЛЬСКОХОЗЯЙСТВЕННЫХ ЗЕМЛЯХ

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Турция

### РЕЗЮМЕ

Согласно статистике, половина сельского населения Турции проживает в лесной и гористой местности. Уровень дохода этого населения низок. Оно нуждается: 1) в сельскохозяйственных землях для выращивания сельскохозяйственных культур и производства продовольствия, 2) в строительных материалах (лесо- и пиломатериалах) для строительства жилья; 3) в топливной древесине для приготовления пищи и обогрева; 4) в пастбищах для выпаса скота. В связи с этим такие природные ресурсы, как леса и пастбища, неразумно эксплуатируются в Турции.

В частности, на малопродуктивных сельскохозяйственных землях, образующихся в результате вырубki лесов, возникает множество проблем, как, например, эрозия и снижение продуктивности почвы в результате постоянного выращивания сельскохозяйственных культур, неправильного использования почвы и т.д.. Таким образом, неправильное использование сельских земель является основной причиной обезлесения, бедности сельского населения, эрозии и прочей деградации почвы. Установлено, что в Турции эрозия в основном наблюдается на малопродуктивных землях. Следует в первую очередь проводить работу с населением лесных и горных районов, с тем чтобы решить проблемы сохранения и устойчивого использования природных ресурсов.

Турция особенно богата лекарственными и ароматическими растениями. 347 видов имеют коммерческую ценность. 30% этих растений экспортируются за границу в объеме около 30 000 тонн в год. Турция занимает третье место в мире (4). Однако большинство этих растений находится под угрозой исчезновения.

Если эти растения, представляющие ценность с экономической точки зрения, будут выращиваться на собственных землях крестьян, то это обеспечит им доход и позволит устойчиво использовать природные ресурсы. В результате сократятся масштабы проблемы эрозии и исчезновения таких растений.

Настоящее исследование было проведено с целью определить эффективность выращивания душицы обыкновенной, шалфея аптечного и мелиссы на малопродуктивных сельскохозяйственных землях в нашем регионе как средства борьбы с эрозией.

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# **BAREFOOT SILVICULTURE IN OAXACA, MEXICO: THE ADAPTATION OF STANDARD SILVICULTURAL SYSTEMS FOR NON-TIMBER FOREST PRODUCTS AND THE INTEGRATION OF INDIGENOUS KNOWLEDGE**

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## **Summary**

As one of the most diverse biological regions in the seasonal tropics, Oaxaca's main management challenge is balancing sustainable forest harvesting with preserving biological diversity, especially challenging for a village community with limited resources - both economic and technical. Medicinal plants and other non-timber forest products are especially sensitive to exploitative harvesting regimes. This paper takes a closer look at the forest management activities of communities in two regions of Oaxaca, Mexico. The Chimalapas and the Sierra Del Norte are discussed as an example of the ways in which changing cultural values, traditions and economies, affect local strategies of resource use and management. Through an analysis of barefoot silviculture and traditional medicine in these two regions, this paper aims to shed light on the complex social, political and historical forces affecting land use management in Oaxaca today.

This paper also demonstrates the need for integrative silvicultural systems that are adaptive, giving communities the flexibility to respond to failures and ever-changing conditions. Community forestry in this part of the world has fostered a great sense of responsibility and better stewardship of the land through the manipulation of standard silvicultural procedures and their integration with traditional agricultural practices. These community-based management approaches better integrate indigenous knowledge and traditions in management decisions. Further, indigenous peoples' efforts to develop their own management plans and silvicultural techniques are important not only in promoting ecological and economic sustainability, but also cultural sustainability, which is essential for the survival of the indigenous medical knowledge, values and traditions.

**Keywords:** Oaxaca, silviculture, barefoot silviculture medicinal plants, community forestry, indigenous knowledge, Zoque, Zapotec, Chinantec, indigenous people.

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## **Introduction**

Oaxaca is one of the most biologically diverse states in Mexico. The region, which covers an area of about 10,000 km<sup>2</sup>, is home to approximately 6,000 plant species. Further, new species of plants are regularly reported by scientific journals. Oaxaca's natural environment is highly varied in terms of both geography and culture. Dissimilar climates, resulting largely from the mountainous topography, have given rise to many vegetation types and endowed the area with a wealth of diverse flora and fauna. The area's diverse ecosystems have also helped foster the emergence of indigenous cultures with highly complex medical systems. Moreover, out of Oaxaca's distinctive natural environments and cultures have evolved an assortment of traditional uses for medicinal plants. Oaxaca's main management challenge is balancing sustainable forest harvesting with preserving biological diversity and indigenous knowledge, especially challenging for a village community with limited resources - both economic and technical. The Chimalapas and the Sierra Del Norte are discussed as an example of the ways in which changing cultural values, traditions and economies, affect local strategies of resource use and management.

For centuries, Oaxaca was one of Mexico's cultural and economic meccas. Oaxaca's present social and political status still reflect its former dominance. According to the literature there are more than 18 ethnic groups in Oaxaca including the Zoque, Zapotec, Chinantec, and Mixtec (Gonzales, 1942). However, in the Chimalapas region alone, an area 600,000 hectares in size, local people believe there are

at least 30 ethnic groups (pers. comm. Issac Matus 1996). The Zoque are the most prominent indigenous group in the state of Oaxaca (Cervantes Servin et al., 1990), and have long inhabited the Chimalapas region. The Zoque purchased the area back from the Spanish Conquistadores with gourds of gold in the early 1700s. Some of these indigenous communities are now closely linked with nearby cities, while others remain relatively isolated. All of these communities are striving to maintain traditional cultural practices within the context of modernization, especially for natural resource management. The struggle to maintain cultural integrity in the face of economic pressures is made more difficult by the complex history of conquest, revolution, and social injustice.

A closer look at this history exposes ways in which changing cultural values, traditions and economies, affect local strategies of resource use and management. These social, political and historical forces have a prominent affect on sound forest management. Forest management activities in Sierra Juarez shows exploitative practices by Fabricas de Papel Tuxtapec (FAPATUX), a national paper manufacture in 1956, FAPATUX acquired a 25 year concession to harvest the communal forests of Ixtln. Despite the success of the communities in working with FAPATUX and influencing the management of the communal lands, they wanted greater control over the lands and sought to prevent the continuation of the concessions. Since then, communal forest management has sought to achieve two primary goals: 1) to provide economic returns and employment, and 2) to steward the land responsibly and sustainably. Their management plans have evolved to include the manipulation of standard silvicultural procedures and their integration with traditional agricultural and non-timber forest product cultivation. Through an analysis of barefoot silviculture and traditional medicine, this papers aims to shed light on the complex social, political and historical forces affecting land use management in Oaxaca today.

### **The White Coat Effect**

The state of Oaxaca is one of the regions in Mexico that has best retained traditional knowledge about medicinal plants. Cervantes Servin et al. (1990) registered 101 medicinal plants (66 wild and 35 cultivated) in the Ocotln District in Oaxaca. In Chimalapas, the traveling herbalist working with Maderas del Pueblo, a local Oaxacan NGO, knows at least 90 species of medicinal plants. There is still a vast knowledge base on medicinal plants. However, local people's use and knowledge of plants is threatened, particularly as a growing number of people turning to 'modern' medicine. In this paper we refer to this transition as the white coat effect.

The role of the travelling herbalist is a traditional and important one in village life in Oaxaca (Messer, 1978). Traditionally, curanderas/os were the most important healer in the communities of various indigenous groups in Mexico. However, today there are relatively few practicing curanderas/os. In Chalchijapa, there are no curanderas/os, a crucial missing link in maintaining faith in herbal remedies. The loss of authority figures, such as the curanderas/os and midwives, is accelerating reliance on Western medicine. Doctors trained in Western medicine and wearing clean white coats, pharmacies displaying shelves of shinny packages of pills, and newly built clinics, all act as symbols of authority and serve to legitimize western medicine. Chalchijapa, like many other villages in Chimalapas, is depending more and more on Western medicine. A private doctor, who occasionally visits from the nearby town of Matias Romero, dispenses shots, pills, and creams to villagers. For emergencies, the villagers must travel to Matias Romero - two to three hours away by car on dirt roads. However, this situation will soon change, as modernization efforts aimed at improving medical care have sponsored the building of a new Western style medical clinic.

In Chalchijapa, Chimalapas, villagers explained that in 1967, a major road was built connecting Santa Maria to the outside world. Since then, traditional medicinal systems have undergone tremendous changes. Campesinos now give their children Western medicine, an indicators of the substantial cultural change and "modernization." The two Zoques said that Western medicine is referred to as "doctor's medicine." This name appears to symbolize the authority that Zoques attach to Western medicine. In Santa Maria, Western medical clinics provide service to the whole community. Many residents of Santa Maria, however, criticize doctors in the state-run hospitals for only prescribing the medication that they happen to have on hand at the time. Consequently, people who can afford to go to private Western doctors usually do. Despite the increasing popularity of Western medicine, most women still treat their

family members' common illnesses with herbs. However, without a permanent locally-based curandera/o in the larger town of Santa Maria to cure the people there are displaying a general trend toward reliance on Western medicine. Few people in the town still trust herbal remedies for anything more than the common cold. As a result, traditional medical practices are quickly disappearing.

### **Community Based Management and NGO Collaboration**

Maderas del Pueblo is a Oaxacan non government organization (NGO) with approximately ten years of experience working with communities in the Chimalapas region. The NGO's programs extend over a range of issues, from silviculture to health and nutrition, to social organization. The people of Chimalapas and Maderas del Pueblo have adopted a position of ardent opposition to the Mexican government's proposal to create a Biosphere Reserve in Chimalapas. Isaac Matus (pers. comm.1996), the coordinator for technical monitoring and evaluation for Maderas del Pueblo, believes that all official reserves in Mexico are failures because they are not designed with the needs of local people in mind and are administered from the top down. Maderas del Pueblo supports the creation of a Campesino Ecological Reserve in Chimalapas, instead of a nationally sponsored Biosphere Reserve, which would emphasize the participation of local people in the management of their natural resources in order to best promote the conservation of the region's environment. This is one of the most important projects the NGO has undertaken to secure the autonomy of the communities. Strengthening the autonomy of local people is viewed as a critical factor in reversing the decline of indigenous cultures (Halffer, 1994). In addition to devolution and decentralization of decision making for conservation objectives, there is a need for integrative silvicultural systems that are adaptive, giving communities the flexibility to respond to failures and ever-changing conditions. Community forestry in this part of the world has fostered a great sense of responsibility and better stewardship of the land through the manipulation of standard silvicultural procedures and their integration with traditional agricultural practices. These community-based management approaches with integrative or "barefoot" silvicultural systems better integrate indigenous knowledge and traditions in management decisions.

### **Barefoot Silviculture: Integrative and Adaptive Systems**

Sound management has traditionally been evaluated by the development of a silvicultural prescription that combines a sequence of treatments into a coordinated plan aimed at meeting a particular management objective. The barefoot silviculture prescription similarly integrates a sequence of management treatments but also justifies the treatment choices based on specific ecological, managerial and social grounds. Usually sound forest management is described by an array of traditional silvicultural practices, most of which are implemented in order to cultivate pine in Ixtlax and neighbouring communities of the Sierra Norte. This array of silvicultural practices are broken into two categories that yield even and uneven aged stands. Even-aged systems include clear cutting, seed tree and shelterwood systems while un-even aged describes single tree and group selection systems. However these terms are deceiving, alluding to age and trying to infer stand structures. Silvicultural choices should be thought of as determining what kind of stand development process or stage of natural succession is most desirable in a given situation. These choices are made among the stand structures and processes to start or to alter them after they have been initiated. The artificial dynamic equilibrium between an indigenous culture and its environment has been achieved through the use of prudent barefoot silvicultural systems, not defined by age but more by vertical structures. These systems may be less stable than nature's ecological equilibrium but ought to be more favorable from the standpoint of the integrated effect of all socioeconomic factors. A new set of structural definitions are thus needed to define the vertical stand structures necessary for many non-timber forest products essential to indigenous cultures and traditional medicinal systems. These structural definitions will make it easier to document barefoot silvicultural systems and the inherent ability that indigenous peoples have developed for distinguishing between stand develop patterns. These structural definitions are divided into single cohort and multicohort stands.

### **Single Cohort Stand Development**

A given aggregation of trees of a single age class or cohort proceeds from birth to death through a sequence of development stages (Oliver and Larsen 1996). These must be recognized if understanding of stand dynamics is to be used to cultivate on-timber forest products essential to indigenous cultures and

traditional medicinal systems. This understanding is critical to achieve management objectives by imitating, guiding, or altering natural processes in barefoot silvicultural treatments.

The first stage in stand development (see graphic 2.3) is called stand initiation, describing the unit of growing space and the cohort of trees that become established in it (or preexisting smaller ones that expand into it). The second stage of stand development is stem exclusion, where trees start to compete with one another and the more vigorous trees usurp the growing space of weaker ones that die from biotic and abiotic effects. Unless some disturbance breaks up this stand and starts a new initiation phase, growth will continue with time until an understory is developed. This stage is called the understory reinitiation. In this stage, many opportunities exist to cultivate an understory of shade tolerant non-timber forest products that take advantage of small vacancies in the growing space. Unless something happens to replace most of the stand, older trees gradually die and replace by younger stand classes turn this single cohort stand into a multicohort stand. This leads gradually into an old growth stage. This process of stand development is shown in Figure 2.3 below (Oliver and Larsen 1996).

The integration of non-timber forest products within single cohort stand development depends on the vertical structure necessary for the product in question.

In the diagram, two stand structures from single cohort origins demonstrate stand development with and without differentiation with completely different vertical structure. With single cohort systems that manage stratified mixtures, development processes must be studied carefully to determine the appropriate integration with cultural systems. The development processes of stratified mixtures of species takes place with differentiation of trees according to height is into different horizontal strata or stories, one above the other, with one species or a group of species in each stratum. The differentiation is not simply into crown classes within a single canopy stratum as in single cohort stands without differentiation and disturbances. With the inclusion of disturbances, stand development processes will follow a pattern discussed under multicohort.

#### **Case of Single Cohort Stand Development: Seed tree system**

The seed tree system has historically been an underused and under appreciated silvicultural system in Mexico. In 1983, 56,000 ha (less than 3% of Mexico's mixed conifer forests) were under even-aged management incorporating this regenerative method with intermediate thinnings (Snook and Negreros, 1986). Today, the numbers are likely significantly higher because communities have seen the greater profitability of this treatment and its success in naturally regenerating pine. Limiting the number of entries into a stand and concentrating management activity in a relatively small area on a year to year basis are two factors which make seed tree systems so profitable. In addition, Negreros and Snook (1984) found that pine annual volume increments were 2.5 times greater in even-aged sites than in selectively cut uneven-aged forests.

In Ixtlŕn, a typical seed tree cut will leave from 10-30 large trees per hectare on the site after the harvest for seed dispersal. Post harvest site preparation is frequently carried out similarly to ecosystems in the United States (Graney and Kitchens, 1983, Roy, 1962, Mielke and Kimmey, 1942). Piling and burning is used heavily by some communities because it favors intolerant pines like *Pinus patula*, *Pinus pseudostrobus*, and *Pinus douglasiana* (all commercial species). Other fire adapted pines will also gain a competitive advantage over hardwoods: *Pinus leiophylla* and *Pinus oocarpa* which resprout from the root collar as saplings; *Pinus patula* and *Pinus oocarpa* which have serotinous cones; and *Pinus montezuma* which exhibits a grass stage early in life. Once sufficient regeneration has been achieved, ideally thousands of seedlings per hectare will become established in the opening created by the harvest, the seed trees can be removed. During a forty year growing period, intermediate thinnings were necessary to redistribute growing space for maximum diameter growth at 500-750 trees per acre, yielding trees 50 cm in diameter and of good commercial form. Those which were not suitable for commercial harvest were stacked and cultivated with mushrooms. This integration of an intermediate treatment with non-timber forest products makes pre-commercial thinnings more viable in otherwise difficult financial situation. This comes from an understanding of single cohort stand development and is thus considered a kind of barefoot silviculture.

The timing of the seed tree removal is a topic of debate in Ixtlŕn. While the seed trees occupy only

10-15% of the total available crown area they will slightly reduce the amount of solar radiation reaching the forest floor. This has the potential of reducing the growth rate of the newly established seedlings. However, the residual trees are free of competition and growing at an increment rate of one cm/year. The relevant question is: when does the value added due to growth of the residuals fall below the value lost due to suppression of the seedlings? Typically, with thousands of seedlings on the forest floor, the loss should be negligible. In fact on poor sites of southern exposure, even the more intolerant species may benefit from the protection of a few trees during the first few years of establishment when seedlings are particularly vulnerable to desiccation. An additional concern is the amount of damage that will be caused to the regeneration by the removal of the residual trees. One community compromises by removing all but three of the seed trees per hectare at ten years to avoid competition with the younger seedlings. The three trees left per hectare act as insurance against failure of the existing natural regeneration.

Some communities are hesitant to rely too heavily on this system because as in all silvicultural systems reliant on natural regeneration, there is room for failure. The communities have dealt with this risk in a number of innovative ways.

Seed tree cuts are riskier than selection cutting or group selection because competing vegetation in the form of oaks can maintain control of the site as seen in other regions (Graney and Kitchens, 1983, Roy 1962). The short term costs of regeneration failure in a seed tree system are high because manual replanting is required. The other systems are not likely to incur any short term costs but over the long run many of these sites will convert to hardwood and conversion back to pine will be very costly. Many communities conduct enrichment plantings and control competing vegetation by hand if sufficient natural regeneration has not been achieved within three years of the harvest. In Ixtlilxco a new initiative has started which will incorporate traditional agricultural practices within forestry operations. After three years the sites are evaluated for regeneration success. On sites where regeneration is absent the opportunity to utilize the area for agricultural production will be offered to the community. The farmer who accepts the land will have three years to cultivate it usually for maize production. During the site preparation all non-pine species are removed and significant amounts of bare mineral soil exposed providing a good opportunity for natural regeneration to become established over the next three years. If at the end of the period of cultivation sufficient natural regeneration still has not been established the area can easily be planted without concern about competing hardwood vegetation since it has been controlled during the previous three years (Cardenas, 1996). Another community used the regeneration period for planting potatoes so that farmers could actively tend to their seedlings while cultivating their crop. Such opportunistic use of existing growing space benefited the community through additional agricultural production and provided incentive to control hardwood competition (Cardenas, 1996). These systems are not original since they closely resemble taungia systems of plantation establishment, but they have been significantly modified to meet the needs of the community.

#### **Case of Single Cohort Stand Development: Clearcut-plantation system**

Plantation silviculture (a single cohort cycle of clear cutting and replanting a desired species) does not currently exist in Oaxacan communities. An analog of this system does however exist in some restoration zones. Large areas of abandoned agricultural land are being reforested by planting commercial species like *Pinus patula* on a 2 meter spacing, yielding a density of 3600 trees per hectare. Other commercial species like *Pinus acahuite* and *Pinus pseudostobus* are being mass produced in Sierra Norte nurseries for plantation purposes. Competing brush species are either outgrown by the fast growing pine or eliminated by manual intervention. Pruning and intermediate thinning regimes have been discussed to increase commercial yield of these plantations. With shifting agriculture continuing to be practiced in this region mature second growth forest will be clear-cut to establish agricultural fields. At abandonment these areas will likely be replanted as a plantation with locally produced nursery stock.

Forty years after planting, the final crop of 200-300 high volume and high value trees is harvested. Logs are left lying horizontally (parallel with slope contours) so as to reduce soil erosion potential during extraction. It is anticipated that these areas will be regenerated according to the seed tree system at the start of the second rotation and clearcutting reserved for the establishment of agricultural fields.

## Multi-Cohort Stand Development

When stands develop with a large number of small disturbances (including harvesting events), new cohorts may start to develop in the openings thus created. This creation and development of such stands makes management more complicated even if they are purely one species. In diverse ecosystems like those in Oaxaca, most multicohort stands are actually mixtures of species with different development rates. Since multicohort stands are defined by different age groups, it is important to be able to recognize the difference in development and resultant stand structures for its integration with cultural knowledge systems. Differences in age distribution are most easily recognizable in mixed stands composed of species with different rates of height growth so that each cohort has a recognizable pattern of dominant and suppressed species in each stratum of the crown canopy. However, single cohort stands of tree species usually segregate into different canopy strata and exist as stratified mixtures so it may be possible to confuse the two. In barefoot silviculture, indigenous cultures have the opportunity to see stand develop over time, thus distinguishing between stratified mixtures that originate from single cohort origins and those that develop into multi-cohort mixtures (through patterns of ecological disturbances). Primary to this understanding is a fundamental knowledge of which species of differing ecological status occupies each different strata in the crown canopy. In general, many indigenous groups have this understanding of these two development patterns and work within them to gain some sort of benefit. It is necessary to document the ways that local people distinguish between these two stand develop patterns (as they represent themselves on the landscape similarly). This type of indigenous knowledge is a fundamental principal of barefoot silviculture and the adaptation of standard silvicultural systems for integrating cultural knowledge on non-timber forest product cultivation.

Traditionally in silviculture, in order to identify cohort development patterns diameter was considered the most appropriate measure (with some inference of age from diameter growth). It is now apparent, that the most accurate assesment of age-class structure of a stand comes from the actual ring counts. Although this is possible with many of the conifers in Sierra Norte, this is not possible with many of the hardwoods in the Chimalapas area. In the following diagram, it is seldom reliable to depend on diameter criteria until direct age has been determined through representative counts typical of that locality and with consideration of the pattern discussed in single-cohort development.

### **Case of Multi-Cohort Stand Development: Selection cutting**

In this region of Mexico, selection cutting as conducted by FAPATUX was applied exclusively to pines like *Pinus patula*. Typically reducing the basal area in a mixed species stand from 64% to 54% over a twenty year period (Negreros and Snook 1984). Under current management in Ixtlbn stands managed under the single tree selection method are entered every ten years to conduct density reductions. Maintaining a residual growing stock of around 49.4 MBF per hectare is achieved by removing 20-25% of the trees. The removal of trees alters the micro climate allowing for more regeneration to take place. The diffuse pattern of timber removal ensures that all ages of trees will be intermixed creating a multiple story. This pattern has some aesthetic and wildlife attributes that stands in protection zones will not achieve. The administrative advantage is there usually is no need for expensive site preparation or planting. Theoretically regeneration is reliable and more or less automatic as new trees are simply recruited from the reservoir of saplings in the forest understory. There are usually more than enough to choose from, although tolerant trees have an advantage. This type of regeneration also means that trees from all size classes must be removed during the harvest, so as to create the ideal distribution under a regulated system ( 14% in each size class for this stand).

This multi-cohort silvicultural system can achieve sustained yield from a single stand of trees. A number of potential problems exist for single tree selection harvesting. These issues must be addressed before single tree selection can be considered a viable management option. Besides the threat of high-grading, there exists a problem with pine regeneration when selection cutting is practiced. If gaps are not large enough to provide the micro climate for shade intolerant pines (accept for *Pinus ayacuite* which is shade tolerant), then oaks will come in to the stand. If this occurs it may be necessary to further open the canopy to promote pine regeneration. Many pines also require bare mineral soil for germination. If the logging operation does not disturb the duff and expose bare mineral soil, pine regeneration may not be successful. Foresters from the region claim however, that this is not a problem as soil scarification does occur. If no regeneration occurs, the plan is to return to the site in ten years for further cutting. Negreros and Snook (1984) studied pine regeneration in the Sierra de Juarez region and found that low-intensity selective cutting does not stimulate pine regeneration to provide for adequate replacement of harvested

trees. Despite these concerns, selective cutting is seen as an appropriate silvicultural system because it maintains a forest canopy with vertical structure necessary for many wildlife species (Hunter 1990). This is also the vertical structure necessary for integration with non-timber trees that can provide fruits, nuts, medicines, condiments and other products. Single cohort silvicultural systems, especially those reliant on single tree selection are especially valuable for developing multi-storied tree gardens as demonstrated here.

#### **Case of Multi-Cohort Stand Development: Group selection**

Some communities within Sierra Norte use a group selection system on a 60 year rotation. This system is typically used in more diverse areas with the primary objective of maintaining a healthy mix of pine and oak. These diverse areas tend to be at lower elevations on more humid sites, usually at the upper boundary of the cloud forest. Group selection is used to maintain the appearance of a contiguous forest canopy while promoting the more valuable pine species. These communities are aware of the pine regeneration problem inherent with single tree selection and the difficulty of achieving a single species stand through natural regeneration. They therefore manage with the intent of maintaining an equilibrium between natural species diversity and promoting commercial valuable species. As with single tree selection, the cutting cycle is ten years, extracting 200m<sup>3</sup>/ha per entry. Many opportunities exist with cohort harvesting for non-timber forest product cultivation and harvesting including honey bee and butterfly collections.

By cutting small groups of trees instead of scattered individuals, the amount of direct sunlight can be increased to the point where regeneration of shade intolerant species (both woody tree and non-woody forest products) can occur. This group selection method mimics what happens naturally when a root disease center or a bark beetle infestation develops, creating small gaps in the forest. It is therefore probable that most shade intolerant species could successfully be managed by small patch cuts of one hectare or less. This management strategy is called mosaic cutting and falls between the traditional group selection cuts and clear cutting in terms of the size of the cut and the intensity of the disturbance. This method will improve growing conditions for many non-timber forest products that depend on full sunlight for their competitive advantage, while still retaining the more or less closed-canopy appearance of the forest as a whole. Because of its aesthetic appeal and high yield potential it seems likely to become a more popular practice in Oaxaca.

#### **Further Opportunities for Integration**

There are further opportunities to define the vertical stand structures necessary for many non-timber forest products essential to indigenous cultures and traditional medicinal systems. These structural definitions will make it easier to document barefoot silvicultural systems and the inherent ability that indigenous peoples have for distinguishing between stand develop patterns. The following table demonstrates such opportunities that should be studied and documented further:

#### **Conclusion**

The choice between growing trees in single cohort or multi-cohort stands will ordinarily depend on particular management goals and constraints. Single and multi-cohort stands are terms used to describe stand structures and the kinds of stand development processes (or stage of natural succession) most desirable in a given situation. These choices are made among the stand structures and processes to start or to alter them after they have been initiated. Many smaller communities might consider the tendency for selection cutting to favor shade-tolerant species a trivial concern, especially when measured against the numerous financial advantages of the selection system (including the presence of many herbaceous NTFP species that require continuous forest cover). However, in the Sierra Norte, the lack of commercial markets for oak wood may convince communities otherwise (Negreros and Snook 1984). For communities heavily tied to forest industries, conversion to tolerant species can be a serious problem. Non timber forest products and the stand structures that promote them need to be analyzed carefully to determine their role in alleviating the dependency on timber. Because the cost of conversion back to a commercial timber species is frequently very high and there is usually no commercial market for the invading species, non-timber forest products may be the only way to generate income during the conversion process. Barefoot silvicultural systems which integrate indigenous knowledge of non-timber forest product cultivation need to be better documented so that lesson learned may be applied to other communities facing the same shortages in commercial timber stocks.

Barefoot silviculture allows indigenous peoples to develop their own management plans and silvicultural techniques to suit their cultural needs. The artificial dynamic equilibrium between an indigenous culture and its environment has been achieved through the use of prudent barefoot silvicultural systems sometimes develop over thousands of years of trial and error. This equilibrium is less stable than nature's own ecological equilibrium but more favorable from the standpoint of the integrated effect of all socioeconomic factors. Barefoot silviculture is thus based on the premise that silvicultural systems can be built to not only promote ecological and economical sustainability, but also cultural sustainability. The success of the management plans and the current barefoot silvicultural systems has yet to be evaluated in Oaxaca (other than this endeavor). The array of silvicultural systems utilized in these communities demonstrate that the autecology of the species being managed and the edaphic differences between sites (as well as the land use history) are all being considered. In addition, the manipulation of standard silvicultural procedures and their integration with traditional agricultural practices indicate that the management of the timber resources in Oaxaca will continue to be a dynamic process. Having the flexibility to respond to failures and ever-changing conditions will ensure that Oaxaca will adapt its management and silvicultural systems over time to achieve its objectives while maintaining its cultural integrity.

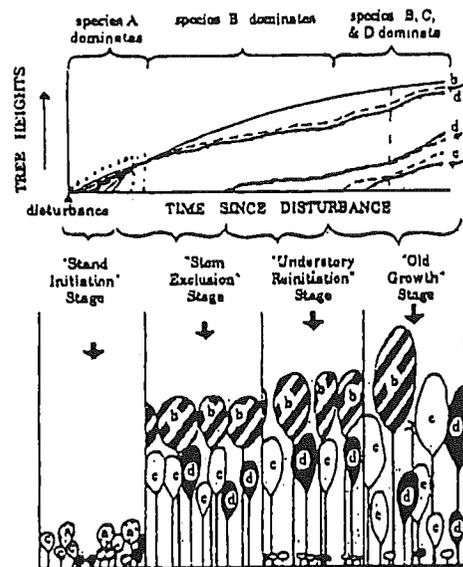
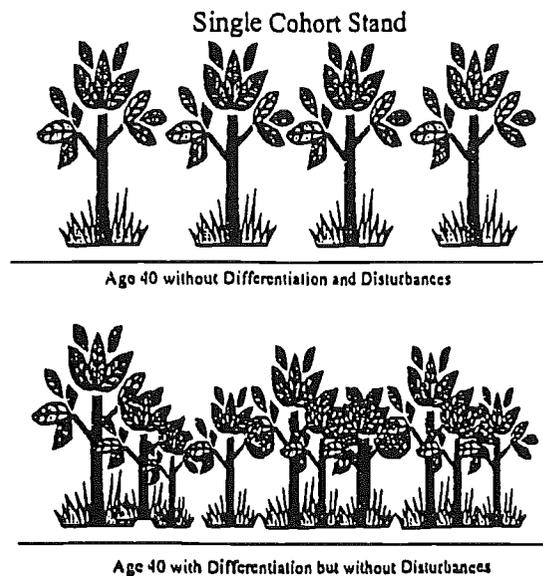
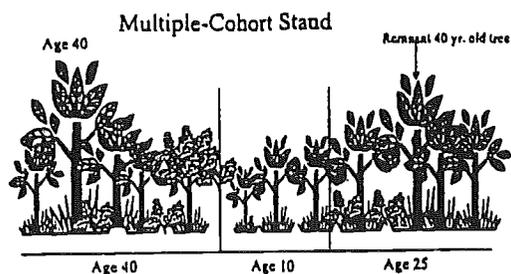


Figure 3.2 Schematic stages of stand development following major disturbances. All trees forming the forest start soon after the disturbance; however, the dominant tree type changes as stem number decreases and vertical stratification of species progresses. The height attained and the time lapsed during each stage vary with species, disturbance, and site. (Oliver, 1981.) (See "source notes.")





	Single Cohort	Multiple Cohort
Conventional Names of Systems	Clearcut Overstory removal Seed tree Shelterwood	Single tree selection Group selection Femel Mosaic
Potential Adaptations with traditional practices	Agriculture Grazing Mushroom cultivation Bamboo cultivation (in Asia) Early successional medicinals Butterfly cultivation Honey	Shade coffee Grazing Mushroom Cultivation Orchid / Bromeliad Some lianas Late successional medicinals
NTFP Shade Requirements	Shade Intolerance Sun-loving	Shade Tolerance Sun-Avoidance



Figure 21.1 Structure of a multi-story tree garden as used throughout the tropics. Fruits, nuts, medicines, condiments, and other products are harvested from different strata.

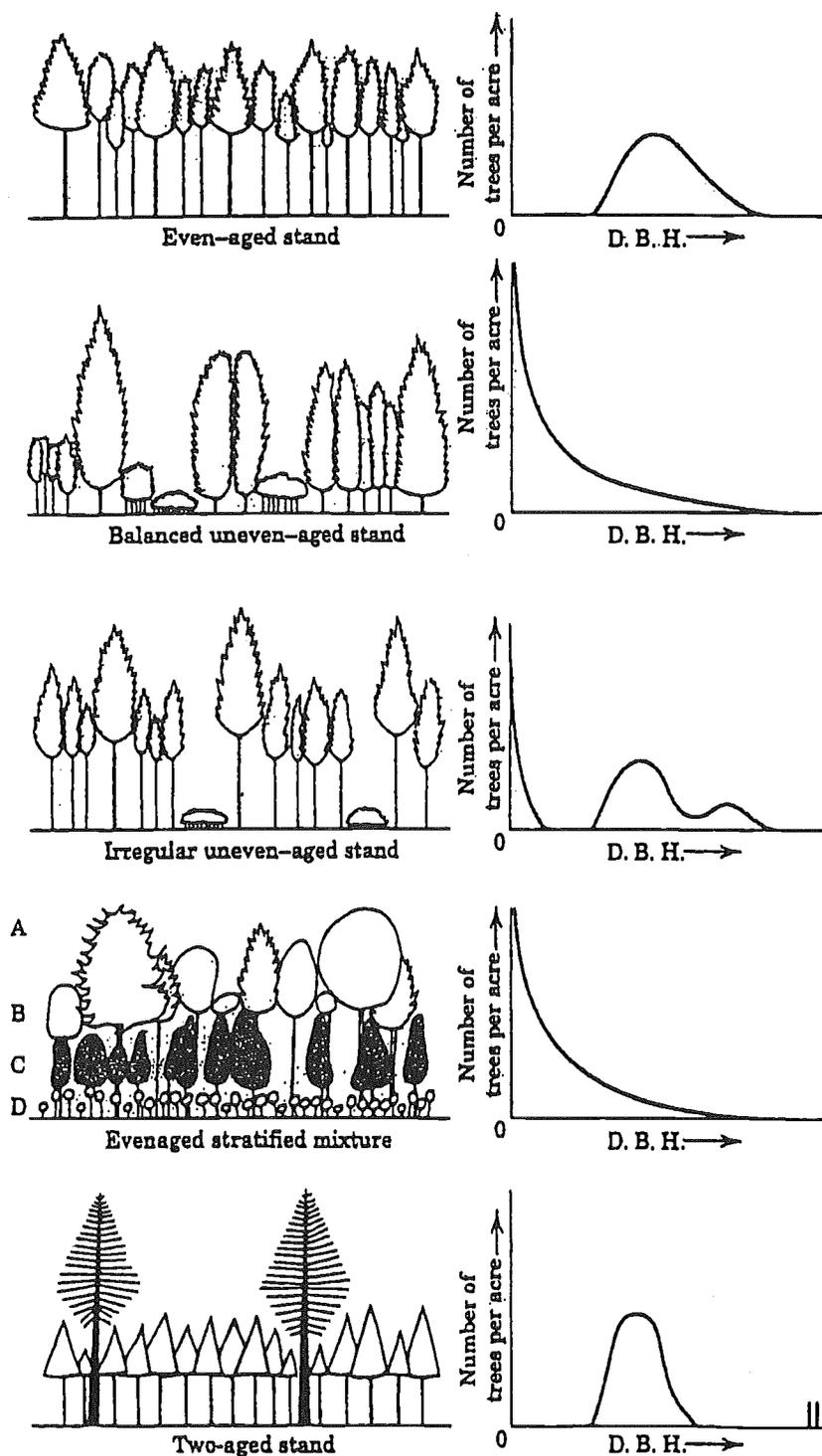


Figure 2.2 Typical examples of five different kinds of stand structure show the appearance of stands in vertical cross section and corresponding graphs of diameter distribution in terms of numbers of trees per unit of area. The trees of the first three stands are all of the same species. The fourth stand consists of several species, but all of the same age, and the fifth stand has trees of two different age classes.

## References

- Bray, D. B.. 1991. The struggle for the forest: conservation and development in the Sierra Juarez. *Grassroots Development*. 15:3 13-25.
- Cardenas, M. G.. 1996. Correspondence, Investigador, Campo Experimental Valles Centrales de Oaxaca, INIFAP.
- Campbell, D. G. and H. D. Hammond (Eds). *Floristic inventory of tropical countries*. pp. 253-309. New York Botanical Garden: NY. 1989.
- Castellanos, J. F. 1996. Correspondence, Investigador, Campo Experimental Valles Centrales de Oaxaca, INIFAP.
- Cervantes Servin, G., and J. Valdez Gutierrez. 1990. Plantas medicinales del Distrito de Ocotlan, Oaxaca. *Anales Inst. Biol. Univ. Auton. Mexico, Ser. Bot.* 60(1): 85-103.
- Ford, R.I. 1994. Preface to Second Edition: Ethnobotany in the nature and status of ethnobotany. Ford, ed. *Ann Harbor, Michigan*. 1994.
- Gonzales, G. 1994. Agricultura indigena y modernización: matrimonio Esastrozo, In *America Indigena*, 2 p.
- Graney, D.L. and R.N. Kitchens. 1983. Oak-Pine. In: pp.172-174. R. M. Burns (ed.).
- Gustavo, D. 1996. Correspondence, Ixtlan Community Leader.
- Guzman, G. 1994. Los Hongos en la Medicina Tradicional de Mesoamerica y de Mexico. *Revista Iberoamericana de Micologia* 11: 81-85.
- Haffler, G. 1994. Putting the Biosphere Reserve into Practice: The Mexican Experience pp.2-28 in UNESCO. *Integrating Conservation, Development and Research*. Parthenon Publishing. London (in press). Silvicultural systems for the major forest types of the United States. *Agriculture Handbook No.445, USDA Forest Service, Washington D.C.*
- Hunter, M. L. 1990. *Wildlife, Forests, and Forestry: Principles of managing forests for biological diversity*. New Jersey: Prentice Hall, Inc. 370 p.
- Martinez, A. F.. 1996. Diversidad biologica de Oaxaca y su conservacion.
- Matus, Isaac. 1996. Correspondence, Coordinator for Technical Monitoring and Evaluation for Maderas del Pueblo
- McDonald, P. M., D. Minore, and T. Atzet. 1983. Southwestern Oregon- Northern California Hardwoods. In: pp.29-32. R. M. Burns (ed.). *Silvicultural systems for the major forest types of the United States. Agriculture Handbook No.445, USDA Forest Service, Washington D.C.*
- Meinecke, E.P. 1914. *Forest tree diseases common in California and Nevada - a manual for field use*. USDA Forest Service, Washington D.C.. 67p.
- Messer, E. 1978. Prehistory and human ecology of the Valley of Oaxaca. *Ann Arbor: University of Michigan Press*, 44 p.
- Messer, E. 1978. Prehistory and human ecology of the Valley of Oaxaca (*Ann Arbor: University of Michigan Press*), 44.
- Mielke, J.L. and J.W. Kimmey. 1942. Heat injury to the leaves of California black oak and some other broad leaves. *Plant Disease Reporter* 26:116-119
- Minnich, R. A., E. F. Vizcaino, J. S. Ramirez, Barbour, M. G, J. H. Burk, W. J. Barry, 1994. El potencial de la Sierra de San Pedro Martir como una Reserva de la Biosfera. Mexico: Proyecto sobre Areas Naturales Protegidos. 55 p.
- Moros, F. A. and C. Solano. 1995. *Forestry communities in Oaxaca: the struggle for free market access*. Translated by Ivonne Plankey Videla and Loraine Woodard.
- Oliver, C. D., and B. Larson. 1990. *Forest Stand Dynamics*. New York: McGraw Hill, Inc. 467 p.
- Pereira, G.B. 1992. *Cosmologia y uso actual de las plantas medicinales de Yucatan*. Universidad Autonoma de Yucatan. Yucatan. Mexico.
- Roy, D. F. 1962. California hardwoods: management practices and problems. *Journal of Forestry* 60:184-186.
- Santiago, L.. 1996. Correspondence, Ixtlan Community Leader.
- Snook, L. C. and P. Negreros. 1986. Effects of Mexico's selective cutting system of pine regeneration and growth in a mixed pine-oak (*Pinus-Quercus*) forest. *USDA Forest Service, Southern Forest Experiment Station. Gen. Tech. Report. SE-46*.
- Zabin, C. 1991. El mercado de la madera in Oaxaca. *Cuadernos de Trabajo: Empresas y Ecodesarrollo*.
- Zamora-Martinez, M.C. 1992. Medicinal plants used in some rural populations of Oaxaca, Puebla and Veracruz, Mexico, 250 p.

## **Glossary of Terms used in this Paper:**

**Cohort:** each aggregation of trees that start as a result of a single disturbance.

**Cutting cycle:** the treatment of stands periodically with each period being called a cutting cycle. The multi-cohort stand would have as many age classes as there were cutting cycles in the rotation.

**Even-aged:** narrow aggregation of the range of tree ages within a stand; or all trees are of the same age or at least of the same cohort.

**Gap and patch dynamics:** patterns of establishments and subsequent development of vegetation in all vacancies of any size in the growing space.

**Growing space:** sum of the factors necessary for growth; available space for plant growth above and below ground.

**High-grading:** process by which the best trees have been cut leaving the worst quality behind. Best species and largest stems are taken first leaving poor seed stock for future generations

**Multistory tree gardens:** small plots that are characterized by a large variety of tree species, shrubs and vines but with few or no herbaceous crops.

**Shade intolerance:** species with a very high compensation point, meaning that much light intensity is necessary for the leaves to sustain themselves.

**Shade tolerance:** the ability to survive in more shaded conditions than other plant species, since their leaves can photosynthesize enough at lower light intensities to stay alive.

**Shade tree/crop combinations:** two storied stands with one or more species of tall trees growing above an herbaceous, shrub, or small tree crop.

**Understory:** the lowermost strata of shrubs or herbaceous vegetation.

**Uneven aged:** contains at least three different age classes intermingled intimately on the same geographic area.

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# LA SYLVICULTURE RURALE TRADITIONNELLE À OAXACA (MEXIQUE) : L'ADAPTATION DES SYSTÈMES COURANTS DE SYLVICULTURE AUX PRODUITS FORESTIERS AUTRES QUE LE BOIS ET L'INTÉGRATION DU SAVOIR AUTOCHTONE

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## RÉSUMÉ

Étant donné que la région de Oaxaca est l'une des régions biologiquement les plus diversifiées des tropiques, la principale difficulté consiste à réaliser l'équilibre entre l'exploitation durable de la forêt et la préservation de la diversité biologique, ce qui est tout particulièrement difficile pour des communautés villageoises ayant des ressources limitées, du point de vue économique comme du point de vue technique. Les plantes médicinales et les autres produits forestiers autres que le bois sont particulièrement vulnérables aux régimes de récolte excessifs. Le document étudie en détail les activités d'aménagement forestier des communautés de deux régions de l'État de Oaxaca au Mexique. Le cas des Chimalapas et de la Sierra Del Norte est étudié pour illustrer la façon dont les valeurs culturelles, les traditions et l'économie influent sur les stratégies locales d'exploitation et de gestion des ressources. Par une analyse de la sylviculture rurale traditionnelle et de la médecine traditionnelle pratiquées dans ces deux régions, le document vise à mettre en évidence le réseau complexe de forces sociales, politiques et historiques qui sous-tend l'aménagement du territoire à Oaxaca aujourd'hui.

Le document fait aussi ressortir la nécessité d'opter pour des systèmes de sylviculture intégrés et susceptibles d'adaptation, qui donnent aux communautés la souplesse voulue pour réagir en cas d'échec et face à des conditions toujours changeantes. La foresterie à l'échelon de la communauté dans cette région du monde a favorisé un sens aigu de la responsabilité et une gestion plus avisée des terres en adaptant des façons sylvicoles courantes et en les intégrant aux pratiques agricoles traditionnelles. Ce mode de gestion à partir de la communauté intègre mieux le savoir et les traditions autochtones dans les décisions concernant la gestion. De plus, la participation des autochtones à l'élaboration de leurs propres plans de gestion et de leurs techniques sylvicoles est importante non seulement pour promouvoir l'exploitation durable du point de vue écologique et économique, mais aussi la pérennité culturelle, essentielle à la survie de la médecine des autochtones, de leurs valeurs et de leurs traditions.

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**ТРАДИЦИОННОЕ ЛЕСОВОДСТВО В ШТАТЕ ОАХАКА (МЕКСИКА):  
АДАПТАЦИЯ СТАНДАРТНЫХ ЛЕСОВОДЧЕСКИХ СИСТЕМ  
ПРИМЕНИТЕЛЬНО К НЕДРЕВЕСНЫМ ЛЕСНЫМ ТОВАРАМ  
И ИНТЕГРАЦИЯ ЗНАНИЙ КОРЕННЫХ НАРОДОВ**

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**РЕЗЮМЕ**

Главная управленческая задача в штате Оахака, который относится к тропическим районам с высокой степенью биологического разнообразия, состоит в том, чтобы сочетать устойчивые лесные заготовки с сохранением биологического разнообразия, и эта задача особенно сложна для сельских общин, имеющих ограниченные – как экономические, так и технические – ресурсы. Лекарственные растения и прочие недревесные лесные товары особенно чувствительны к чрезмерным заготовкам. В настоящем документе более подробно рассматривается использование лесов сельскими общинами в двух районах штата Оахака (Мексика). На примере районов Чималапас и Сьера-Дель-Норте изучается то, как изменяющиеся культурные ценности, традиции и экономика воздействуют на местные стратегии использования ресурсов и управления ими. В настоящем докладе ставится цель выяснить посредством анализа традиционного лесопользования и традиционной медицины в этих двух районах сложные социальные, политические и исторические силы, воздействующие сегодня на практику землепользования в штате Оахака.

В докладе также показана необходимость разработки таких комплексных лесоводческих систем, которые позволяли бы общинам гибко реагировать на ошибки и на постоянное изменение условий. Общинное лесоводство в этой части мира стимулировало высокое чувство ответственности и более разумное пользование земельными ресурсами, что достигается за счет применения оптимальных стандартных лесоводческих методов и их интеграции в традиционную сельскохозяйственную практику. Эти подходы к управлению на базе общины позволяют более полно учитывать знания и традиции коренных народов при принятии решений по вопросам управления. Кроме того, усилия коренного населения в области разработки собственных планов управления и лесоводческих методов вносят существенный вклад в обеспечение не только экологической и экономической, но и культурной устойчивости, что крайне важно для сохранения медицинских знаний, ценностей и традиций коренных народов.

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## PRODUCTION, TRANSPORT AND STORAGE OF CHESTNUTS IN TURKEY

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### SUMMARY

The size of forested areas around the world is steadily decreasing, which is adversely affecting forest by products. Although Turkey is one of the world's leading chestnut producers, the importance which it attaches to this product remains insufficient.

The chestnut, which is one of Turkey's numerous forest by-products, is the fruit of a species of tree which grows in coastal areas and has been cultivated for a long time. But in recent years, chestnut ink or mycosis (*Phytophthora cambivora*) and chestnut cancer. (*Endothia parasitica*) have been causing serious damage, with the result that interest in this by-product has somewhat declined.

Chestnut harvesting begins in early September and ends in mid-October. This is a costly and difficult operation. In Turkey, chestnut trees number around 2.5 million. Average production Per tree varies between 15 and 30 kg, which represents 50,000 tonnes of product. Maximum transport capacity is 350 kg by means of the cableway system, which is regarded as practical and economic in the hilly Black Sea region.

If large quantities of chestnuts are involved, they can be stored in refrigerated warehouses. For the purposes of chestnut production, farmers must be provided with all technical facilities and bureaucratic formalities must be complied with.

**Keywords:** Chestnut, production, transport, storage.

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# **PRODUCTION, TRANSPORT ET MISE EN MAGASIN DES CHATAIGNES EN TURQUIE**

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## **Resume**

Les étendues forestières sur la surface terrestre diminuent de plus en plus, ce qui influe négativement sur les sous-produits sylvestres. Bien que la Turquie se place dans les premiers rangs sur le plan de la production de châtaignes dans le monde, l'importance qu'elle y accorde reste insuffisante.

La châtaigne qui est un de nos nombreux sous-produits sylvestres est le fruit d'une espèce d'arbre qui pousse sur le littoral de notre pays et que l'on cultive de longue date. Mais, ces dernières années, l'encre, ou mycose du châtaignier (*Phytophthora cambivora*) et le cancer du châtaignier (*Endothia parasitica*) causent de grands dégâts, par suite de quoi l'intérêt porté à ce sous-produit a diminué en partie.

La production des châtaignes commence début septembre, et se termine mi-octobre. Le ramassage des châtaignes est une opération à la fois coûteuse et difficile. En Turquie, le nombre de châtaigniers est de l'ordre de 2 500 000. Le rendement moyen par arbre varie de 15 à 30 kg. Il s'agit donc de 50.000 tonnes de produit. Les capacités de transport atteignent au maximum 350 kilos grâce au système téléphérique que l'on considère comme pratique et économique dans la région accidentée de la Mer Noire.

Si les fruits des châtaigniers sont en grande quantité, on peut les conserver dans des dépôts frigorifiques. Pour la production de châtaignes, on doit procurer aux paysans toutes facilités de technique et de bureaucratie.

**Mots clés:** Châtaigne, production, transport, mise en magasin.

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## **1. Introduction**

Les étendues forestières sur la surface terrestre diminuent chaque jour en se retirant vers les montagnes. De cet état de choses qui se voit aussi à des niveaux élevés dans notre pays qu'est la Turquie se trouvent mal la matière première du bois que l'on considère comme produit essentiel de nos forêts et beaucoup de sous-produits sylvestres.

Dans notre pays, on n'attache pas suffisamment d'importance aux sous-produits sylvestres. De leur inventaire à leur protection et à leur développement, plusieurs sujets sont incomplets et maintenus par des hasards. L'aspect économique de ce sujet est très inférieur au niveau voulu. L'importation de la matière première et du produit fini est facile et sans peine, ce qui a été efficace de ce point de vue.

La châtaigne qui est un de nos nombreux sous-produits sylvestres est le fruit d'une espèce d'arbre qui pousse sur le littoral de notre pays et que l'on cultive de longue date. Mais, ces dernières années, l'encre, ou mycose du châtaignier (*Phytophthora cambivora*) et le cancer du châtaignier (*Endothia parasitica*) causent de grands dégâts, par suite de quoi l'intérêt porté à ce sous-produit a diminué en partie.

## **2. La Chataigne Et Situation En Turquie**

La châtaigne qui est un des sous-produits des forêts de Turquie est un fruit de la "*Castanea sativa* Mill." de la famille *Fagaceae*. C'est un arbre de 20 à 25 m de hauteur, de 1 m 50 à 2 m 50 de diamètre, dont le tronc est épais, qui vit longtemps et dont les feuilles tombent en hiver. La cupule est hérissée de piquants touffus et durs. Elle contient en général 3 fruits. Les fruits mûrissent en octobre et en novembre.

L'arbre donne de puissantes racines pivotantes. Il pousse en abondance par des drageons à partir de racines vivantes et par des rejets sur de vieilles souches. Les châtaigneraies s'étendent en général sur l'Europe du Sud, sur l'Afrique du Nord, sur la Turquie et sur la Caucase.

La châtaigne est un fruit riche en hydrates de carbone et qui comporte, pour la plupart, de l'amidon et de la fructose (40 à 50%). Elle contient 5% de lipide, 5% de protide et 40 à 45% d'humidité. Diverses espèces de châtaigniers croissent dans diverses parties du monde. Et c'est l'espèce "*Castanea sativa* Mill." qui pousse en Turquie.

En Turquie, on procède à la production de châtaignes principalement dans les régions de la mer Noire, de la Marmara et de l'Égée. Ces dernières années, il n'y a pas eu d'augmentation importante ni dans le nombre de châtaigniers ni dans la production de châtaignes. On sait que la "*Phytophthora cambivora* (Petri) Buism." et l' "*Endothia parasitica* (Murr.) A." y jouent un rôle important.

La production de châtaignes assure un revenu continu depuis l'automne jusqu'au printemps. Le produit est consommé en majeure partie à l'intérieur du pays, et une petite partie seulement est exportée. Les espèces de châtaignes conformes à la confiserie se vendent généralement à un meilleur prix.

En Turquie, le nombre de châtaigniers est de l'ordre de 2 500 000. Le rendement moyen par arbre varie de 15 à 30 kg. Il s'agit donc de 50.000 tonnes de produit. Dans la production de châtaignes, la Turquie se place parmi les cinq premiers pays. Une grande partie de l'exportation est effectuée vers les pays du Moyen-Orient.

### **3. Production Des Chataignes**

On doit commencer le ramassage des châtaignes quand les cupules hérissées de piquants s'entrouvrent et que les fruits qu'elles comportent commencent à apparaître après avoir pris leur couleur naturelle. Mais tous les fruits ne peuvent pas mûrir à la fois. C'est la raison pour laquelle il faut ramasser tous les deux jours les fruits tombés sans les faire attendre à la lumière du jour. Exposés à la lumière du jour, les fruits perdent de leur éclat et de leur teneur en humidité. La production des châtaignes commence début septembre, et se termine mi-octobre.

Dans plusieurs endroits, on procède au ramassage après avoir battu les châtaigniers avec des baguettes. Cela cause des dégâts tels que brisement de branches et chute de feuilles. Le ramassage des châtaignes est une opération à la fois coûteuse et difficile.

Après les études effectuées dans la contrée d'Artvin, on a constaté que l'on ramasse les châtaignes en secouant l'arbre ou en battant les branches avec des baguettes lors du mûrissage des châtaignes (quand on voit 2 ou 3 châtaignes ouvertes en automne). Les châtaignes sont encore dans leurs cupules hérissées de piquants. Pour faire tomber les châtaignes d'un arbre haut d'environ 15 m, on y monte, on bat les branches avec des baguettes longues de 2 ou 3 m, ou encore, de 3 à 8 m pour ramasser les châtaignes ensuite. Au cours du battage, il ne faut pas nuire aux branches et aux rejets. Au besoin, on peut fixer des crochets à la pointe des baguettes. Mais la fixation d'un sac sous le crochet, qui cause la perte de temps pendant la cueillette des fruits n'est pas préférée.

Les expérimentations montrent que, dans la contrée d'Artvin, les châtaignes sauvages mûrissent plus tôt par rapport aux châtaignes greffées. Les fruits de bonne qualité de châtaigniers sauvages sont plus en vogue. C'est pour cette raison que les mauvais individus des châtaigneraies sauvages doivent être abattus et débardés.

Bien que la demande dans la contrée soit élevée, la production n'est pas suffisante. Dans les châtaigneraies, pour la plupart, greffées, certains producteurs ne produisent que pour leur propre consommation, certains autres produisent pour la mise en vente. Un arbre donne en moyenne 200 kilos de produits par an. Il a été signalé qu'on a atteint une capacité de 15 tonnes par an. Les châtaignes produites sont vendues sur une large mesure dans la localité d'Artvin. Le reste est commercialisé sous forme de ventes de détail ou de gros à Erzurum, à Kars, à Ankara et à Bursa.

#### 4. Transport Et Mise En Magasin Des Châtaignes

Étant donné que les châtaignes sont dans leurs cupules hérissées de piquants, il est facile de les transporter à dos ou au moyen de brouette, de malle etc. sur des surfaces planes. Sur les terrains montagneux, le transport est réalisé par de simples câbles téléphériques électriques. Parfois, on se sert de bêtes de somme sur les terrains de ce type.

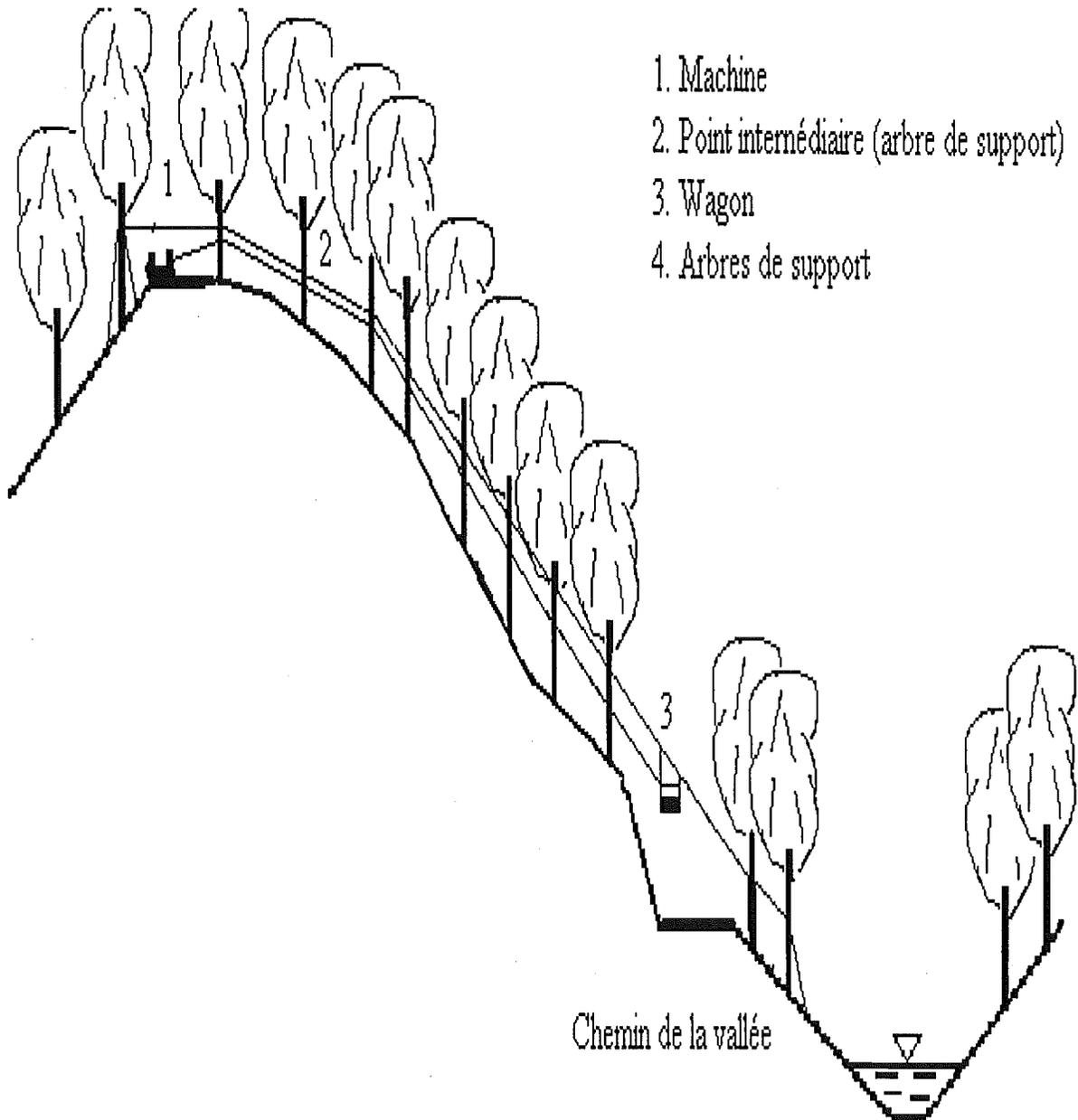


Fig.1. Système électrique destiné au transport des châtaignes sur un terrain montagneux

Le système téléphérique, qui est commun dans la région, est considéré comme un moyen de transport économique. La facilité de montage et de démontage ainsi que la simplicité de fonctionnement comptent parmi les autres avantages du système. Une bonne organisation du travail s'est révélée nécessaire pour pouvoir raccourcir les tranches de cours de travail et augmenter le rendement.

Dans le système téléphérique que l'on considère comme pratique et économique dans la contrée, les capacités de transport atteignent au maximum 350 kilos en fonction du diamètre du câble porteur ainsi que de la longueur de la ligne téléphérique.

Au cours de la mise en magasin des châtaignes, leur teneur normale en humidité de 40 à 50 % doit être prise en considération. De ce fait, elles se différencient des autres fruits à écorce dure. Pour une bonne conservation, le taux d'humidité doit être maintenu à un niveau donné, les fruits doivent être protégés contre les champignons parasites et il ne faut pas permettre la baisse de la qualité. C'est pourquoi il faut rechercher et utiliser les moyens de conservation dans des dépôts frigorifiques.

Actuellement dans plusieurs contrées de notre pays, les cupules contenant les châtaignes sont réunies en plusieurs amas sous les arbres, et elles sont conservées après avoir été recouvertes d'herbes telles que fougères. De la sorte, les producteurs peuvent conserver les fruits du châtaignier dans leurs cupules, et ce avec moins de perte de qualité, jusqu'aux mois d'hiver.

Au bout d'une attente de deux jours dans un endroit ombragé, les fruits ramassés sont placés dans des récipients de fer-blanc ou dans des sacs en plastique par emballage de 15 kilos, et ils sont soumis à une température de 0 °C à 2 °C. L'aération faite de temps à autre empêchera l'accumulation d'humidité libre sur les fruits. Dans le milieu de conservation, le taux d'humidité doit être de 85 à 90%, mais il faut empêcher la venue de l'humidité libre sur les fruits.

Voici comment on met en magasin les châtaignes dans la contrée. Par des pincettes on ramasse les fruits tombés à terre, puis on les amasse dans des puits creusés dans un frais. Ces puits se trouvent généralement dans le sol, ils sont profonds de 20 à 30 cm et de dimensions de 2 m x 2 m et ils peuvent contenir environ 500 kilos de châtaignes. Les fruits mis dans le puits doivent être recouverts de buissons et de feuillage. Il faut les arroser par aspersion d'eau pour que les piquants puissent s'écarter facilement. Au bout d'une attente de 20 à 25 jours, on sort les fruits hors du puits. Les châtaignes qui se séparent de leurs piquants sont laissées à sécher pendant 3 à 5 jours. Les puits creusés pour la mise en magasin doivent être à l'abri, et entourés de haie. Étant de petite quantité, le produit peut être conservé dans des fûts.

Si les fruits des châtaigniers sont de grande quantité, on peut les conserver dans des dépôts frigorifiques. Il est également possible de les faire attendre sans eau dans un réservoir en béton ou dans un puits après les avoir mélangés avec du sable sec ou avec de la terre tamisée.

Dans la contrée d'Artvin, au cours de l'attente de la période de mûrissage des châtaignes, les fruits sont mangés par les fettes-chèvres (*caprimulgus*) existant dans la contrée. Les fruits tombés à terre sont pris par des bêtes telles que souris, écureuils. Mais si les fruits tombés à terre sont dans leurs cupules hérissées de piquants, ils ne sont mangés que par les ours. Les fruits qui n'ont pas de piquants et qui tombent des arbres sont mangés la nuit par d'autres animaux.

Le rendement accuse une baisse à cause des maladies qui frappent les châtaigniers dans certains villages. La cime de l'arbre commence à sécher pendant la première année et la dessiccation envahit tout l'arbre qui meurt au bout de la deuxième année.

## **5. Conclusion Et Propositions**

La production des châtaignes, sous-produits sylvestres dans notre pays, n'est pas au niveau voulu à plusieurs égards. On a besoin de travaux scientifiques d'orientation en ce qui concerne la production et l'amélioration des châtaignes, les techniques de transport et de conservation, l'aménagement des châtaigneraies, et de la commercialisation. Après quoi, on verra augmenter le rendement des châtaigniers.

Bien que la Turquie se place dans les premiers rangs sur le plan de la production de châtaignes dans le monde, l'importance qu'elle y accorde reste insuffisante. Surtout, on doit augmenter les possibilités de lutte contre les maladies qui exercent des effets négatifs actuels sur le châtaignier.

Pour la production de châtaignes, on doit procurer aux paysans toutes facilités de technique et de bureaucratie. Il faut les aider en matière de commercialisation. Enfin il faut qu'ils soient appuyés par ORKÖY, organisation nationale pour l'aide aux cultivateurs.

## 6. Bibliographie

Anonim, Kütahya orman Bölge Müdürlüğü Kestane İnceleme raporu, 20 s., (1998), Ankara.

Anşın, R. Yöremizin Doğal Bitkilerinden Kestane (*Castanea sativa* Mill) ve Karaağaç (*Ulmus L.*)'larda çok tehlikeli iki bitkisel hastalık, K.Ü. Dergisi 4, 61-70, (1970), Trabzon.

Anşın, R; Okatan, A; Özkan, Z.C. Doğu Karadeniz Bölgesinin Önemli Yan Ürün Veren Odunsu ve Otsu Bitkileri. Tübitak, TOAG-903, (1194), Trabzon.

Bozkurt, Y; Yaltirik, F; Özdönmez, M. Türkiye'de Orman Yan Ürünleri, İ.Ü. Yayın No: 2845/302, (1982), İstanbul.

Grente, M.J. " Les formes hypovirulantes d'*Endothia parasitica* et les espoirs de la Lutte contre le chancre du châtaignier" Académie d'Agriculture de France(1965), 51: 1033-1037.

Soylu, A. 'Kestane Yetiştiriciliğinde ve Özellikleri, Atatürk Bahçe Kültürleri Araştırma Enstitüsü Yayınları, 1984, Yalova.

T.C. Orman Bakanlığı, Orman Genel müdürlüğü. Orman Tali Ürünlerinin Üretim ve Satış Esasları. 283, IV-1434, (1995), Ankara.

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## ЗАГОТОВКА, ТРАНСПОРТИРОВКА И СКЛАДИРОВАНИЕ КАШТАНОВ В ТУРЦИИ

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### РЕЗЮМЕ

Лесной покров во всем мире продолжает сокращаться, что отрицательно сказывается на заготовках недревесных лесных товаров. Хотя Турция занимает одно из первых мест в мире по заготовкам каштанов, этому сектору по-прежнему уделяется недостаточное внимание.

Каштан, будучи одним из наших многочисленных недревесных лесных товаров, является плодом дерева, которое произрастает на морском побережье нашей страны и которое выращивается с давних времен. Однако в последние годы микоз каштанового дерева (*Phytophthora cambivora*) и рак каштанового дерева (*Endothia parasitica*) наносят огромный ущерб, в результате чего заинтересованность в этом лесном субпродукте частично снизилась.

Заготовка каштанов начинается в начале сентября и заканчивается в середине октября. Она представляет собой дорогую и одновременно трудоемкую операцию. В Турции число каштановых деревьев составляет порядка 2 500 000. Средний выход на одно дерево колеблется от 15 до 30 кг. Таким образом, общие заготовки составляют 50 000 тонн. Грузоподъемность средств транспортировки не превышает 350 кг. Для транспортировки используется система подвесных канатных дорог, которая считается практичной и экономичной в гористом районе Черного моря.

Когда каштаны заготавливаются в большом количестве, их можно сохранять в холодильниках. Что касается заготовок каштанов, то крестьянам следует предоставить все необходимые технические и организационные возможности.

**Ключевые слова:** Каштан, заготовка, транспортировка, складирование.

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# **THE EFFECT OF HARVESTING, TRANSPORTATION AND STOCKPILING ACTIVITIES IN THE RESIN TAPPING ON THE RESIN PRODUCTIVITY AND QUALITY**

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## **Abstract**

In order to access quality and productivity of the gum resin which is an important non-wood forest products , application of the property tapping, transportation and stockpiling techniques should be applied in Turkey.

In Turkey, gum resin has been tapped from only calabrian pine forests (*Pinus brutia* Ten.) by the forest peasants. According to Forestry General Administration, It is estimated that the capacity of the gum resin tapping in Turkey about 20000 - 25000 ton / Per year. At the same time, on occasion of using of the gum resin in the paper, paint and the other industries, it is a very important industrial product, as well.

The production processes in forest, stockpiling and transportation of gum resin are vital theme. It is said that the transportation and stockpiling failures of the gum resin are important deteriorating factors on the gum resin quality. Furthermore, the failure transportation methods cause the missing in the gum resin production processes. Albeit, that opening the mouth of barrels arranged on the edge of forest roads and awaiting the filled pot corrupts pureness rate of the resin.

About 1- 4 kg/year is tapped from a pine tree. In the process of resin manufacturing from tree to the manipulation, the resin productivity is reported to decrease about 18.3 %. Generally, this problem is attributed to the evaporation of turpentine and leaking of resin from the pots. But, this can be solved by putting more emphasis on the working conditions of the employees and their education.

**Key Words:** Resin tapping, resin quality, resin productivity, resin transportation and stockpiling.

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## **Introduction**

In forestry, the harvesting, transporting and stockpiling of wood are known main production activities, the same activities for gum resin are important subjects, as well. Especially in Turkey, being one of the precious non-wood forest products, gum resin has increased its importance day by day. It is desirable to increase the gum resin yield and quality. Suitable tapping techniques should be used and transportation of the gum resin to the manufacturing processes with proper means should be applied.

On the other hand; today, U.S.A. is a leading country for resin yield, tapping about 500 000t/year, Greece is tapping about 20 000 t / year and Turkey about 5 000 t / year. However, it is estimated that the potential gum resin yield of Turkey can be increased to about 25 000 t / year. Germany and Japan have been known as the top countries for substantial imports of gum resin. Whereas, resin yield per tree is about 3 kg/year in the world, this ratio is 1 kg/year in Turkey (Tek and Özkan, 1998).

## Gum Resin Tapping and the Situation of Turkey

The beginning time of gum resin tapping changes with district and altitude. Tapping should be done before vegetation season. If the tapping is applied on a tree for the first time, the tapping application must be applied on the south part of the tree. In general, tapping activities begin at the 18°C temperature (Anşin, Eminağaoğlu, 2000).

As for the gum resin tapping area, it should be selected from the district in high temperature and moisture. The resin tapping should be done on the quality trees with experienced employees and by suitable tools. On the other hand, the tapping area must not be oversloped, overaltitude and windy. Generally, the diameter of tree is preferred to be about 26 cm and over for tapping application. Weed shouldn't be in the production area or weed control should be applied there. In order to perform a desirable production, education and control mechanism should be applied (Anşin, Eminağaoğlu, 2000).

The maximum resin yield from calabrian pine trees has been obtained with American bark chipping method with 50 % sulfuric acid solution. However, because of the use of the body of tree for long time, easy workmanship, time conservation and the resin quality, American bark chipping method with 60 % sulfuric acid paste is a more advantageous technique (Önal, 1995).

Resin production; from injured trees by some tools is realized either by the wood chips with resin treatment with water evaporation or some solvent and distillation or using sulfide terebentine and tall oil. In the mean time, about 1-4 kg gum resin is tapped from an average pine tree (Acar, 1998).

There are two important resin tapping techniques.

- Open blaze method;
- Closed blaze method.

Instead of the mazek method, if acid-paste method is applied, the resin yield can increase and the deformation of technological features of trees can decrease. Besides, the education of laborers can provide substantial advantages for yield and quality in the resin production.

Resin production is made from calabrian pine (*Pinus brutia* Ten.) stand in Turkey and there is 3 million ha calabrian pine forest in total. Today, the forest area resin tapping is 100.000 ha in Turkey. According to this case, if a well work planning is organized an average laborer can tap resin from about 4.000 trees in one season. In order to retain seed trees in the calabrian forest, 6-8 trees/ha shouldn't be tapped. (Anşin, Eminağaoğlu, 2000).

The Calabrian forests occupy about 15% (3 million ha) of the total forest areas in Turkey. The most important part of the total Calabrian forest area is found in Mediterranean and Aegean districts (Huş and Kantarcı, 1998). In general resin is consumed in the pulp, paper, paint, food, flower, medical and perfume industries. Also, it is used as an adhesive substance and rubber. Instead of fully closed forest and thin trees, it is determined that less canopy closure ratio of the forest, diameter level of c-d and young forests are suitable for gum resin production (Acar, Gül ve Örtel, 1996).

In Turkey gum resin production methods are mazek-fiella method and bark chipping with acid solution method. In practice, the most suitable resin production method should be applied according to the productivity, tree species and cost.

After that, the education of employees related to the determined method is necessary and application of controlling or monitoring activities are important. Firstly, by application of the applied education, maximum resin yield, minimum destruction in the physical and mechanical features of tree, better quality gum resin and constructions of the better work safety can be performed.

As it is stated, in the resin manufacturing process from the tree to the manufacture, the resin productivity has decreased about 18.3%. About 14% of this is caused by the evaporation of the terebentin and 4.3% by leaking of the gum resin from the pots. But, this can be solved by putting more emphasis on the working conditions of the employees and their education(Gürsu). Beside of the resin production techniques, the selection of production tools and pots are also important.

## **Transportation, Employing and Stockpiling in Resin Production**

In Turkey, it has been observed that the transportation and stockpiling failures of the *Pinus brutia* Ten. gum resin change the physico-chemical properties of the resin (Hafızoğlu, 1998). On the other hand, failures in transportation methods can cause the loss of the resin yield. Besides, keeping the resin barrels uncovered and filled pots waiting can cause deterioration in the pureness of the resin. (Deniz, 1989).

Following the TS 1048 standards including the rules and methods of the gum resin stockpiling and transportation will decrease the losses mentioned above. That the increasing of the resin stockpiling time can cause little terebentine rate but high acid number. Besides, unsuitable stockpiling factors with hot climate and some reactions can cause Oxidation and low acid number. As a result of unsuitable stockpiling, evaporation of the terebentine cause important amount of losses. At the same time, weathering the gum resin results oxidized resin acid which decreased resin quality. Thus, firstly to prevent the evaporation of the terebentine, necessary measurement should be taken. Besides, stockpiling of the resin should be done in the galvanized sheet iron barrels not in the pool.

In order to tap maximum gum resin, the trees should not be damaged. The crop should be suitable to the specifications of the method. At the same time brazes of the crop should not be set up deeper than they are supposed to be. And, fixing the aprons and income resin pots should make the least damages on the tree. On the other hand, the resin tapping method should be economic and simple. The resin pots should be clear and cold, as well.

In the application of acid paste method, lack of work force is among important difficulties in Turkey. Besides, deterioration and changing of the physico-chemical properties of trees can be decreased by using qualified employees (Göker, 1998).

Employing qualified laborers outside of the gum resin production season protect the turnover of laborers. At the same time anthropometric suitability of tools used in the resin production processes and psychological suitability of the working methods and body activities in the processes are important for the quality of work life. Moreover, if the area tapped gum resin is considered in the planning of the forest road network, it will promote advantages for stockpiling and transportation activities.

## **Results**

As resin is one important non-wood forest product in Turkey and world, the process from production to marketing including employing, transportation, stockpiling and the others should be focused again. It is known that non-wood forest products are of significant importance for sustainable forest management. Turkey has got a high potential of non-wood forest products and thus; both non-governmental organizations and governmental organizations, by considering some application models and samples in the development countries, should focus on these matters mentioned above from different angles and beside traditional approaches.

It is known that generally, in the production of non-wood forest products, traditional and primitive methods have been used and there is unclarity in the non-wood forest products market in Turkey. On the other hand, in order to apply new and modern techniques, employees and the other persons relating the processes should be educated. And, instantly, the potential of non-wood forest products of Turkey by application of the participation management, should be prompted.

As a result; In the resin production without deteriorating the ecosystem, the most suitable tapping, transportation and stockpiling activities should be used. Especially, education of the employees, carefully selection of the tools used for the production of the resin, some substructure services as a construction and maintenance of the forest road network will effect productivity and quality.

## References

- TEK,Ö.B.,ÖZKAN,P.,1998:Çam Reçinesi ve Yan ürünlerinin Pazarlaması İçin Bir Yaklaşım, 3. Çam Reçinesi Sempozyumu Tebliğleri, Tebliğ 11, 21-30s., 20-21 Kasım 1998, İzmir.
- ANŞİN, R., EMİNAĞAOĞLU, Ö.,Orman Yan Ürünleri, K. Ü Orman Fakültesi Yayınları, 90s.,Artvin,2000.
- ÖNAL, S.,1995, Bazı uyarıcı maddelerle Kızıl çam ve Karaçamalarda reçine üretimi, OAE Yayın No:249, 52s., Ankara.
- ACAR, H. H.,1998:Ormancılık İş Bilgisi Ders Notları, KTÜ Orman Fakültesi Yayın No:55, 160s., Trabzon.
- HUŞ, A. S.,19..: Ormanlarımız ve Reçine, İ.Ü.Orman Fakültesi, 31s., İstanbul.
- KANTARCI, D.,1998:Yaşlı Kızıl çam Ormanlarında Reçine Üretiminin Orman Eko sisteminin Yapısı ve Özellikleri Bakımından İrdelenmesi, 3. Çam Reçinesi Sempozyumu Tebliğleri,Tebliğ 15,39-42s.,20-21 Kasım 1998, İzmir.
- ACAR,M. İ.,GÜL,S., ÖRTEL, E.,1996:Türkiye'de Kızıl çam Ormanlarından Akma Reçine Üretiminde Asit-Pasta Tahrik Tekniğinin Uygulanması Esasları Üzerine Araştırmalar, Teknik Bülten No:5, T.C.Orman Bakanlığı Yayın No: 025, ISSN 1300-9508, Ege Ormancılık Araştırma Enstitüsü Müdürlüğü, İzmir.
- GÜRSU, İ.,.....: Kızıl çamlarımızda Rasyonel Reçine İstihsal Metodu Üzerine Araştırmalar, Ormancılık Araştırma Enstitüsü, Teknik Bülten Serisi, No:16, 52s., Ankara.
- DENİZ, İ.,1989:. Kızıl çam (Pinus brutia Ten.) Reçinesinin Kimyasal Özellikleri, TÜBİTAK Doğa Dergisi, Cilt:13, Sayı: 3a, 515-522s., Ankara.
- HAFIZOILU, H.,1998:Behaviour of Resin Acids During Storage and Technical Processes, 3. Çam Reçinesi Sempozyumu Tebliğleri, Tebliğ 16, s43., 20-21 Kasım 1998, İzmir.
- GÖKER, Y.,1998:Dikili Çam Ağaçlarında Reçine Üretiminin Odunun Teknolojik Özelliklerine Etkisi, 3. Çam Reçinesi Sempozyumu Tebliğleri, Tebliğ 13, 32-35s., 20-21 Kasım 1998, İzmir.

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# INCIDENCES DES MÉTHODES DE RÉCOLTE, DE TRANSPORT ET D'ENTREPOSAGE UTILISÉES DANS LE GEMMAGE SUR LA PRODUCTIVITÉ ET LA QUALITÉ DE LA RÉSINE

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## RÉSUMÉ

Pour assurer un niveau élevé de qualité et un bon rendement dans la production de la résine, produit forestier autre que le bois important, il faut appliquer des méthodes appropriées de gemmage, de transport et d'entreposage.

En Turquie, la résine n'est recueillie que dans les forêts de pin de Calabre (*Pinus brutia* Ten.) par des paysans. D'après l'Administration générale de la foresterie, la capacité de production est estimée à environ 20 000 à 25 000 tonnes de résine par an. La résine, qui peut être utilisée par l'industrie du papier, des peintures et d'autres, est un produit industriel très important.

Les méthodes utilisées pour récolter la résine en forêt, l'entreposer et la transporter sont déterminantes. On peut dire que de mauvaises conditions de transport et d'entreposage sont des facteurs importants de la dégradation de la qualité de la résine. De plus, de mauvaises méthodes de transport entraînent des pertes dans les volumes de résine. Les barils laissés ouverts au bord des routes forestières en attendant que la résine soit versée dans les conteneurs puis enlevée altèrent la pureté du produit.

Un pin donne environ de 1 à 4 kg de résine par an. Depuis le gemmage jusqu'à l'utilisation en usine de la résine, le volume baisse d'environ 18,3 %. Le phénomène est généralement dû à l'évaporation de la térébenthine et aux coulures de résine des pots. Toutefois, le soin apporté par les employés à la manipulation et leur formation peuvent atténuer les pertes.

**Mots clefs :** Gemmage, qualité de la résine, productivité, transport et entreposage.

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## ВЛИЯНИЕ ЗАГОТОВКИ, ТРАНСПОРТИРОВКИ И ХРАНЕНИЯ ПРОДУКТОВ ОСМОЛОПОДСОЧКИ НА ВЫХОД И КАЧЕСТВО СМОЛЫ

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### РЕЗЮМЕ

Чтобы повысить качество и выход смолистой камеди, которая является важным недревесным лесным товаром, в Турции следует применять правильные методы осмолподсочки, транспортировки и хранения.

В Турции смолистая камедь собирается крестьянами только в лесах калабрийской сосны (*Pinus brutia* Ten.). По данным Генерального управления лесного хозяйства, ежегодное производство смолистой камеди в Турции составляет примерно 20 000-25 000 тонн. В то же время ввиду использования смолистой камеди в целлюлозно-бумажной, лакокрасочной и прочих отраслях промышленности она является также очень важным промышленным продуктом.

Производственные процессы в лесах, хранение и транспортировка смолистой камеди – это вопросы, имеющие громадное значение. Как считается, неправильные транспортировка и хранение смолистой камеди являются важными факторами, ухудшающими качество этого продукта. Кроме того, неправильные методы транспортировки ведут к потерям смолистой камеди при ее производстве. Вместе с тем открытие бочек, выставленных на краю лесных дорог и несвоевременная транспортировка заполненных емкостей снижают чистоту смолы.

В течение одного года от одной сосны получали примерно 1-4 кг смолы. В ходе всего процесса получения смолы - от дерева до ее приготовления – потери продукции составляли примерно 18,3%. В целом это, видимо, объясняется испарением терпентина и утечкой смолы из емкостей. Однако эту проблему можно решить путем повышения внимательности работников и улучшения их подготовки.

**Ключевые слова:** Осмолподсочка, качество смолы, выход смолы, транспортировка и хранение смолы.

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# **GALL PRODUCTION STRATEGY THAT IS INTERFERING WITH LIFE CYCLES OF TWO IMPORTANT GALL-MAKER SPECIES, *Andricus gallaetinctoriae* (Oliv) and *A.kollari* Htg. (Hymenoptera: Cynipidae) IN TURKEY**

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Turkey

## **Summary**

Gall wasps belong to the family Cynipidae that is placed, with other families, in the super family Cynipoidea. Cynipoidea are parasitic Hymenoptera and all species except those in the subfamily Cynipinae behave as typical parasitoids or hyperparasitoids of other insects. The Cynipinae are the gall wasps and they alone induce gall formation and as larvae are phytophagous. In the Cynipinae, there are some gall wasps whose larvae have lost the ability to induce gall formation and these larvae live obligatorily as inquilines in the galls of gall-forming Cynipinae.

Over 90 percent of gall-inducing animals occur on dicotyledonous plants and most of these infest only three families, Rosaceae, Compositae, and Fagaceae. The fidelity of cynipids to oaks demonstrates the degree of monophagy among gall inducers. In North America and Europe, for instance, 87 and 76 percent of all cynipids attack species of *Quercus* and the host range of each wasp species is generally restricted to one or a few related oak species. Oak cynipids are notable for structural diversity of galls they induce. They also display a range of galling sites on the plant, host plant associations and life cycle. Many of them have two generations each year. The galls of the two generations are often radically different in structure.

The diversity of cynipid galls is the result of venation in gall tissues which develop outside the larval chamber, including surrounding layers of wood or spongy tissue, complex air spaces within the gall, and surface coats of sticky resins, hairs or spines.

The structure of galls peripheral to the nutritive zone is varied. One of the most specialized galls is that of *Andricus kollari* (Hartig) in which eight concentric zones of different tissues have been described. Several galls, like in those *Andricus gallaetinctoriae* (Oliv.) have high tannin content which render them bitter-tasting. Because of their high tannin contents, galls of *A.gallaetinctoriae* and *A.kollari* have been utilized for thousands of years.

Agamic generation of *A.gallaetinctoriae* can be found most common on *Quercus infectoria* Oliv., however, they are also found on *Quercus ithaburensis* Decne. Ssp. *macrolepis* (Kotschy.) Hedge and Yalt., *Q.cerris* L., *Q.conferta* Kitt., *Q.ilex* L., *Q.rubur* L., *Q.petraea* (Mattuschka) Lieb. and *Q.pubescens* Willd. *Q.infectoria* is almost found in all woodlands of Turkey, however, it grows most commonly in the South Eastern Anatolia. In its large range, the two sub species, *Q.infectoria* ssp. *biossieri* (Reut) Gtirke is found West, Middle, East, and South Eastern parts of Anatolia and *Q.Infectoria* ssp. *infectoria* A. Camus is found in the North west and Marmara regions.

Adults of agamic generation are 5-8 mm in length, and mainly dull brown with yellowish white, fine, short, and thick hairs. The antenna coated with sparse hairs includes fourteen segments. Thorax is covered with dense light brown pubescence. Prothorax becomes narrow towards the front. There are two longitudinal stripes on mesothorax. Anteriorly the scutellum is provided with two pits, the form of which may be of taxonomic value.

*A.gallaetinctoriae* have a high reproductive potential (like many other gall wasps) and females may contain about 700 to 800 eggs. Eggs consist of a rather short body and a long pedicel which is 10 to 14 times as long the egg body. Egg laying is lasted until early June. After oviposition, the egg is more or less embedded in bud tissue. Larval stage is lasted about two months, from early June to late August or to the beginning of September. Gall formation period lasts about from mid June to beginning of July, so

immature galls are found from mid-July to early September. Pupation generally begins in mid-August when the color of gall changes from light green to white, and lasts about 15 to 25 days.

Mature agamic galls of *A.gallaetinctoriae* are almost spherical, 13-24 mm in diameter, clothed with sharp, stiff spines about 1-4 mm in length, and 1.23 to 6 gram in weight. Maturing galls are bright in color, single-chambered and non-coalesced clusters. Walls of mature galls are 5-6 mm in thickness and can not be crushed without a stroke of a hammer. Perhaps, there is an interaction between the color of gall and the development of the gall wasps in it. The galls which are indigo-blue in color generally includes young larvae. The mature larvae can be found in the green or light green galls. White galls include pupae or adults gnawing an exit hole. In the following days, especially after a rain, color becomes reddish. Emergence of adults was not observed in the galls collected before late July. Adult exiting from galls collected in different years and places showed that the adult emerging period begins in early September and lasts until late October.

Adult emergency from the galls collected in late August and early September and stored in the room conditions occurred between 8 to 21 October. Early harvest of galls results in not only the loss of crop but also the reduction in the population of the gall wasps. In gall harvesting, the galls collected should be kept in the vicinity of the production area until wasps exit the galls.

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## Abstract

Gall formation is arguably the most intimate relationship between herbivorous insects and their host plants, and galls induced by cynipid gall wasps might well be the most sophisticated structures of induced plant growth. Each species of cynipid gall wasps induce the growth of unique galls which are both structurally distinct and anatomically novel structures to their host plant. Most species of cynipids are in tribe Cynipini, all of which gall oaks and allied Fageaceae. In Europe approximately 76 percent of all cynipids attack species of *Quercus* and the host range of each wasp species is generally restricted to one or a few related oak species. European oaks are members of two different oak species groups within the genus *Quercus*, the 'white' oaks of the section *Quercus*, and the 'black' oaks of the section *Cerris*. In the cynipid gall wasps, a sexual spring generation develops on oaks in the section *Cerris*, particularly the Turkey oak, *Quercus cerris*, while a parthenogenetic summer generation develops on oaks in section *Quercus*, such as *Q.petraea*, *Q.pubescens*, and *Q.robur*. The two oak groups occur together naturally in southern Europe, the Mediterranean coast of north Africa, and Asia Minor, and these regions represent the natural, native distribution of gall wasps exhibiting the alternating life cycle. The majority of host altering Andricuc species are found in the eastern part of this region, where the Turkey oak, *Q.cerris*, is the host of sexual generation galls. In Turkey, where the Turkey oak, *Q.cerris* has a large natural range, approximately 20 species of cynipid wasps induce galls on the oaks of Turkey. The vast majority of oak galls are of no particular economic significance. Because of their high tannin contents, galls of *A.gallaetinctoriae* and *A.kollari* have been utilized for thousands of years in Asia Minor. Agamic generation galls of *A.gallaetinctoriae* can be found most common on *Quercus infectoria* Oliv., however, they are also found on *Q.petraea* (Mattuschka) Lieb. and *Q.pubescens* Willd. *Q.infectoria* is almost found all oak woodlands of Turkey, however, it grows most commonly in the Southern East Anatolia. *A.kollari* is found around the Sea of Marmara, along the Aegean coast, and some inner parts of Turkey. In gall developing areas, negative effects of human being and animal grazing have a great role on gall production. Early harvest of galls results in not only the loss of crop but also the reduction in the population of the gall wasps. This may also result in the increase in the population of other harmful species on the same host plants. In the last 10 years, the income portion of the gall exportation in Turkey's non-wood forest products has been 0.74% on average. This number indicates that, while it has the potential of providing the people living in rural areas and having low life standards with an important source of income, gall production in Turkey is still far from what is expected because of inefficient gall harvesting strategies.

## Introduction

Gall wasps belong to the family Cynipidae which is placed, with other families, in the superfamily Cynipoidea. All species of this superfamily, except those in the subfamily Cynipinae behave as typical parasitoids or hyperparasitoids of other insects (Askew, 1984). The Cynipinae are the gall wasps and they alone induce gall formation and as larvae are phytophagous (Quinlan, 1979; Evenhuis, 1980). In the Cynipinae there are some gall wasps whose larvae have lost the ability to induce gall formation and these larvae live obligatorily as 'inquilines' in the galls of gall-forming Cynipinae (Krombein et al., 1979). All cynipid inquilines are phytophagous and feed on specialized nutritive cells that they themselves induce from tissues of the host gall. (Shorthouse, 1980; Washburn and Cornell, 1981).

Herbivory by gall-makers has the potential to result in number of negative impacts on host plants. The negative impacts of gall-makers infesting certain agricultural crops are well documented. But, the frequency and degree to which gall-makers injure their hosts in natural situation is still open to question (Abrahamson and McCrea, 1986; Price, 1987). Some workers have suggested that gall-maker impact is negligible (Wangberg, 1978; Gander, 1979), however, quantitative analyses have repeatedly shown that galls are metabolic sinks for carbon (Fourcroy and Braun, 1967; Jankiewicz et al., 1970; Hartnett and Abrahamson, 1979), and some mineral elements (Palci and Hassler, 1967).

Over 90 percent of gall-inducing animals occur on dicotyledonous plants and most of these infest only three families, Fagaceae, Rosaceae, and Compositae (Mani 1964). Cynipid gall inducers are divided into three (Kinsey, 1920; Askew, 1984) or five (Ronquist, 1994) tribes, based on morphological similarities and partly on host plant. Most species of cynipids are in tribe Cynipini, all of which gall oaks and allied Fagaceae. The fidelity of cynipids to oaks demonstrates the degree of monophagy among gall inducers. In North America and Europe, for instance, 87 and 76 percent of all cynipids attack species of *Quercus* and the host range of each wasp species is generally restricted to one or a few related oak species (Krombein et al., 1979; Abrahamson and Weis 1987). Oak cynipids are notable for structural diversity of galls they induce (Askew 1984; Dreger-Jauffret and Shorthouse, 1992; Shorthouse and Rohfritsch 1992; Williams, 1994). They also display a range of galling sites on the plant, host plant associations and life cycle (Askew, 1961, 1984; Ambrus 1974; Cook et al. 1998). Oak cynipid gall structures are characteristic of the gall-inducer, rather than of the host plant (Ambrus, 1974; Rohfritsch, 1992), and result from cynipid traits expressed at two stages in the wasp's life cycle.

European oaks are members of two different oak species groups within the genus *Quercus*, the 'white' oaks of the section *Quercus*, and the 'black' oaks of the section *Cerris* (Nixon and Crepet, 1985). These two oak sections are, to some extent, associated with different cynipid genera (Ambrus 1974; Csóka, 1997). An interesting feature of the genus *Andricus* is that the vast majority of galls found on section *Cerris* oaks belong to sexual generations, including 9 of the 10 sexual generation-only species, and 6 of the 20 species known to have a two generation life-cycle. The remainder of two-generation species have both generations on section *Quercus* oaks, and all of the asexual generation-only *Andricus* species attack oaks in this group (Cook et al., 1988). Hebert (1987) pointed out that all major groups of cyclic parthenogenes include obligately asexual members and *Andricus* is no exception with 35 asexual species in Europe.

Many species of oak cynipid gall wasps have two generations each year, one sexual and the other parthenogenetic. The most complex reproductive cycle is seen in most of the gall wasps that attack oak. Here, there is an alternation of generations, a sexual generation of males and females alternating with a so-called 'agamic' generation comprising only females. In *Andricus* and *Neuroterus* genera, it is usual to find not only that agamic generation of females is composed of strict androphores and gynephores, but also that one sexual generation female will produce in her progeny either agamic androphores or gynephores but not usually both (Folliot, 1964). Thus there is here even earlier determination of sex of the sexual generation; at the agamic generation one-and-a-half life cycles previously (Askew, 1984).

The galls of the two generations are often radically different in structure, and produce adults of very different size; where both generations are present in the life-cycle, sexual generation galls and adults are usually smaller than their asexual counterparts (Ambrus, 1974; Askew, 1984; Pujade, 1994, 1997). In *Andricus*, sexual generation galls usually develop more rapidly than associated asexual generations, and

are often tiny, inconspicuous structures (Cook et al., 1998). The two galls are often induced on different plant organs. The majority of known sexual generation *Andricus* galls are induced on buds or catkins, with fewer species galling stems (Ambrus, 1974; Pujade, 1994). Leaves are very rarely galled by *Andricus* species (Askew, 1984).

In the cynipid gall wasps, a sexual spring generation develops on oaks in the section *Cerris*, particularly the Turkey oak, *Quercus cerris* L., while a parthenogenetic summer generation develops on oaks in the section *Quercus*, such as *Q. petraea* (Mattuschka) Lieb., *Q. pubescens* Willd., and *Q. robur* L.: (Cook et al., 1988). The two oak groups occur together naturally in southern Europe, the Mediterranean coast of north Africa, and Asia Minor, and these regions represent the natural, native distribution of gall wasps exhibiting the alternating life cycle (Csóka et al., 1988). The majority of host altering *Andricus* species are found in the eastern part of this region, where the Turkey oak, *Q. cerris*, is the host of sexual generation galls (Ambrus, 1974; Csóka 1997). The asexual generation may be highly host-specific, or attack a range of host species in this oak section (Ambrus, 1974; Nieves-Aldry, 1987; Csóka, 1997). Within *Andricus*, a phylogenetically dispersed set of species have sexual generations on oaks in the section *Cerris*, either as a part of an alternating life cycle or in sexual-only life cycles (Cook et al., 1998).

Gall formation does not begin until after the gall wasp larva has emerged from its egg, and that gall development ceases upon death of the larvae (Askew, 1984). Larval secretions, as yet uncharacterized (Schönrogge, et al., 1998), are thought to control the type and structure of plant tissue forming the gall (Rohfritsch, 1992). Maternal egg-laying behavior determines how many larval cells develop within a single gall structure, and so whether the gall is unilocular or multilocular. Gall structures, though constructed of plant tissues, thus represent the extended phenotypes of gall wasp genes (Dawkins, 1983; Stern 1995; Crespi et al., 1997).

The shapes and morphologies of cynipid galls vary widely not only between the species of gall-former, but also between generations, where the gall former has more than one generation per year (Dregger-Jauffret and Shorthouse, 1992). Mature cynipid galls can be as small as 2-3 millimeters or as large as 10 cm in diameter. Galls of some species house only a single larva whereas others are inhabited by several hundred. Cynipids induce galls on virtually all plant organs and many of them have impressive surface structures, such as spines of variable shapes or glands, which can secrete sugary or otherwise sticky compounds (Ambrus, 1974). Although the gross morphology of cynipid galls may vary, the inner organization of tissues is similar (Bronner, 1992; Rohfritsch, 1992). Tissues found in all cynipid galls include a layer of cytoplasmically dense nutritive cells which line the larval chamber, followed by a layer of vacuolate parenchyma, a layer of sclerenchyma, a layer of parenchymatous gall cortex and epidermis (Rohfritsch, 1992). Nutritive cells are unique to insect galls and serve the inducers as the sole source of food. Adjoining parenchyma are converted to nutritive cells as the inducer feeds (Bronner, 1976).

Cynipid wasps also control the physiology of gall tissues (Bagatto et al., 1996 ; Harris and Shorthouse, 1996). Not only do gall serve as physiological sinks for nutrients and assimilates, but tannins and phenolic compounds, thought to serve as feeding inhibitors for herbivorous insects, are concentrated in the peripheral parenchyma while inner gall tissue have non (Bronner, 1976).

There have been a number of invasions of new geographical areas by cynipid gall wasps, always associated with introduction to the area of their host plant. *A. kollari*, *A. lignicola* and *A. quercuscalicis* have expanded their ranges into northern and western Europe from natural distributions in southern Europe following human introduction of Turkey oak, *Q. cerris*, *A. lignicola* and *A. quercuscaicis* reached Britain through natural range expansion from Italy and the Balkans, while *A. kollari* was purposely introduced into Britain in large numbers in the first half of the 19th century from the eastern Mediterranean (Claridge, 1962; Williamson, 1996) to utilize its galls as raw material in the manufacture of ink (Askew, 1984).

In Turkey approximately 20 species of cynipid wasps induce galls on the oaks of Turkey. (Acatay, 1943; Schimitschek, 1944; Alkan, 1952; Karaca, 1956; Baş, 1973; Ekici, 1975; Eroğlu, 1977; Çanakçıoğlu and Mol, 1998; Eroğlu, 2000). The vast majority of oak galls are of no particular economic significance. Because of their high tannin contents, galls of *A. gallaetinctoriae* and *A. kollari* have been utilized for thousands of years. *A. gallaetinctoriae* is found over much of Turkey where the two host oak

groups occur together naturally in large areas. *A.kollari* is found around the Sea of Marmara, along the Aegean coast, and some inner parts of the country. In gall developing areas, negative effects of human being and grazing have a great role on gall production. Galls collected have not been kept in a close vicinity of woodlands. Early harvest of galls results in not only the loss of crop but also the reduction in the population of the gall wasps. This may also result in the increase in the population of other harmful species on the same host plants. The purpose of this study is to discuss the rural potentiality of gallings by these two important gall-maker species and the gall harvesting strategies that interfere with their life cycles.

## Material and Method

Information on life cycle of the two important gall-makers, *A.gallaetinctoriae* and *A.kollari* came from some field collections of agamic galls on *Quercus infectoria* Oliv. in Adıyaman Forest District along with additional collections of galls on *Q.pubescens* in Kemalpaşa and Edremit in Turkey.

Collection of galls were made in the last August and early September and galls were placed in jars at room temperature and adults removed, counted and curated daily as they exited. The average longevity of agamics under laboratory conditions was observed. The emergency period of agamics and commercially gall production times were evaluated.

The gall production strategy that has been interfered with life cycles of these two important gall-maker species was discussed.

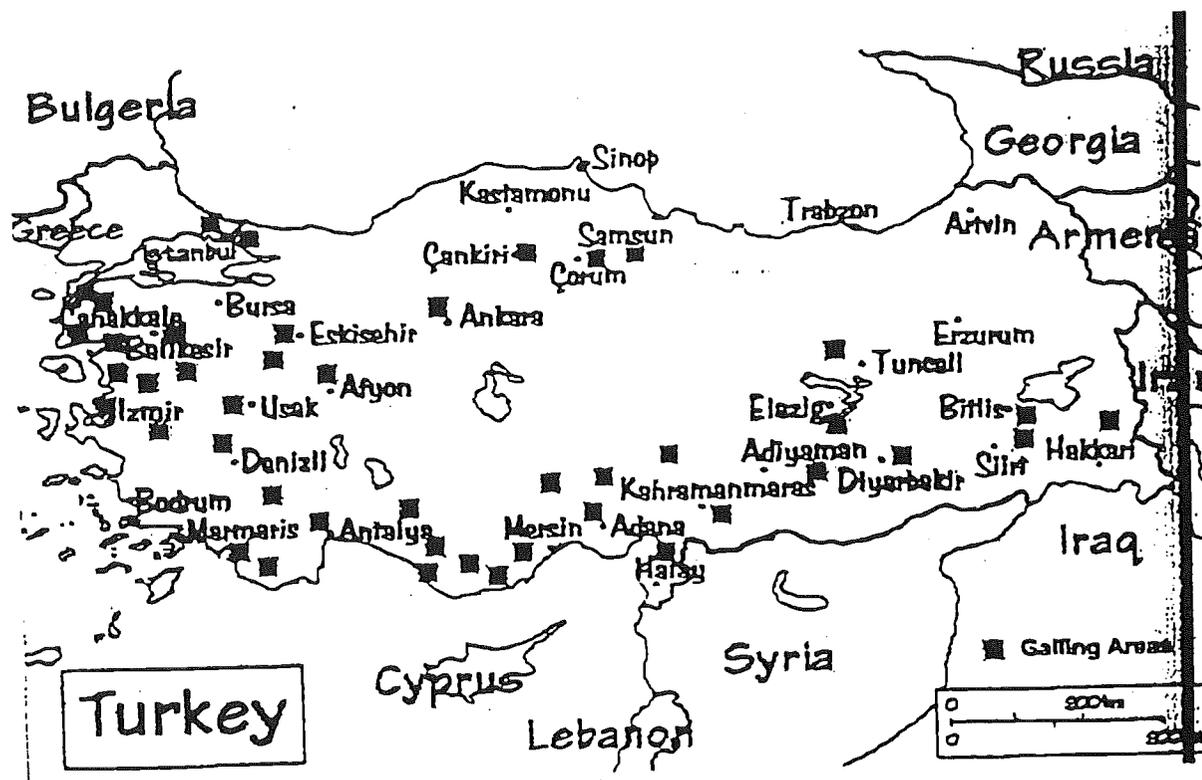
## Results

Adults of agamic generation *A.galleatinctoriae* are mainly dull brown with yellowish white, fine, short, and thick hairs. The lengths of the adults were average 6.2 (5.0 to 7.6) millimeters (Baş, 1973; Ekici, 1975). The adults reared galls from *Quercus infectoria* Oliv. were average 39.4 (15.6 to 49.9) mg and from *Q.pubescens* were average 22.4 (12.5 to 32.3) mg in the weight (Ekici, 1975). This species has a high reproductive potential (like most of the other gall wasps) and females may contain about 700 to 800 eggs (Baş, 1973; Ekici, 1975). Egg laying is lasted until early June. Larval stage is lasted about two months, from early June to late August or to the beginning of September (Ekici, 1975). Each gall includes only one larva (Baş, 1973). Rarely, when two or more eggs are laid in a bud, the galls induced fuse with each other (Ekici, 1975).

Gall formation period lasts about from mid June to beginning of July, so immature galls are found from mid-July to early September. Pupation generally begins in mid-August when the color of gall changes from light green to white, and lasts about 15 to 25 days. Immature gall are found from mid-July to early September. Mature agamic galls of *A.gallaetinctoriae* are almost spherical, 13-24 (average 17.8) mm in diameter, clothed with sharp, stiff spines about 1 to 4 millimeters in length, and 1.23 to 6 (average 3.3) gram in weight. Walls of mature galls are 5-6 mm in thickness and can not be crushed without a stroke of a hammer. (Eroğlu, 2000). Maturing galls are bright in color, single-chambered and non-coalesced clusters.

Agamic generation galls of *A.gallaetinctoriae* can be found most common on *Q.infectoria* Oliv., however, they are also found on *Q.ithaburensis* Decne., *Q.rubur* L., *Q.petraea* (Mattuschka) Lieb. and *Q.pubescens* Willd. (Schimitschek, 1944; Alkan, 1952); Karaca, 1956; Baş, 1973; Ekici, 1975; Eroğlu, 1997). *Q.pubescens* and *Q.petraea* are two common hosts in the second group. *Q.infectoria* is almost found all woodlands of Turkey, however, it grows most commonly in the Southern East Anatolia. In its large range, the two sub species, *Q.infectoria* ssp. *biossieri* (Reut) Gürke is found west, middle, east, and southern east parts of Anatolia and *Q. Infectoria* ssp. *infectoria* A. Camus is found north west and Marmara regions (Kayacık, 1963). *A.gallaetinctoriae* is found over much of Turkey (Figure 1) where the two host oak groups occur together naturally in large areas.

Figure 1. Gallling areas of *Andricus gallaetinctoriae* in Turkey



Emergence of adults was not observed in the galls collected before late July. The highest emergency occurred from the galls that were collected in the last week of August (Ekici, 1975). Adult exiting from galls collected in different years and places showed that the adult emerging period begins in early September and lasts until late October (Ekici, 1975; Eroglu, 1997). Adult emergency from the galls collected late August and early September and stored in the room conditions occurred between 8 to 21 October (Eroglu, 2000).

Twenty five percent of the agamics of *A. gallaetinctoriae* emerged between the dates of 8 to 14 October and the rest 15 to 21 October. The large portion of emergence was occurred in the second half of the October. Before winter, we reared about 50 adults of *A. gallaetinctoriae* from the 60 percent of the galls collected in Ad\_yaman-Kuyucak. The average longevity of these adults under laboratory was 12.7 (4 to 16) days (Eroglu, 2000). This period for the adults reared galls from Edremit was 12 to 18 days. Ba\_ (1973) and Ekici (1975) were found the longevity 6 to 12 and 4 to 13 days.

Agamic galls of *A. kollari* are similar to galls of *A. gallaetinctoriae* but do not have stiff spines protruding through the surface. They are globular, woody marble galls, 14 to 23 (average 16.5) millimeter in diameter, and from 0.50 to 2.10 (average 1.32) grams in weight. Almost all adults exited the galls until late September from galls collected on *Q. pubescens* in Edremit and Kemalpa\_. (Eroglu, 2000).

Sexual females of *Andricus kollari* (Hartig) (= *circulans* Mayr) oviposit in May to June in buds of *Q. robur*, and also *Q. petraea* and *Q. pubescens*. Agamic galls of *A. kollari* mature in August and agamic females mostly emerge in September although some larvae overwinter and do not emerge until the following May or June. Agamic females oviposit in buds of *Q. cerris*, depositing eggs between the embryonic leaves. Development during winter is slow and the sexual galls, which are small, thin-walled, ellipsoid structures, do not become visible among the buds scales until March or April (Beijerinck, 1902; Marsden-Jones, 1953; Folliot, 1964, Askew, 1984).

## Discussion

*A.gallaetinctoriae* and *A.kollari* are oak galling cynipids requiring two different oak species groups for their development. They are found throughout the overlapping native ranges of the two oak groups. While *A.gallaetinctoriae* is found over much of Turkey (Figure 1), *A.kollari* is found only the areas around the Sea of Marmara, along the Aegean coast, Black Sea coast as far as Samsun, and some inner parts of Anatolia.

Only the agamic generation of *A.gallaetinctoriae* can be found most common on *Q. robur*, *Q.petraea* and *Q.pubescens* in the North Hungary and Transcarpathia (Melika and Csoka, 1993; Diakontshuk and Melika, 1993). Agamic generation of *A.kollari* is found on *Q.robur*, and most common on *Q.petraea*, in the North Hungary, Transcarpathia (Melika and Csoka, 1993), and in the rest of the Ukraine, it can be found on *Q. suber* and *Q.ilex* (Diakontshuk and Melika, 1993).

In agamic generation of *A.gallaetinctoriae*, adult emerging period begins in early September and lasts until late October. The average longevity of the adults under laboratory was 12.7 days on average. Adults from galls collected in Edermit lived 12 to 18 days. The longevity was also found 6 to 12 and 4 to 13 days (Baş, 1973; Ekici, 1975).

Observations on the sexual generations of *A.kollari* suggest that both males and females will prove shorter-live than the agamic generation. Without food, males of this species live for 2-3 days, females 4-5 days. Despite their smaller size, and thus a greater potential for wind dispersal, such short lifespan may effectively limit the dispersal potential of the sexual generation (Stone et al. 1995). In *Andricus quercuscalicis* (Burgsd.) a nested analysis of deviance showed that there was no difference in longevity between the no food treatment and water only, but the treatment with sugar-water produced a significant increase in longevity. The average longevity of agamics under laboratory conditions without sugar was 12.2 days and with sugar-water as food was 16.2 days. It is possible that with a diet including nutrients other than sugars, the agamics could live for more than three weeks (Stone et al. 1995).

Two species of inquiline gall wasps reared from the agamic galls of *A.gallaetinctoriae* collected from South Eastern and western Anatolia were *S.umbraculus* Olivier and *Synergus gallaepomiformis* Boyer de Fonsc. (Ekici, 1975) which was also reared from galls of *Cynips insana* Westw. in the western Anatolia (Schimitschek, 1944). The greatest number of individuals emerged from a single gall were 8 in *S.gallaepomiformis* and 4 in *S.umbraculus*. Inquilines reared from agamic galls of *A.gallaetinctoriae* were *S.hayneanus* Hart., *S.pallidipennis* Mayr, *S.reinhardi* Mayri, *S.tristis* Mayr, and *S.umbraculus* Ol. (Diakontshuk & Melika, 1993). Inquilines reared from agamic galls of *A.kollari* were *Synergus albipes* Hart., *S.crassicornis* (Curtis), *S.hayneanus* Hart., *S.nervosus* Hart., *S.pallicornis* Hart., *S.pallidipennis* Mayr, *S.reinhardi* Mayri, *S.rotundiventris* Mayr, and *S.umbraculus* Ol. (Diakontshuk & Melika, 1993).

Both types of inquiline larvae emphasized in Askew (1984) may be seen in galls of *A.gallaetinctoriae* and *A.kollari* in which *S.reinhardi* occludes the larval chamber and destroys the gall-making larva, and *S.umbraculus* and *S.gallaepomiformis* Boyer de Fonsc. occupy peripheral cells in the parenchyma. Galls inquilled by *S.umbraculus* and *S.gallaepomiformis* may also produce adults of both gall-makers and inquilines. As a conclusion the inquilines do not have an important negative impact on these two gall-makers in their galling areas in Turkey.

Perhaps, there is an interaction between the color of gall and the development of the gall wasps in it. The galls which are indigo-blue in color generally includes young larvae. The mature larvae can be found in green or light green galls. White galls include pupae or adults gnawing an exit hole. In the following days, especially after a rain, color becomes reddish.

Galls of *A.gallaetinctoria* are commonly harvested in July and August, when they are indigo-blue or light green. However emergence of adults was not observed in the galls collected before late July. Adult exiting from galls collected in different years and places showed that the adult emerging period begins in early September and lasts until late October (Ekici, 1975; Eroğlu, 1997).

Galls collected in an area are not usually kept or stored in a close vicinity of woodlands so as to give the adults a chance to go back to the woodlands for their next generation. Early harvest or early removal of galls results in not only the loss of crop but also the reduction in the population of gall wasps. This may also result in the increase in the population of other harmful species on the same host plants. Supporting this is the fact that about fifty percent of the agamics collected in Adıyaman-Kuyucak were galls of *A.gallaetinctoriae* and the rest were galls of *Cynips insana* Westwood (Eroğlu 2000). Gall inducers do not move from place to place seeking food as to other phytophagous insects (Strong et al., 1984), but remain stationary and create highly nutritious food at their feeding sites.

In gall developing areas, negative effects of human being and animal grazing have also a great role on gall production, whereas there has been no evidence as to whether the galls of *A.gallaetinctoriae* and *A.kollari* can cause severe injury and bring about the demise of host trees. On the contrary, if the oaks with galls are protected from the other agents (such as humans and animals), they can reach up to 15 to 20 m in height and 1.0 to 1.5 m in diameter.

Although the exportation income from gall production in Turkey, shows differences by the years, but the average income in a long period is more or less stable. For example, the yearly average exportation income of galls between the years of 1961 to 1970 was 395.000 USD and 1990 to 1999 was 495.000 USD. In the last 10 years, the income portion of the gall exportation in Turkey's non-wood forest products has been 0.74% on average. This number indicates that, while it has the potential of providing the people living in rural areas and having low life standards with an important source of income, gall production in Turkey is still far from what is expected because of inefficient gall harvesting strategies

## Literature Cited

- Abrahamson, W.G.; McCrea, K.D. 1986. The impacts of galls and gallmakers on plants. Proc. Entomol. Soc. Wash. 88(2): 364-367.
- Abrahamson, W.G.; Weis, A.E. 1987. Nutritional ecology of arthropod gall makers. In: Slansky, F., Jr.; Rodriguez. J.G., eds. Nutritional ecology of insects, mites, spiders, and related invertebrates. New York, NY: John Wiley & Sons, Inc.: 235-258.
- Alkan, B. 1952. Türkiye Zoosesid (Zoocecid)leri (Kökene hayvansal bitki urları) üzerine çalışmalar. Ziraat fakültesi Yıllığı, Yıl: 2, Fasikül: 4, 259-291, Ankara.
- Ambrus, B. 1974. Cynipida-Gubacsok-Cecidia Cynipidarum. Fauna Hung. Akad. Kiado, Budapest, XII, 1a/f.: 1-119.
- Askew, R.R. 1961. On the biology of the inhabitants of oak galls of Cynipidae (Hymenoptera) in Britain. Transactions of the Society for British Ent. 14: 237-268.
- Askew, R.R. 1971. Parasitic Insects. New York: Elsevier Publishing Company. 316 p.
- Askew, R.R. 1984. The biology of gall wasps. In: Ananthkrishnan, T.N., ed. Biology of galling insects. New Delhi: Oxford and IBH Publishing Co.: 223-271.
- Bassett, H.F. 1873. On the habits of certain gall insects of the genus *Cynips*. Can. Ent. 5: 91-94
- Baş, R. Türkiye'de orman ağaçlarında zarar yapan zar kanatlılar (Hymenoptera) üzerine araştırmalar. OAE Yayınları, Tek. Bült. Serisi No:66 Ankara, 155s.
- Beijerinck, M.W. 1902. Über die sexuelle Generation von *Cynips kollari*. Marcellia 1: 13-20.
- Bronner, R., 1976. Contribution à l'étude histochimique des tissus nourriciers des Zoodécidies. Marcellia. 40:1-136.
- Cook, J.M.; Stone, G.N.; Rove, A. 1998. Patterns in the evolution of gall structure and life cycles in oak gall wasps (Hymenoptera: Cynipidae). In: Csóka, G.; Mattson, W.J.; Stone, G.N.; Price, P.W., eds. The Biology of Gall-Inducing Arthropods: proceedings of the international symposium: 1997 August 14-19; Mátraküred, Hungary. Gen. Tech. Rep. NC-199. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station: 148-152.
- Crespi, B.J., Carmen, D.A., Chapman, T.W. 1997. Ecology and evolution of galling thrips and their allies. Annual Review of Entomology. 42: 51-71.
- Csóka, G. 1993. Variation in *Quercus robur* susceptibility to galling wasps (Hymenoptera: Cynipidae) linked to tree phenology. In: Price, P.W.; Mattson, W.J.; Baranchikov, Y.N., eds. The Ecology and Evolution of Gall-Forming Insects. Krasnoyarsk, Siberia, USDA, North Central Forest Experiment Station, General Technical Report NC-174:148-152.
- Csóka, G. 1997. Plant galls. Budapest, Hungary: Agroinform Publishing.
- Çanakçıoğlu, H.; Mol, T. 1998. Orman Entomolojisi. Özel Bölüm. İ.Ü., Orman Fakültesi,
- Dawkins, R. 1983. The extended phenotype: the long reach of gene. Oxford: Oxford University Press.

- Diakontshuk, L.; Melika, G. 1993. A compilation of the oak galling cynipids (Hymenoptera: Cynipidae) in the Ukraine. In: Price, P.W.; Mattson, W.J.; Baranchikov, Y.N., eds. The Ecology and Evolution of Gall-Forming Insects. Krasnoyarsk, Siberia, USDA, North Central Forest Experiment Station, General Technical Report NC-174:102-108.
- Doncaster, L. 1916. Gametogenesis and sex-determination in the gall-fly, *Neuroterus lenticularis* (Spathogaster baccarum). Part III. Proc. Roy. Soc. B. 89: 183-200.
- Dreger-Jauffret, F.; Shorthouse, J.D. 1992. Diversity of gall-inducing insects and their galls. In: Shorthouse, J.D.; Rohfritsch, O., eds. Biology of insects inducing galls. New York, NY: Oxford University Press: 8-33.
- Eady, R.D., Quinlan, J. 1963. Hymenoptera Cynipoidae. Key to families and subfamilies and Cynipinae (inducing galls) Handbook I dent. Br. Insects 8 (1a): 1-81.
- Ekici, M. 1975. *Andricus (Cynips) galleatinctoriae* (Oliver) (Mazı arısı) üzerine arařtırmalar. OAE yayınları, Tek. Blt. Serisi No:66, Ankara 155 s.
- Erođlu, M., 1997. Mazıarısı *Andricus galleatinctoriae* (Oliver) (Hymenoptera, Cynipidae) zerine bazı Tespitler. KT Orman Fakltesi, Seminerler Serisi No:3, Trabzon, 9-14.
- Erođlu, M., 2000. Gall production strategy that is interfering with life cycles of two important gall-maker species, *Andricus galleatinctoriae* (Oliv.) and *A.kollari* Htg. (Hymenoptera: Cynipidae) in Turkey. Seminar on "Harvesting of Non-Wood Forest Products", Menemen-İzmir (Turkey), 2-8 October 2000, Joint FAO/ECE/ILO Committee on Forest Technology, Management and Training, 10 p.
- Folliot, R. 1964. Contribution à l'étude de la biologie des Cynipides gallicoles (Hymenopteres, Cynipoidea). Annals. des Sciences. Naturelles, Zoologie (Paris), Series 12, 5: 407-564.
- Fourcroy, M.; Braun, C. 1967. Observations sur la galle de l'*Aulax glechomas* L. Sur *Glechoma hederacea* L. II. Histologie et rle physiologique de la coque sclérifiée. Marcellia. 34: 3-30.
- Gander, M.V. 1979. The effect of the gall forming moth *Dactylethra siccifolii* (Lepidptera: Gelichiidae) on *Solanum panduraeforme* (Solanaceae). J. Entomol. Soc. South. Africa. 42: 283-286.
- Harting, T. 1840. Uber die Familien der Gallwespen. Z. Ent. Germar 2: 176-209.
- Hartnett, D.C.; Abrahamson, W.G. 1979. The effects of stem gall insects on life history patterns in *Solidago canadensis*. Ecology. 60: 910-917.
- Jankiewicz, L.S.; Flich, H.; Anloszewski, H. 1970. Preliminary studies on the translocation of <sup>14</sup>C-labelled assimilates and <sup>32</sup>PO<sub>4</sub> towards the gall evoked by Cynips (*Diplolepis*) quercus-folii L. On oak leaves. Marcellia. 36: 163-172.
- Karaca, İ., 1956. Orta Anadolu orman ve meyve ađaçlarında grlen menēi nebati ve hayvani urlarin amili ve morfolojisi hakkında arařtırmalar. A.. Ziraat Fakltesi Yayınlarından, No:84, Ankara, VIII+34 s.
- Kayacık, H. 1963. Orman ve park ađaçlarının zel sistematiđi II. Cilt: Angiosprnae. İ.. Orman Fakltesi.
- Kinsey, A.C. 1920. Phylogeny of cynipid genera and biological characteristics. Bull. Am. Mus.Nat. Hist. 42: 357-402
- Krombein, K.V, Hurd, P.D, Smith, D.R., Burks, B.D. 1979. Catalog of Hymenoptera of America North of Mexico. Vol. 1. Symphata and Aprocita (parasitica). Washington: Smithsonian Institution Press. 1198 pp.
- Magnus, W. 1914. Die Entstehung der Pflanzengallen verursacht durch Hymenopteren. Vienna. 160 pp.
- Mani, M.S. 1964. Ecology of Plant galls. The Hague: Junk, 434 pp.
- Marsden-Jones, E. M. 1953. A study of life cycle of *Adleria kollari* Hartig, the marble or Devonshire gell. Trans. R. Ent. Soc. Lond. 104: 195-222.
- McColloch, J.W. 1923. The Hessian fly in Kansas. Tech. Bull. 11. Agric. Exp. Stn., Kansas State Agric. College, Manhattan.
- Melika, G.; Cska, Gy. 1993. Comparing the oak galling cynipid fauna of Transcarpathia with that of Northern Hungary and the rest of the Ukraine. In: Price, P.W.; Mattson, W.J.; Baranchikov, Y.N., eds. The Ecology and Evolution of Gall-Forming Insects. Krasnoyarsk, Siberia, USDA, North Central Forest Experiment Station, General Technical Report NC-174:96-102.
- Meyer, J. 1950. Gigantisme nucleolarie et cecidogenesis. C.R. Acad. Sci. Paris 2131: 1333-1335.
- Nixon K.C.; Crepet W.L. 1985. Preliminary phylogenetic reconstruction of Quercus at generic and sectional levels. American Journal of Botany. 72: 934-935.
- Palct, J.; Hassler, J. 1967. Concentration of nitrogen in some plant galls. Phytion 12: 173-176.
- Price, P.W. 1987. Adaptive natura of isect galls. Environmental Entology 16:15-24.
- Pujade, J. 1994. Formes cinipo-cecidogenes detectades o que poden detectarse, en les florsiels fruits de les fagacies a Andorra (Hymenoptera;Cynipidae: Cynipinae). Annals Inst. Andorrans Centre de Barcelona, (1992).
- Pujade, J. 1997. Malformacions produides per cynipids als borrons de fagacies detectades a Andorra. Annals Inst. Est. Andorrans Centre de Barcelona, (1995), 13-39.
- Quinlan, J. 1979. A revisionary classification of the Cynipoidea (Hymenoptera) of the Ethiopian zoogeographical region. Bull. Br. Mus. Nat. Hist. Entmology 39: 85-133.
- Rohfritsch, O. 1992. Patterns in gall development. In: Shothouse, J.D.; Rohfritsch, O., eds. Biology of insect-iduuced galls. Oxford: Oxford University Press: 60-87.
- Schimitschek, E. 1944. Forstinsekten der Trkei und ihre Umwelt. Grundlagen dertrkischen Foretentomologie. Volk und Reich Verlag, Berlin, XVI+371 pp.

- Schönrogge, K.; Harper, L.J.; Brooks, S.E.; Shorthouse, J.D.; Lichtenstein, C.P. 1998. Reprogramming plant development: Two approaches to study the molecular mechanism of gall formation. In: Csóka, G.; Mattson, W.J.; Stone, G.N.; Price, P.W., eds. *The Biology of Gall-Inducing Arthropods*. USDA, North Central Forest Experiment Station, General Technical Report NC-199: 153-160
- Shorthouse, J.D. 1980. Modifications of galls of *Diplolepis polita* by the inquiline *Periclistus pirata*. *Bulletin de la Société Botanique de France (Actualités Botaniques)*. 127: 79-84.
- Shorthouse, J.; Rohfritsch O., eds. 1992. *Biology of insect-induced galls*. Oxford: Oxford University Press. 285 p.
- Stern, D.L. 1995. Phylogenetic evidence that aphids, rather than plant, determine gall morphology. *Proceedings of the Royal Society of London, Series B* 260: 85-89.
- Stone, G.N.; Schönrogge, K.; Crawley, M.J.; Fraser, S. 1995. Geographic variation in the parasitoid community associated with an invading gallwasp, *Andricus quercuscalicis* (Hymenoptera: Cynipidae). *Oecologia*. 104: 207-217.
- Strong, D.R.; Lawton, J.H.; Southwood, T.R.E. 1984. *Insects on plants*. Oxford: Blackwell. 313 p.
- Wangberg, J.K. 1978. Biology of gall forms of the genus *Valentibulla* (Diptera: Tephritidae) on rabbitbush in Idaho, USA. *J. Kansas Entomol. Soc.* 51: 472-483.
- Washburn, J.O.; Cornell, H.V. 1981. Parasitoid patches and phenology: their possible role in the local extinction of a cynipid wasp population. *Ecology*. 62: 1597-1607.

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# STRATÉGIE DE PRODUCTION DE GALLES INTERFÉRANT AVEC LE CYCLE ÉVOLUTIF DE DEUX IMPORTANTES ESPÈCES GALLIGÈNES, *Andricus gallaetinctoriae* (Oliv.) et *Andricus kollari* Htg. (Hymenoptera : Cynipidae), EN TURQUIE

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## RÉSUMÉ

Les insectes galligènes appartiennent à la famille des cynipidés qui, avec d'autres familles, est dans la superfamille des cynipoidea. Ce sont des hyménoptères parasites et toutes les espèces, à l'exception des espèces de la sous-famille des cynipinae se comportent typiquement comme des parasites ou des hyperparasites d'autres insectes. Les cynipinae sont des galligènes; ce sont les seuls à produire des galles. À l'état larvaire, ils sont phytophages. Il y a des cynips dont les larves ont perdu la capacité de produire des galles, qui vivent donc obligatoirement comme espèces inquilines, dans les galles formées par d'autres cynips.

Plus de 90 % des insectes galligènes se développent sur des plantes dicotylédones et la plupart ne s'attaquent qu'à trois familles : les rosacées, les composacées et les fagacées. La fidélité des cynips aux chênes montre combien les agents galligènes sont monophages. En Amérique du Nord et en Europe par exemple, 87 et 76 % des cynips se développent sur le chêne (*Quercus*) et chaque agent ne se développe généralement que sur une espèce de chêne ou sur quelques espèces apparentées. Le cynips du chêne est remarquable par la diversité structurelle des galles qu'il provoque. Il se caractérise également par la diversité des parties de la plante qu'il peut attaquer, la diversité des associations végétales hôtes et de son cycle évolutif. Un grand nombre de cynips ont deux générations par an. D'une génération à l'autre, les galles ont souvent une structure radicalement différente.

La diversité des galles dues au cynips tient à la nervation des tissus qui se développent à l'intérieur de la logette larvaire, y compris des couches de tissu ligneux ou spongieux environnantes, des alvéoles complexes à l'intérieur de la galle et, en surface, des couches de résine collante, de poils ou d'épines.

La structure des galles qui se développent autour de la zone nutritive est diverse. L'une des galles les plus spécialisées est celle d'*Andricus kollari* (Harting), dans laquelle huit zones concentriques de tissus différents ont été trouvées. Plusieurs galles, comme celles d'*Andricus gallaetinctoriae* (Oliv.) sont très riches en tanin, ce qui leur donne un goût amer. Leur richesse en tanin fait que les galles d'*Andricus gallaetinctoriae* et d'*Andricus kollari* sont utilisées depuis des milliers d'années.

La génération agame d'*Andricus gallaetinctoriae* se retrouve le plus fréquemment sur le chêne à galles des teinturiers (*Quercus infectoria* Oliv.); mais on la trouve aussi sur *Quercus ithaburensis* Decne Ssp. *macrolepis* (Kotschy.) Hedge et Yalt., *Quercus cerris* L., *Quercus conferta* Kitt., *Quercus ilex* L., *Quercus rubur* L., *Quercus petraea* (Mattuschka) Lieb. et *Quercus pubescens* Willd. Le chêne des teinturiers (*Quercus infectoria*) est présent dans quasiment toutes les forêts de Turquie, mais c'est dans le sud-est, en Anatolie, qu'il est le plus commun. La sous-espèce *Quercus infectoria* ssp. *bioissieri* (Reut) Gtirke est présente dans l'ouest, le centre, l'est et le sud-est de l'Anatolie, et *Quercus infectoria* ssp. *infectoria* A. Camus, l'autre sous-espèce, est courante dans le nord-ouest et dans la région de Marmara.

Les adultes nés de la parthénogénèse ont entre 5 et 8 mm de long et sont principalement de couleur brun foncé avec des poils blanc jaunâtre, fins, courts et épais. L'antenne, couverte de poils épars, comporte 14 articles. Le thorax est couvert d'un duvet brun clair, dense. Le prothorax se rétrécit vers l'avant. Le mésothorax porte deux rayures longitudinales. Le scutellum comporte deux cavités, dont la forme peut être intéressante du point de vue taxinomique.

*Andricus gallaetinctoriae*, comme de nombreux autres cynips, a une capacité de reproduction élevée et les femelles peuvent pondre de 700 à 800 œufs environ. Les œufs comportent un corps assez court et un long pédicelle qui est 10 à 14 fois plus long que le corps. La ponte dure jusqu'au début de juin. Une fois pondu, l'œuf

est plus ou moins inclus dans le tissu du bourgeon. Le stade larvaire dure environ deux mois, du début de juin à la fin d'août ou au début de septembre. La période de formation de la galle dure environ du milieu du mois de juin au début du mois de juillet et l'on trouve des galles immatures de la mi-juillet au début du mois de septembre. Le nymphage commence généralement vers la mi-août, quand la couleur de la galle passe du vert pâle au blanc, et dure entre 15 et 25 jours.

Les galles agames adultes d'*Andricus gallaetinctoriae* sont presque parfaitement sphériques, ont un diamètre de 13 à 24 mm et sont recouvertes d'épines pointues et raides d'environ 1 à 4 mm de long, elles pèsent entre 1,23 et 6 grammes. Les galles en cours de maturation sont de couleur vive, ont une chambre unique et ne sont pas coalescentes. Les coques des galles, d'une épaisseur de 5 à 6 mm, ne peuvent être cassées qu'à l'aide d'un marteau. Il se peut qu'il y ait un rapport entre la couleur de la galle et le stade de développement de la larve. Les galles de couleur indigo hébergent généralement des jeunes larves. Les larves adultes se trouvent dans les galles vertes ou vert clair. Les galles blanches hébergent des nymphes ou des adultes qui commencent à percer un trou pour sortir. Dans les jours qui suivent, en particulier après la pluie, la galle devient rougeâtre. Les galles recueillies avant la fin du mois de juillet ne comportent pas d'adultes. Les observations faites en différentes années et en différents endroits montrent que la période de sortie des adultes va de début septembre à fin octobre.

La sortie des adultes des galles qui avaient été recueillies à la fin du mois d'août et au début du mois de septembre et conservées à température ambiante a eu lieu entre le 8 et le 21 octobre. Si l'on recueille les galles trop tôt, non seulement on perd la récolte mais on diminue en outre la population de cynips. Les galles recueillies doivent être conservées à proximité de la zone de production jusqu'à la sortie des insectes.

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**СТРАТЕГИЯ ЗАГОТОВКИ ГАЛЛОВ, ПРЕПЯТСТВУЮЩАЯ ЖИЗНЕННЫМ ЦИКЛАМ ДВУХ ВАЖНЫХ ГАЛЛООБРАЗУЮЩИХ ВИДОВ – *Andricus gallaetinctoriae* (Oliv.) и *A. kollari* Htg. (Hymenoptera: Cynipidae) - В ТУРЦИИ**

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**РЕЗЮМЕ**

Орехотворки принадлежат к семейству Cynipidae, которое наряду с другими семействами относится к высшему семейству Cynipoidea. Cynipoidea – это паразитические Hymenoptera, и все виды, за исключением подсемейства Cynipinae, ведут себя как типичные паразитоиды или гиперпаразитоиды других насекомых. Cynipinae – это орехотворки, и только они возбуждают образование галлов и на стадии личинок являются растительоядными. В семействе Cynipinae встречаются орехотворки, чьи личинки потеряли способность вызывать образование галлов, и эти личинки обязательно ведут себя как инквилины в галлах галлообразующих видов семейства Cynipinae.

Более 90% галлообразующих насекомых встречаются на двудольных растениях, при этом большинство из них инвазируют только три семейства, а именно Rosaceae, Compositae и Fagaceae. Тот факт, что орехотворки живут только на дубах, показывает степень монофагии галлообразующих насекомых. В Северной Америке и Европе, например, 87 и 76% всех орехотворок нападают на породы *Quercus*, и круг пород, поражаемых каждым видом орехотворок, обычно ограничивается одним или несколькими близкими породами дубов. Дубовые орехотворки отличаются структурным разнообразием образуемых ими галлов. Для них характерны также определенные места на растениях, где формируются галлы, определенные группы деревьев-хозяев и определенный жизненный цикл. Многие из них имеют ежегодно два поколения. Галлы двух поколений зачастую коренным образом отличаются друг от друга по своей структуре.

Разнообразие галлов, образуемых орехотворками, является результатом инервации тканей галлов, которые развиваются вне личиночной камеры, включая окружающие слои дерева или губчатой ткани, образование сложных воздушных раковин в галле и формирование поверхностного слоя из клейких смол, волосков или шипиков.

Структура галлов, находящихся на периферии питательной зоны, различна. Одним из наиболее специализированных галлов является *Andricus kollari* (Hartig) ö, в котором обнаружено восемь концентрических зон различных тканей. Ряд галлов, подобных *Andricus gallaetinctoriae* (Oliv.), имеют высокое содержание танина, что делает их горькими на вкус. По причине высокого содержания в них танина галлы *A. gallaetinctoriae* and *A. kollari* использовались в течение тысячелетий.

Агамное поколение *A. gallaetinctoriae* чаще всего можно встретить на *Quercus infectoria* Oliv.; вместе с тем оно также встречается на *Quercus ithaburensis* Decne. Ssp. *macrolepis* (Kotschy.) Hedge and Yalt., *Q. cerris* L., *Q. conferta* Kitt., *Q. ilex* L., *Q. rubur* L., *Q. petraea* (Mattuschka) Lieb. and *Q. pubescens* Willd. *Q. infectoria* широко встречается во всех лесах Турции, но в основном эта порода произрастает в юго-восточной Анатолии. Два подвида *Q. infectoria* ssp. *biossieri* (Reut) Gtirke произрастают в западном, среднем, восточном и юго-восточном районах Анатолии, а

*Q. Infectoria ssp. infectoria* A. Camus встречается на северо-западе страны и в районе Мраморного моря.

Особи взрослого агамного поколения имеют длину 5-8 мм; они имеют, как правило, матово-коричневую окраску с желтовато-белыми прожилками и тонкие, короткие и толстые волосики. Усики покрыты редкими волосиками и имеют 14 сегментов. Грудная клетка покрыта плотной светло-коричневой опушкой. Проторакс сужается к передней части. На мезотораксе имеются две продолговатые полосы. Спереди скутеллум имеет две ямки, форма которых может иметь таксономическую ценность.

*A. gallaetinctoriae* имеют высокий репродуктивный потенциал (подобно многим другим орехотворкам): самки могут иметь примерно 700-800 яиц. Яйца имеют довольно короткое тельце и длинный стебелек брюшка, который в 10-14 раз превышает длину тельца яйца. Яйца откладываются до начала июня. После откладки яйцо более или менее заделывается в ткань почки. Личиночная стадия длится около 2 месяцев: от начала июня до конца августа или начала сентября. Период галлообразования длится примерно от середины июня до начала июля, в связи с чем незрелые галлы встречаются с середины июля до начала сентября. Окукливание обычно начинается в середине августа, когда из светло-зеленых галлы становятся белыми, и длится примерно 15-25 дней.

Созревшие агамные галлы, образованные особями *A. gallaetinctoriae*, имеют почти сферическую форму диаметром 13-24 мм, покрыты острыми, твердыми шипиками длиной примерно 1-4 мм и весят 1,23-6 граммов. Созревающие галлы имеют светлую окраску, одну полость и несоединенные пучки. Стенки созревших галлов имеют толщину 5-6 мм, и их нельзя разбить без молотка. Возможно, существует взаимосвязь между окраской галлов и развитием в них орехотворок. Галлы, имеющие сине-фиолетовую окраску, обычно включают молодые личинки. Взрослые личинки могут встречаться в зеленых или светло-зеленых галлах. Белые галлы включают куколки, а взрослые особи проделывают выходное отверстие. В последующие дни, особенно после дождей, они приобретают красноватый цвет. Появления взрослых особей в галлах, собранных до конца июля, не наблюдалось. Наличие взрослых особей, покидающих галлы и которые были собраны в различные годы и в различных местах, свидетельствует о том, что они начинают появляться в начале сентября и продолжают появляться до конца октября.

Появление взрослых особей из галлов, собранных в конце августа и начале сентября и хранящихся в комнатных условиях, происходило в период с 8 по 21 октября. Ранняя заготовка галлов приводит не только к потерям урожая, но и к сокращению популяции орехотворок. После заготовки галлы должны храниться неподалеку от района их образования до тех пор, пока орехотворки не покинут галлы.

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# **SUSTAINABLE UTILIZATION OF GUM AND RESIN BY IMPROVED TAPPING TECHNIQUE IN SOME SPECIES**

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## **Summary**

Gums and resins form an important group of non-wood forest products. The industrial applications of gum and resin have expanded tremendously in recent years. They are used in many unrelated industries such as paper, textile, petroleum, pharmaceutical, cosmetics, food, varnishes, lacquers and soaps. Even though gum is produced by a large number of plants, their commercial exploitation is restricted to members of the Leguminosae, Sterculiaceae and Combretaceae. Gum is also extracted from seeds, seaweed and microorganisms. Resins are obtained from members of Pinaceae (rosin, amber), Leguminosae (copal), Dipterocarpaceae (dammar), Burseraceae (elemi, frankincense, guggul) and Umbelliferae (*asafoetida*, *galbanum*). Gums and resins are considered as the byproducts or end products of certain metabolic pathways. Poor soil, drought and other hostile situations promote the production of gums and resins. Indonesia, India, China and Sudan are the major producers of gums and resins. Millions of people worldwide, especially in developing countries depend on collection of gums, resins and latex as a means for their livelihood. However, the market of these products has declined over years due to several reasons. The main reasons of this decline are the unscientific and brutal methods of tapping, over exploitation leading to the death of the tapped trees and erratic supply of these products in the market. Commercial tapping of gum and resin is done by blazing, peeling or making deep cuts on the bole. On account of injurious and wasteful tapping and over-exploitation the populations of gum and resin producing plants have markedly declined. On the absence of cultivation of these plants there is a grave concern about the loss of the wild germplasm. Simple and effective tapping techniques which ensure optimum yield and regeneration of tapped trees have been developed for gum Arabic (*Acacia senegal*), gum ghatti, (*Anogeissus latifolia*), neem gum, (*Azadirachta indica*), guggul (*Commiphora weightii*), and gum karaya (*Sterculia urens*) which ensure sustainable production of these material. The details of these methods are discussed.

**Keywords:** Gums, resins, non-wood forest products, improved tapping technique, ethephon.

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## **Introduction**

Products from plants such as tannins, rubber, gums, gumresins, resins, essential oils, honey, medicines, fodder, wild fruits and several other materials were classified as minor forest products. These are presently grouped as non-wood forest products and have immense application in the industry, and also provide livelihood to millions of rural poor. Gums and resins form an important and widely used group of non-wood forest products, and are principal components in food and pharmaceutical industries. The world market for gum only as food additives is over US \$ 10 billion in 1993 (Coppen, 1995).

Natural gums (gums obtained from plants) are hydrophilic carbohydrate polymers of high molecular weights, generally composed of monosaccharide units joined by glucosidic bonds (Davison, 1980). They are generally insoluble in oils or organic solvents such as hydrocarbons, ether, or alcohols. Gums are either water soluble or absorb water and swell up or disperse in cold water to give a viscous solution or jelly (Mantel, 1949). On hydrolysis they yield arabinose, galactose, mannose and glucuronic acid.

Based on solubility in water gums are classified as (1) soluble, (2) insoluble and partially soluble

gums. Certain gums dissolve in water to form a transparent colloidal solution (e.g. Gum Arabic). Gums such as gum tragacanth, gum karaya do not dissolve in water but swell up into a jelly-like mass. However, if sufficient amount of water is added they yield a thick transparent solution. Partially soluble gums first form a swollen jelly by dispersing in water and become solution on addition of more water. Mogador or Morocco gum (from *Acacia gummifera*) is an example of partially soluble gum.

Resins are polyterpenes and their acid derivatives. They are oxidation products of terpenes in all manners of incomplete stages. Resins are very complex chemical compounds and are soluble in organic solvents. They do not have affinity for water. The less soluble resins can be made to dissolve by a process known as 'running' or sweating (Mantel, 1950). When the resins contain essential oils, they are called oleoresins or soft resins. Gumresins are a combination of resins and true gums with a mixture of characteristics of both. Certain gumresins contain small amount of essential oil. They are called oleo-gumresins. Small quantities of resins exude on the surface of the trunk due to injury by wind, fire, lightning or wound caused by animals. However, for commercial purpose tapping is necessary. Sometimes the natural exudation is so copious that the resins becomes buried and fossilized in the soil around the trunk. Vast deposits of resin may be found where the original forest has disappeared. Amber is an example of fossil resins.

Gums are produced by members of a large number of families but commercial exploitation is restricted to a few species of *Leguminosae*, *Sterculiaceae* and *Combretaceae* (Table 1). Gum is also extracted from seeds (Table 2), seaweeds (Table 3) microorganisms (Table 4), and *Aloe barbadensis* (aloe gum) wood chips of *Larix occidentalis* (stractan), seed coats or barns of corn, wheat, oats, barley, rice and soybean (Hemicellulose). Resins occur in a wide range of plants. They are formed in the specialized structures called ducts. With the exception of Lac produced by the Lac insect (*Laccifer lacca*) all the natural resins are of plant origin. The important commercial resins are obtained from Pinaceae (rosin, amber), *Leguminosae* (copal), *Dipterocarpaceae* (Dammars), *Burseraceae* (elemi resins, guggul, frankincense) and *Umbelliferae* (*asafoetida*, *galbanum*) (Table 5). Amber and copal are the hardest resins, Elam and pine resins are soft and while resin form *Rhus vernicifera* is liquid and is used as natural varnish.

**Table 1. List of a few plants, which are commercially tapped for, gums with their product names**

Name of the source	Family	exudate/product
<i>A. senegal</i> (L.) Willd.	Leguminosae	Gum Arabic
<i>seyal</i> Del.	Leguminosae	Gum Arabic
<i>Anogiessus latifolia</i> Wall.	Combretaceae	Gum ghatti
<i>Astragalus gummifer</i> Labill.	Leguminosae	Gum tragacanth
<i>Astragalus microcephalus</i> Willd.	Leguminosae	Gum tragacanth
<i>Azadirachta indica</i> A.Juss.	Meliaceae	Neem gum
<i>Cochlospermum gossypium</i> L.	Cochlospermaceae	Gum karaya
<i>Lannea coromandalica</i> (Hout) Merrill.	Anacardiaceae	Joel or Jingan gum
<i>Prosopis juliflora</i> DC.	Leguminosae	Mesquite gum
<i>Sterculia urens</i> Roxb.	Sterculiaceae	Gum karaya
<i>villosa</i> Roxb.	Sterculiaceae	Gum karaya

## Formation of gums and resins

Natural gums and resins are present either in the intercellular space (ducts or cavities) of the plant parts or as exudate produced due to injury. The ducts or cavities formed due to injury are called traumatic ducts/cavities. The causes of gum and resin formation and their biosynthesis are not fully understood. Poor soil, drought and other hostile environmental conditions promote their production. Gums and resins do not re-enter the metabolism of the plant in which they are produced and therefore, they are considered as by-products or end products of certain metabolic changes. It is suggested that gum formation may be a pathological response of the plants to protect the injured part by sealing the region to prevent water loss and infection. The development of the duct is schizogenous (separation of the duct initials by dissolution of middle lamella), schizo-lyigenous (separation of the initials followed by lysis of epithelial cells) and lysigenous (separation of the duct initials followed by lysis of epithelial cells) and lysigenous (death of

the initials). The secretion may be eccrine (the secretory products are transported out of the cytoplasm as individual molecules against the concentration gradient by membrane-bound molecular pump with ATP supplying the energy, granulocrine (through vesicles formed from golgi bodies or ER) and holocrine (by lysis of the whole cell).

**Table 2: List of plants which yield seed gum**

Plant names	Family	Product
<i>Ceratonia siliqua</i> L. (Carob tree)	Leguminosae	Locust bean gum
<i>Cyamopsis tetragonolobus</i> (L.) Taub.	Leguminosae	Guar gum
<i>Cydonia oblonga</i> Mill.	Rosaceae	Quince seed gum
<i>Plantago psyllium</i> L.	Plantaginaceae	Psyllium seed gum
<i>P. ovata</i> Forsk.	Plantaginaceae	Psyllium seed gum
<i>Linum usitatissimum</i> L.	Linaceae	Flax seed gum
<i>Abelmoschus esculentus</i> (pods)	Malvaceae	Okra gum
<i>Tamerindus indica</i>	Leguminosae	Tamarind gum

**Table 3: List of a few seaweeds used as sources of gum**

Plant names (Red Algae, Rhodophyceae)	Products	
<i>Chondrus crispus</i>	-	Carrageenan
<i>C. ocellatus</i>	-	Carrageenan
<i>Gigartina stellata</i>	-	Carrageenan
<i>G. mamillata</i>	-	Carrageenan
<i>G. acicularis</i>	-	Carrageenan
<i>G. radula</i>	-	Carrageenan
<i>G. pistillata</i>	-	Carrageenan
<i>Euclima spinosum</i>	-	Carrageenan or Agar
<i>E. muricatum</i>	-	Carrageenan or Agar
<i>E. cottonii</i>	-	Carrageenan or Agar
<i>E. edule</i>	-	Carrageenan or Agar
<i>Gelidium amansii</i>	-	Agar
<i>G. cartilagineum</i>	-	Agar
<i>G. nudifrons</i>	-	Agar
<i>G. latifolium</i>	-	Agar
<i>G. arborescens</i>	-	Agar
<i>Gracilaria confervoides</i>	-	Agar
<i>G. cornea</i>	-	Agar
<i>Acanthopeltis japonica</i>	-	Agar
<i>Pterocladia capillacea</i>	-	Agar
<i>P. densa</i>	-	Agar
<i>P. lucida</i>	-	Agar
<i>P. nana</i>	-	Agar
<i>Abnfeltia plicata</i>	-	Agar
<i>Furcellaria fastigiata</i>	-	Furcellaran
<b>Brown algae (Phyophyceae)</b>		
<i>Macrocystis pyrifera</i>	-	Alginate
<i>M. integrifolia</i>	-	Alginate
<i>Laminaria digitata</i>	-	Alginate
<i>L. cloustoni</i>	-	Alginate
<i>L. sacchariana</i>	-	Alginate
<i>Ascophyllum nodosum</i>	-	Alginate
<i>Nereocystis luetkeanica</i>	-	Alginate
<i>Fucus vesiculosus</i>	-	Alginate
<i>F. serratus</i>	-	Alginate
<i>F. spiralis</i>	-	Alginate
<i>Eklonia maxima</i>	-	Alginate
<i>Pelvetia canaliculata</i>	-	Alginate

**Table 4: Biosynthetic gum (microbial gum)**

Name of the organism		Product
<i>Xanthomonas compestris</i>	-	Xanthan
<i>Pseudomonas elodea</i>	-	Gellan
<i>Leuconostoc mesenteroides</i>	-	Dextran
<i>Aureobasidium pullulans</i>	-	Pullulan
<i>Hansenula holstii</i> (yeast)	-	Phosphomannan - Y.2448
<i>Sclerotium rolfsii</i> (fungus)	-	Scleroglucan

**Table 5: List of a few plants which are commercially exploited as sources of gumresins and resins with their product names**

Name of the plant	Family	Product/exudate
<i>Agathis alba</i>	Araucariaceae	Dammar minyak)
<i>Ailanthus excelsa</i>	Simaroubaceae	Bassora, hog gum
<i>Altingia excelsa</i>	Altingiaceae	Rasamala resin
<i>Anacardium occidentale</i>	Anacardiaceae	Cashew gum, Acajou gum
<i>Anisoptera sp.</i>	Dipterocarpaceae	Dammar mersawa
<i>Balanocarpus heimii</i>	Dipterocarpaceae	Dammar Penak
<i>Penangianus</i>	Dipterocarpaceae	Dammar hitam - II
<i>Boswellia carterii</i>	Burseraceae	Olibanum
<i>Serrata</i>	Burseraceae	Salaiguggal
<i>Calophyllum inophyllum</i>	Gutiferae	Tacamahaca resin
<i>Canarium hirsutum</i>	Burseraceae	Elemi resins
<i>C. rufum</i>	Burseraceae	Elemi resins
<i>Luzonicum</i>	Burseraceae	Manila elemi
<i>Cistus landaniferus</i>	Cistaceae	Labdanum
<i>Commiphora wightii</i>	Burseraceae	Guggal, guggul
<i>Convolvulus scammonia</i>	Convolvulaceae	Levant
<i>Copaifera coriacea</i>	Leguminosae	Copaiba balsam
<i>Daemonorops sp.</i>	Palmae	Dragon's blood
<i>Dipterocarpus kerri</i> (and other species)	Dipterocarpaceae	Dammar
<i>Dorema ammoniacum</i>	Umbelliferae	Ammoniacum
<i>Dracaena draco</i>	Agavaceae	Dragon's blood
<i>Dryobalanops aromatica</i>	Dipterocarpaceae	Damar kapur
<i>Ferula asafoetida</i>	Umbelliferae	Asafoetida
<i>Ferula galbaniflua</i>	Umbelliferae	Galbanum
<i>Hopea globosa</i>	Dipterocarpaceae	Dammar mata kuching
<i>H. intermedia</i>	Dipterocarpaceae	Dammar mata kuching
<i>micrantha</i>	Dipterocarpaceae	Dammar mata kuching
<i>Liquidambar orientalis</i>	Altingiaceae	Styrax
<i>Mangifera indica</i>	Anacardiaceae	Mangiferin
<i>Myroxylon balsamum</i>	Leguminosae	Balsam of Tolu
<i>Myroxylon pereirae</i>	Leguminosae	Balsam of Peru
<i>Pinus sp.</i>	Pinaceae	Rosin
<i>Pistacia lentiscus</i>	Pistaciaceae	Mastic resin
<i>Rhus vernicifera</i>	Anacardiaceae	Japanease varnish
<i>Schinus molle</i>	Anacardiaceae	American mastic
<i>Semicarpus anacardium</i>	Anacardiaceae	Bhilawanshell liquid
<i>Shorea curtissii</i> (and other species)	Dipterocarpaceae	Dammar
<i>Sindora supa</i>	Leguminosae	Sapa oil
<i>Styrax benzoin</i>	Styracaceae	Benzoin
<i>Vateria indica</i>	Dipterocarpaceae	White dammar
<i>Xanthorrhoea australis</i>	Xanthorrhoeaceae	Resina lutea

India, Indonesia, China and Sudan are among the major producers of gums and resins.

## Uses of gums and resins

Use of gums and resins by human goes back to remote times. Gum Arabic has been used at least 4500 years before (Davison, 1980). It was shipped as an article of commerce by Egyptian fleets. Ancient inscriptions make frequent mention of gum Arabic called 'kami', which had been used as textile adhesives and in painting. Egyptian (Third dynasty, B.C.2650) used gum Arabic for wrapping mummies. Guggul was used as medicine about 5000 years ago. The earliest reference of medicinal and therapeutic properties of guggul is in Atharva Veda. Detailed account of guggul as a drug is given in the treaties of Charaka (B.C.1000), Sushruta (B.C.600), Vagbhata (17 century AD) and various Nighantus written in India during 12 to 14 centuries (Kumar & Shankar, 1982; Satyawati, 1991). Frankincense or olibanum from *Boswellia cateri* is referred to in Bible as a source of incense. Trade in medicinal and spicy resins like asafoetida, galbanum and ammoniacum was practiced by ancient people (Howes, 1950). The industrial applications of gums and resins have expanded tremendously in recent years. They have been used in many unrelated industries. Some important uses of natural gums and resins are given below.

### Paper industry

Gum prevents dilatancy at high shear, helps regular distribution of pulp fibres, increases mullin-bursting strength, pick and retention of fibres, decreases porosity, fast crush, and improves surface properties, finish, ink acceptance and smoothness.

### Textile industry

Gum is used as a thickening agent for pigment in printing fabrics. It prevents migration of dyestuff in pad dying operations, and produces very fine line prints with good definition and excellent washout.

### Petroleum and gas industry

Gum is used as a component in drilling fluids, removing calcareous deposits, acidizing wells and secondary recovery of oils.

### Pharmaceuticals

Gum tragacanth is superior in pharmaceutical applications. Gum is used as suspending agent for insoluble drugs, demulcent agent, emulsification, antiseptic preparations, binder for tablets and tablet coating, jelly lubricants, spermicidal jellies and to mask the unpleasant taste of syrups. It is also used as a medicine for treatment for low blood pressure caused by hemorrhage or surgical shock.

### Cosmetics

Spreading properties of gums add smoothness to the skin and forms a thin protective coating. They are used for preparation of facial masks, foam stabilizer, production of liquid soaps, lotions, protective creams, face powder, tooth paste, mouth wash and hair cream.

### Food industry

Of all polysaccharide consumed by human being, starch is the principal metabolizable energy source. The vast number of other polysaccharides consumed as natural compounds of edible vegetable, fruits and other material pass through the gastro - intestinal tract with little or no change. The intake of low concentrations of hydrophilic polysaccharides such as gum is beneficial as it will increase the bulk of intestinal content and also prevent excessive absorption of fats. Gums have been used in food industry in various ways. Even though they are used in low concentrations they impart important properties to the product.

The major functions of gum in the food products are gelling and thickening. As gums are water soluble or water dispersible hydrocolloids, they usually possess suspending, dispersing and stabilizing properties and therefore, acts as emulsifiers, coagulants, adhesives, binding, bulking, encapsulating, flocculating, gelling, suspending, clarifying, swelling, thickening and whipping agents, crystallization inhibitors, film formers, stabilizers and protective colloids.

### **Flavour fixation**

Several powdered flavours are prepared dry to meet the specific requirement of food products such as pudding, desserts, cake, soup and beverage mixes. These products are manufactured by spray drying methods. Spray drying is done usually after the oil flavours are emulsified in gum solution. The flavour is "sealed in" in particles of varying sizes (1-50  $\mu$ m). They are released only after they come in contact with water. Gum Arabic is preferred in citrus oil flavour. Generally the ratio of gum to flavour is 4:1.

### **Confectionery**

A large part of gum Arabic is used in confectionery products to prevent crystallization. The gum also emulsifies and evenly distributes the lipid compounds. It retards fat accumulation on the surface in caramels and toffees. Candy jellies (contain 50% less sugar than hard candies) such as jujubes, fruit gums, fruit pastilles and gumdrops are manufactured using gum. The gum gives them a clear and finer taste. Sugar coated confections made by panning process employ gum to provide adhesive and firm coating for nuts. Gum also acts as a whipping and stabilizing agents for aerated confections such as angel kisses, marshmallows, soft caramels, nougats and meringues.

### **Dietetic food**

Gum is used as a bulking agent and for the preparation of special purpose food (those for diabetics). A mixture of gum Arabic and xanthan is used in making stabilized, whipped or aerated low caloric products such as butter, margarine, toppings, spreads and frozen desserts.

### **Bakery products**

Gums extend the shelf life of bakery products. It is used for bun glaze, and gives the dough good water holding capacity and less flabby appearance. In cake and biscuits the gum gives softer and better texture. It is also used as a component in topping and icing bases, emulsifying powder, encapsulating flavour, dispersal of vegetable fats and flavour release at specific melting temperature.

### **Beverages**

Two different gums have been generally used in combination as emulsifier in many flavour emulsions such as orange, lemon, lime, cherry, root beer and cola. It stabilizes pulp in concentrates and finished drinks. Gum Arabic is generally preferred in citrus oil emulsion concentrates. It forms a cloud-producing agent in beverages. In dry beverage mixes where spray-dried emulsion of vegetable oil produces a stable free flowing powder which on dispersal in water gives a cloudiness or turbidity typical of citrus or other juices. Gum is also used in manufacture of beer. It maintains the beer foam under adverse conditions and is responsible for the "lace curtain" effect on the sides of the glass when the beer is consumed. It is also used for wine clarification.

### **Diary product**

Gums have the ability to prevent crystallization of sugar; therefore, it has been used in many diary products and confectioneries. It is used as the cream stabilizer. It provide uniform, smooth creamy texture to the ice cream and maintain this texture during ice-thaw cycle.

### **Low calorie milk shake**

Gum when used in milk shakes, suspends solids and helps emulsify the immiscible fat in the system. It also control overrun and provide smooth creamy body. Gum is also used in ice pops, water ices, sherbets (etc.).

### **Cheese products**

In the manufacture of cheese the gum speeds up coagulation, increases yield of curd solid by 10 per cent and separation and makes removal of curd easier. It also gives the finished cheese an excellent, smooth, resilient body and texture. Gum reduces the exudation of water from cheese from soft cheese such as cheese spreads and melted cheese products in which water content is high.

### **Instant and cooked pudding**

Gum produces firm pudding in cold water system with excellent body, texture and flavour release. It stabilizes pudding system and reduces weeping.

### **Pie and pastry fillings**

Gum acts as cold water gel base for instant bakery jellies and instant lemon pie fillings. It gives improved flavour release and a soft gel body with broad temperature tolerance.

### **Meat products**

Gum is used in the manufacture of processed meat such as salami, bologna and sausages. It acts as a binding and stabilizing agent and retains water. In canned meat and fish products it is used as a thickener. In preparation of synthetic meat products from plant proteins, gum is used to give the eating quality of chewy protein gels to impart meat like chewiness.

### **Miscellaneous**

Gum emulsifies and stabilizes all types of salad dressings, emulsifies oil and suspend solids in meat and flavour sauces, suspends solids and produce uniform body in fountain syrups and controls overrun, fat dispersion and prevent freeze-thaw break down in whipped toppings. Gum is used in dry powdered stable oil soluble vitamins food supplement, jellies, jams, synthetic potato chips, macaroni, spaghetti and so many other preparations.

### **Other uses**

Gums are used for making inks, paints, metal cutting fluids, toys, air fresher gels, hydro-mulching to promote seed germination, boiler compounds, ceramics, welding rods, cleaners crayon and in mining, polymerization aide, lithography, stabilizing insecticides, surface coating of wood and plastics, polish, leather industry, adhesives and explosives.

### **Uses of gum resins and resins**

Gum resins have been used in industry such as perfumery, and other cosmetics, medicine, spices and incense. Resins are now mainly employed in paints, varnishes, lacquers, sizing paper, manufacture of soap, linoleum, sealing wax, adhesives, medicines, ink, etc.

## **Improvement of Tapping Technique**

Introduction of new tapping methods using ethephon (2 chloroethyl phosphonic acid), a plant growth regulator, have increased exudation of gum/gumresin in certain plants such as *Anogiessus latifolia*, *Acacia senegal*, *Commiphora wightii*, *Sterculia urens* and *Mangifera indica*. These methods also ensure the sustainable yield, regeneration and survival of the tapped trees. Ethephon is safe, inexpensive and non-toxic. It is used for enhancing rubber yield in rubber tree, ripening of fruits (mango, bananas and citrus), induction of abscission, flowering, root initiation, seed germination and breaking of dormancy.

The first systematic study on improvement of resin tapping was done during World War II because of the urgent need of oleoresin. Chemical stimulation experiments on resin flow by application of sulfuric acid; hydrochloric acid and sodium hydroxide have been carried out. The prolongation of oleoresin flow by acid stimulation resulted in 50 to 100 % higher production (Snow, 1949). The oleoresin flow is also prolonged by inoculating wounds on pine trees with the suspensions of pitch canker fungus, *Fusarium lateritium* and *F. pini* (Hepting, 1947; 1954; Clapper, 1954). Ethephon (2 Chloroethylphosphonic acid) and paraquat (1,1 dimethyl 4, 4' bipyridium chloride) or other herbicides when administered alone or in combination into the stem, induces extensive oleoresin soaking within the stem of pines (Roberts, 1973; Roberts et al., 1973; Barker & Schmid, 1976; Cooper, 1976; Nix, 1976; Peters & Roberts, 1976; Peters et al., 1978; Schnell & Toennisson, 1978; Kossuth et al., 1984). The treatment does not induce oleoresin soaking in *Abies balsamea*, *Larix laricina* (Kiatgrajai et al., 1976a,b) *Pseudotsuga* and *Tsuga canadensis* (Rowe et al., 1976; Conner et al., 1977). Ethephon treatment induces formation of gum cavities in the secondary xylem and cortex of cherry, peach, plum and prunes (Wilde & Edgerton, 1975).

Application of Indol 3-acetic acid (IAA) morphactin (EMD-7301) and kinetin (6-furfuryl aminopurine) increase the number of gum ducts in *Sterculia urens* (Setia & Shah, 1977a) but was ineffective in *Commiphora wightii* (Setia & Shah, 1977b). An increase in the number of vertical resin ducts due to application of growth regulator was also reported in *Pinus halepensis* (Fahn & Zamski,

1970). These reports however, do not mention the effect of the hormones on the amount of gum or gum resin secreted.

Application of ethephon enhances exudation of gum and gumresin in certain hardwood species (Nair et. al., 1980; 1985; Bhatt and Shah, 1985; Bhatt, 1987; Bhatt et. al., 1989; Bhatt & Mohan Ram, 1990; Nair et. al., 1995). Neem gum which contains about 35% protein (Anderson & Hendrie, 1971) has great potential for industrial use, but neem tree (*Azadirachta indica*) is generally not tapped because of the meager amount of exudation. Administration of ethephon and paraquat (1,1'-dimethyle 4,4' bipyridium salt) into the sapwood of neem mediated copious gum exudation (Nair et. al., 1980; 1985). The treatment induced formation of gum ducts and cavities in the sapwood (Nair et. al., 1995).

Guggul, an oleo-gumresin exuded by *Commiphora wightii* is the source of an important drug, the gugglip, which possesses hypocholestraemic and hypolipaemic activi-ties and is used in the control of arteriosclerosis, the main cause of coronary heart disease. The traditional tapping methods used are unproductive and destructive. Due to wasteful and injurious tapping techniques, the natural population of this small tree of the semi-arid regions of India has depleted fast. An improved tapping technique using "Mitchie Golledge knife coupled with ethephon application can enhance googol production by about 22 times over that obtained from control and rapid wound healing. April and May are peak months for guggul tapping as established by localization of resins using epifluorescence microscopy (Bhatt et. al., 1989).

*Anogeissus latifolia* occurs commonly in dry deciduous forests of India. Besides providing fuel wood and timber, the tree yields a valuable gum called gum ghatty. Gum ghatty has been used in India for calico printing, in confectionery, ceramics, food and pharmaceuticals. An improved tapping method based on application of ethephon yielded about 466 fold increase in gum (Bhatt, 1987b). Similar method is successfully tested in *Mangifera indica* (Bhatt & Shah, 1985).

Gum Arabic produced by *Acacia senegal* has various uses. *Acacia senegal* trees in India does not yield gum. A study by Bhatt and Mohan Ram (1990) indicated that 0.8 to 0.9 kg of good quality gum can be obtained per tree by introducing 4 ml of ethephon containing 960 mg of the active substance through a hole in the sapwood in April /May.

A dry exudate from *Sterculia urens* known as gum karaya is one of the least soluble gums used for many industries such as petroleum and gas, textiles, paper and pulp, pharmaceuticals medicine and several other products (Gautami & Bhat, 1992). The commercial tapping of karaya is done by blazing, peeling, or by making deep cuts at the base of the bole using an axe. These methods often lead to the death of the tapped trees. On account of crude tapping methods and over exploitation the population of karaya trees has markedly declined. In the absence of cultivation of these trees in regular plantation, there is a grave concern about the loss of wild germplasm of *S. urens*. Presently, the governments of Madhya Pradesh, Rajasthan, and Utter Pradesh have imposed a ban on the tapping and collection of the gum karaya to allow recovery and regeneration of this tree.

As gum karaya is vital for tribal economy and its trade value is substantial, there is a pressing need to develop a scientific and sustainable tapping method to increase the yield and ensure the survival of the tapped trees. A simple and safe technique of tapping with substantial increase in the yield is being developed using ethephon to enhance gum yield and wound healing. After 45 days a thick wound tissue has developed at the injured region and nearly replaced the damaged tissue. The wound is completely healed 60 days after tapping. The Yield has increased about 20 to 30 times more than the control. There was a marked difference in the yield among individual trees, presumably due to heterozygosity. The systematic and scientific tapping technique using ethephon as stimulating agent for gummosis or gumresinosis could ensure substantial improvement and sustainable production of these materials.

## Conclusion

The future of natural gum and resin industry is uncertain and therefore, a thorough economic study of the national and international trade is necessary. Synthetic products are preferred by the industry

because of the uncertain supply and cost of natural gums and resins. However, unstable oil prices, decreased production and high costs of the synthetic material create a promising future for natural gums and resins. In spite of the competition from synthetic products, natural gum and resins are preferred in certain industries as they are superior.

The tapping methods used are brutal and injurious to the plants, often leading to their death. The technology available is old and the innovations are essential for sustain-able yield and quality control. A concerted effort by researches and agencies such as research institution, Universities and non-governmental agencies is urgently needed to improve all aspects of the industry such as tapping, collection, processing, grading, classification and marketing. R and D are completely lacking in the area of utilization of natural gums and resins. The industry completely depends on traditional and certain ad hoc investigations by individuals. Research into genetic improvement and selection of species for production of gums and resins should be initiated which may lead to establishment of plantation of these species. Gum and resin industry can provide employment and a steady additional income to rural people and thereby stop their migration into the towns and cities.

## References

- Anderson, D.M.W. & A. Hendrie. 1971. Proteinaceous gum polysaccharide from *Azadirachta indica*. *Carbohydrate research* 20: 259-268.
- Barker, J. A. & J. J. Schmid 1976. Parquet-induced lightening in slash pine. *Proceedings of the Lightwood Research Coordination council Annual meeting*. Jacksonville, Florida. PP 88 -101.
- Bhatt, J. R. 1987. Gum tapping in *Anogeissus latifolia* (Combretaceae) using ethephon. *Current Science* 56: 936-940.
- Bhatt, J. R. & H.Y. Mohan Ram 1990. Ethephon induced gum production in *Acacia senegal* and its potential value in the semi-arid regions of India. *Current science* 59: 1247-1250.
- Bhatt, J. R. & J. J. Shah 1985. Ethephon (2-chloroethyl phosphonic acid) enhanced gumresinosis in mango, *Mangifera indica* L. *Indian Journal of Experimental Biology* 23: 330-339.
- Bhatt, J. R. , M. N. B. Nair & H. Y. Mohan Ram 1989. Enhancement of oleo-gumresin production in *Commiphora wightii* by improved tapping technique. *Current Science* 58: 349-357.
- Clapper, R. B. 1954. Stimulation of pine oleoresin flow by fungus inoculation. *Economic Botany* 8: 269-284.
- Conner, A. H., M. A. Diehl & J. W. Row 1977. Induction of lightwood in northern and western conifers. TAPPI conference papers, Madison, WI, USA.
- Cooper, R. W. 1976. Lightwood inducement. Its status today. *Proceedings of the Lightwood Coordination Council Annual Meeting*, Jacksonville, Florida. pp 3-5.
- Coppen, J. J. W. 1995. Gum resins and latex of plant origin. *Non-wood forest products-6*. Food and agriculture organization of United nation.
- Davison, R. L. 1980. *Handbook of water-soluble gums and resins*. McGraw Hill Book company, New York
- Fahn, A. & E. Zamski 1970. The influence of pressure, wind, wounding and growth substance on the rate of resin duct formation in *Pinus halepensis* wood. *Israel Journal of Botany* 19: 429-446.
- Gautami, S. & R. V. Bhat 1992. A monograph of gum Karaya, National Institute of Nutrition, ICMR, Hyderabad, India.
- Hepting, G. H. 1947. Stimulation of oleoresin flow in pines by fungus. *Science* 105: 209.
- Hepting, G. H. 1954. Gum flow and pitch-soak in Virginia pine following *Fusarium* inoculation. USDA Forest Service. Southeast Forest Experiment Station. Paper No.49.
- Howes, F. N. 1950. Age-old resins of the Mediterranean region and their uses, *Economic Botany* 4: 307-316.
- Kiatgrajai, P., A. H. Conner, J. W. Rowe, W. Peters, & D. R. Roberts 1976a. Attempt to induce lightwood in eastern hemlock by treating with paraquat. *Wood and Fibre Science* 8: 170.
- Kiatgrajai, P., A. H. Conner, J. W. Rowe, W. Peters, & D. R. Roberts 1976b. Attempt to induce lightwood in balsam fir and tamarack by treating with parquet. *Wood and fibre Science* 9: 31-36.
- Kossuth, S. V., D. R. Roberts, J. B. Huffman & Shish-chi Wang 1984. Energy value of parquets treated and resin-soaked loblolly pine. *Wood and Fibre Science* 16: 398-402.
- Kumar, S. & V. Shankar 1982. Medicinal plants of Indian desert: *Commiphora wightii* (Anott) Bhand.. *Journal of Arid Environment* 5: 1-11.
- Mantel, C. L. 1949. The water-soluble gums: Their botany source and utilization. *Economic Botany* 3: 3-31.
- Mantel, C. L. 1950. The natural hard resins: Their botany, source and utilization *Economic Botany* 4: 203-242.
- Nair, M. N. B., J. R. Bhatt & J. J. Shah 1985. Induction of traumatic gum cavities in sapwood of neem (*Azadirachta indica* A.Juss.) by ethephon and paraquat. *Indian Journal of Experimental Biology* 23: 60-62.
- Nair, M. N. B., K. R. Patel, J. J. Shah, R. C. Pandalai 1980. Effect of ethephon (2 Chloroethyl phosphonic acid) on gummosis in the bark of *Azadirachta indica*. *Indian Journal of Experimental Biology* 18: 500-503.

- Nair, M. N. B., K. R. Shivanna & H.Y. Mohan Ram 1995. Ethephon enhances karaya gum yield and wound healing response: A preliminary report. *Current Science* 69: 809-810.
- Nix, L. E. 1976. Paraquat induction of resin soaking in pines in South Carolina Piedmont. Proceedings of the Lightwood Research coordination Council Annual meeting, Jacksonville, Florida. Pp. 102-108.
- Perters, W. J. & D. R. Roberts 1976. Paraquat induced lightwood developed in all southern pines. Proceedings of the Lightwood Research Coordination Council Annual Meeting, Jacksonville, Florida. Pp.55-65.
- Peters, W. J., D. R. Roberts, & J. W. Munson 1978. Ethrel, diquat, paraquat interaction in lightwood formation. Proceedings of the Lightwood Research Coordination Council Annual Meeting, Atlanta, Georgia. Pp. 31-39.
- Roberts, D. R. 1973. Inducing lightwood in pine trees by paraquat treatment. USDA Forest Research Notes SE-191.
- Roberts, D. R., N. M. Joye jr., A. T. Proveaux, W. J. Peters & R. V. Lawrence 1973. A new and more efficient method of naval stores production. *Naval store Review* 73: 4-5.
- Rowe, J. W., A. h. Conner, M. A. Diehl & H. Wroblewska 1976. Effect of treating northern and western conifers with paraquat. Proceedings of the lightwood Coordination Council Annual Meeting, Jacksonville, Florida. Pp. 66-76.
- Satyawati, G. V. 1991. Guggulipid. A promising hypolipidaemic agent from guggul (*Commiphora wightii*) In: H. Wagner (ed), *Economic and Medicinal Plant Research* Vol. 4pp. 47-80. Academic Press. Harcourt Brace Javanovich, London.
- Schnell, R. L. & R.L. Toennisson 1978. Paraquat and pine trees in east Tennessee. Proceedings of the Lightwood Coordination Council Annual Meeting, Atlantic Beach, Georgia. Pp. 4-6.
- Setia, R. C. & J. J. Shah 1977a. Effect of Morphactin, IAA and Kinetin on gum canals in *Sterculia urens* Roxb. *Indian Journal of Experimental Biology* 15: 297-301.
- Setia, R. C. & J. J. Shah 1977b. Effect of growth hormones on gumresin canals in *Commiphora mukul* Engl. *Flora* 166: 93-96.
- Snow, A. G. 1949. Research on improvement of turpentine practices. *Economic Botany* 3: 375-394.
- Wild, M. H. & L. J. Edgerton 1975. Histology of ethephon injury on Montmorency cherry branches. *Horticulture Science* 10: 79-81.

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## UTILISATION DURABLE DES GOMMES ET DES RÉSINES PAR UNE TECHNIQUE AMÉLIORÉE DE GEMMAGE PRATIQUÉE SUR CERTAINES ESPÈCES

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### RÉSUMÉ

Les gommés et les résines représentent un groupe important de produits forestiers autres que le bois. Les applications industrielles des gommés et des résines ont connu un essor considérable ces dernières années. Ces produits sont utilisés par de nombreuses industries totalement différentes : papier, textiles, pétroles, produits pharmaceutiques et cosmétiques, produits alimentaires, vernis, laques et savons. Bien qu'un grand nombre de végétaux produisent de la gomme, l'exploitation commerciale est limitée à la famille des légumineuses, des sterculiacées et des combrétacées. La gomme est également extraite de graines, d'algues et de micro-organismes. Les résines sont produites par les végétaux de la famille des pinaceae (colophane, ambre), par des légumineuses (copal), des dipterocarpaceae (dammar), des burseraceae (élémi, encens, guggul - ou myrrhe indienne) et des ombellifères (ase fétide, galbanum). Les gommés et les résines sont considérées comme des sous-produits ou des produits finals de certaines chaînes métaboliques. Des sols pauvres, la sécheresse et d'autres conditions hostiles favorisent la production de gommés et de résines, dont l'Indonésie, l'Inde, la Chine et le Soudan sont les principaux producteurs. Dans le monde entier et en particulier dans les pays en développement, des millions de personnes vivent de la récolte de gommés, de résines et de latex. Mais le marché de ces produits a reculé au cours des années pour plusieurs raisons, dont les principales sont les méthodes non scientifiques et brutales d'extraction, l'exploitation excessive conduisant à la mort de l'arbre saigné et l'offre erratique des produits sur le marché. Pour extraire les gommés et les résines à des fins commerciales, on procède par martelage, écorçage ou en pratiquant de profondes entailles sur le tronc. En raison des méthodes d'extraction dangereuses et antiéconomiques et de l'exploitation excessive, les populations de végétaux producteurs de gommés et de résines ont baissé de façon notable. Faute de cultiver ces végétaux, le risque est grand de perdre les plasmas germinatifs sauvages. Des techniques d'extraction simples et efficaces, qui garantissent un rendement optimal et la régénération des arbres exploités, ont été mises au point pour la gomme arabique (*Acacia senegal*), la gomme ghatti (*Anogeissus latifolia*), la gomme neem (*Azadirachta indica*), le guggul (*Commiphora weightii*) et la gomme karaya (*Sterculia urens*). Ces méthodes, qui permettent une production durable, sont exposées en détail.

**Mots-cléfs :** Gommés, résines, produits forestiers autres que le bois, techniques d'extraction améliorées, éthéphon.

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## УСТОЙЧИВОЕ ИСПОЛЬЗОВАНИЕ ЖИВИЦЫ И СМОЛЫ НЕКОТОРЫХ ВИДОВ ДЕРЕВЬЕВ БЛАГОДАРЯ БОЛЕЕ СОВЕРШЕННЫМ МЕТОДАМ ПОДСОЧКИ

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### РЕЗЮМЕ

Живица и смолы составляют важную группу недревесных лесных товаров. В последние годы резко расширилось промышленное применение живицы и смол. Они используются в самых различных отраслях промышленности, таких, как целлюлозно-бумажная, текстильная, нефтяная, фармацевтическая, парфюмерная, пищевая, лакокрасочная и мыловаренная. Хотя собираемая осенью живица производится большим числом растений, для промышленных заготовок используются только породы семейств Leguminosae, Sterculiaceae и Combretaceae. Живица также извлекается из семян, морских водорослей и микроорганизмов. Смолы добываются из растений семейств Pinaceae (канифоль, янтарная смола), Leguminosae (копал), Dipterocarpaceae (даммар), Burseraceae (элеми, франкинсенс, гуггул) и Umbelliferae (асафетида, гальбанум). Смолы и живица считаются побочными или конечными продуктами некоторых метаболических путей. Бедные почвы, засухи и прочие экстремальные условия способствуют производству живицы и смол. Крупными производителями живицы и смол являются Индонезия, Индия, Китай и Судан. Миллионы людей во всем мире, особенно в развивающихся странах, зависят от заготовок живицы, смол и латекса, которые являются для них источником средств к существованию. Вместе с тем по целому ряду причин рынок этих товаров в последние годы сократился. Основными причинами этого сокращения являются ненаучные и грубые методы подсочки, чрезмерная эксплуатация, ведущая к гибели подсочных деревьев, и нерегулярная поставка на рынки этих товаров. Промышленная подсочка в целях получения живицы и смол производится путем зарубок, ошкуривания или глубоких надрезов на стволах деревьев. По причине варварской подсочки и чрезмерной эксплуатации заметно сократились популяции деревьев, вырабатывающих живицу и смолы. Поскольку эти растения не разводятся, существует серьезная опасность потери генетического фонда дикой природы. Для гуммиарабика (*Acacia senegal*), камеди гхатти (*Anogeissus latifolia*), камеди мелии индийской (*Azadirachta indica*), гуггула (*Commiphora weightii*) и камеди стеркумеи (*Sterculia urens*) были разработаны простые и эффективные методы подсочки, которые обеспечивают оптимальный выход и восстановление подсочных деревьев, что гарантирует устойчивое производство этих материалов. В документе подробно обсуждаются эти методы.

**Ключевые слова:** живица, смолы, недревесные лесные товары, усовершенствованный метод подсочки, этефон.

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# **THE REVIEW OF NON-WOOD FOREST PRODUCTS MANAGEMENT IN TURKEY AS FROM THE FIVE YEAR DEVELOPMENT PLANS AND FORESTRY MAIN PLANS**

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## **Abstract**

Approximately 9500 plant species have been discovered in Turkey which has a rich flora according to other countries as geographically and up to 3000 of these species are endemic species for the country. Some of non-wood forest products which are weighted in the world production also denote endemic species characteristics.

The utility from these resources has increasingly been continuing. As known, the production is realised according to internal and external demands. Because the production potential is very high for home consumption. Therefore, there is a chance for exporting of non-wood forest products for the country. For example, in between 1990 and 1998, a total of \$ 300.937.000 forest products was exported. A part of \$ 294.448.000 of total export revenues was obtained from non-wood forest products. The remaining of it (\$ 6.488.000) was from round wood. In this case, about 98% of total forest products export revenues was obtained from the non-wood forest products.

Although non-wood forest production is very important for Turkey, not so much information are given place in the development plans about it. However, first principles, targets and policies on this point were mentioned clearly in the fourth Five Year Development Plan. For the many plan periods, it has been seen that the production targets of non-wood forest products harvested systematically have been realised over production targets at the end of plan period.

On the other hand, the approaches related to the production of non-wood forest products in Forestry Main Plans which is prepared for the 20 years period are not different from that in the development plans.

In this study, the possible effects of the targets, strategies and policies determined in the Five Year Development and Forestry Main Plans as related to non-wood production on the rational management of wood and non-wood forest products of forest resources owned by State Forest Enterprises have been discussed.

**Keywords:** Non-wood Forest Products, Forest Management, Five Year Development Plans, Forestry Plans

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## **Introduction**

The Five Year Development Plans (FYDPs) are prepared for a five year period to plan the improvement of Turkish economy with the assistance of the targets, principles and policies determined at the macro economic level. In Turkey, planned development periods began in 1960s and the first FYDP was made in 1963. Then until the year 2000, six (6) more FYDP have been prepared and put into practice.

The basis of planning works in question is the sectors formed from enterprises, which activate in various areas. In Turkish economy, forestry is also one of these sectors. The forestry sector needs sectoral plans in order to organise its activities according to targets, principles and policies mentioned in the FYDPs. For this purpose, the General Directorate of Forestry makes Forestry Main Plans (FMP) for a 20-year period in Turkey. The first FMP for 1973 - 1995 period and the second one for 1990 - 2009 were made. Under the FMPs which are made at sectoral level, other plans prepared at the regional and management levels take part in.

The targets and strategies determined in the FYDPs require to be taken part in the sector, region and management plans in the system mentioned above. Unless this consistency is not obtained, it is impossible to state that the existing resources are used effectively and according to the national development plan's targets and strategies. Especially in the sectors in which complex and multi-dimensions activities occur like forestry, obtaining the consistency is more important for these kind of sectors. Therefore, it is required to be consistent among various plans mentioned above for sustaining forest management activities rationally.

On the other hand, the production of forest outputs is generally divided into two main categories as wood and non-wood forest products. The main objective of this paper is to review the management of non-wood forest products in the Turkish Forestry sector. But, it is fact that in Turkish forestry sector, it has not been attached required importance to the non-wood forest outputs so far. So that a forest product is named as fundamental or secondary product according to the management objective, because of the wood raw material management dominating in the forest sector (Türker, 2000), wood based products are fundamental and non-wood based forest products are named as secondary product (GDF, 1998).

However, the importance of the non-wood forest outputs in the Turkish forestry sector is increasing more and more because of the following characteristics; Turkey has a rich flora according to other countries as geographic location and also 9500 plant species have been discovered over the country and up to 3000 of these species are endemic species for the country and lastly some of our non-wood forest products which are weighted in the world production also denote endemic species and a 97 % of total Turkish forest product export revenues in 1990 is non-wood forest products (Ministry of Forestry, 1994, SPO, 1995, Konukçu, 1999).

In Turkish forestry sector, it is stated that the management activities of non-wood forest products are also carried according to the targets, principles and policies determined by FYDPs and FMPs (GDF, 1988). However, in the Turkish forestry sector, it has not been attached required importance to the non-wood forest outputs as mentioned above and consequently, with some problems in practice are faced as will be mentioned later. As a result of these negative situations, in the scope of principles and policies related to forest sector in the seventh FYDP; it is stated that "... forest management and silvicultural plans would be reorganised and applied by taking into consideration wood and non-wood products and services, various functions of forests and management objectives..."It is also stated that a new approaches on the basis of non-wood forest harvesting planning are needed (SPO, 1995).

In this study, the non-wood forest product management in Turkish forestry sector will be reviewed from the point of objective, principles and policies determined in the FYDPs and FMP especially with the assistance of various figures relating to import and export.

## **Material and Method**

In this study, the objectives, principles, targets and policies related to non-wood forest products in the FYDPs and Forestry Special Impression Commission Reports (FSICR) which have been prepared by State Planning Organisation (SPO) since 1963 and FMP made by the General Directorate of Forestry (GDF) for the 1990 - 2009 period have been used as a research material.

On the other hand, in this paper the evaluation of the management of non-wood forest products in the Turkish forestry sector has been reviewed from the point of the FYDPs and FMP in detail.

## **Findings**

### **3.1. The Production of Non-Wood Forest Products in Turkey**

It is possible to classify the goods and services provided by forest resource as national and global benefits according to the level of getting profit (Topak, 1999). Non-wood forest products as one of national benefits are tree, shrub, wooden, grass and herbaceous growing in forest and its open spaces,

various crops obtained from their leaves, flowers, seeds, stems and roots and gum resins. These are also named as secondary forest products (SPO, 1995a).

The production of non-wood forest products in Turkey is realised in two ways as planned and unplanned (SPO, 1995a, GDF, 1995). The planned production has been realised according to the targets determined by the FYDPs, the demands of home and foreign markets and management and silvicultural plans and the basic of budgets, the regulations belong to the logging of forest outputs and the production and sale rules of forest secondary products. Particularly resin, storax, laurel leaf, box-tree, garden stake and fat pine among produced in this way can be taken into account.

On the other hand, other non-wood forest products which have high potential of exporting and distributed forest areas such as pine nuts, chestnut, sage, mushrooms, sumac, lime etc. are produced without any plan and independently from the market demands and in accordance with the articles 37 and 40 of Forest Law 6831, provided stumpage price are taken.

As seen, the production of non-wood forest products in Turkey is realised according to the home and foreign demands. Because the production potential is high for the home consumption. Therefore, the exporting chance of non-wood forest products for the country has been occurred. For example, in between 1990 and 1998, a total of \$ 300 937 000 of forest products was exported. A part of \$ 294 448 000 of total export revenues was obtained from the non-wood forest products. The remaining of it (\$ 6 488 000) was from round wood (Konukçu, 1999), representing 98 % of total forest products exports.

### 3.2 Five Year Development Plans and Non-Wood Forest Outputs Production

In this part of the study, a general review of the production of non-wood forest products will be made according to the FYDPs. As the production of these crops is generally devoted to exportation, the information about exporting and importing of non-wood forest products are given below table for all plan periods and \$317 311 000 in the sixth plan period and \$302 534 000 in the first three years of seventh FYDP are paid for importing the natural rubber also shown in that table (Konukçu, 1999).

The production of the non-wood forest products is different for each plan period. Therefore, the FYDPs will be reviewed one by one.

**Table : Exports and Imports Non-Wood Forest Products in Turkey**

PLAN PERIOD	YEARS	Export (\$)	Import (\$)	Import - Export (\$)	Import/Export (%)
I	1963 - 1967	11 279	456	10 823	4
II	1968 - 1972	13 235	500	12 735	4
III	1973 - 1977	34 723	695	34 028	2
IV	1979 - 1983	76 764	256	76 508	-
V	1985 - 1989	177 367 800	5 656 000	171 711 000	3
VI	1990 - 1994	141 720 000	13 861 000	127 859 000	10
VII*	1996 - 2000	119 568 000	27 562 000	92 006 000	23

*\*/ First three years achievements*

#### I. FYDP Period (1963 -1967)

The forestry sector is a sub-sector of Agricultural sector in this plan period (1963 - 1967). In this plan, it is only anticipated that valonia oak and stone pine forests seen as considerable export material are subjected to special forest regime to prevent the destruction of it related to the production and management of the non-wood forest outputs (SPO, 1963). There are some more information about the supply, demand, import and export estimations of the non-wood forest outputs and various policies relating to this subject in the first Five Year Forestry Development Plan which was made for the same period and source for the first FYDP in detail (Ministry of Agriculture [GDF], 1963).

On the other hand, when looking at home demand estimations for the non-wood forest products in the first FYDP period, while it was not anticipated any increase in resin, about - 2 % annual average increase in other non wood forest products would be realised, in another word, it was estimated that a 2 % decrease in the home demand of non-wood forest products would be occurred in the first plan period. However, when looking at foreign demand estimations in the same period, it was estimated that about 9.7 % annual average increase would be occurred at the end of period. In this plan period, it is stated that the achievement rate of the targets determined as related to the production of non-wood forest outputs was 30 - 50 % (SPO, 1968).

However, at the end of first FYDP, about \$ 11.279 export revenue was obtained from the non-wood forest outputs production and only \$ 456 of non-wood forest products was imported. Consequently, in the first plan period, a total of \$10 823 net foreign exchange revenue was obtained from the non wood forest products for the national economy (SPO, 1985a).

## **II. FYDP Period (1968 - 1972)**

In the second FYDP, it is noticed that the estimations of the production export and import relating to resin and other non-wood forest outputs. According to these information, annual increases in home demands were estimated to be 8 % in resin and 1.2 % in other non wood forest outputs during the second plan period. For the same period, when looking at the foreign demands of the non-wood forest outputs; it was estimated that while there was no any increase in the resin production, about 1.4 % annual demand increase in the other non-wood forest outputs would be occurred. On the other hand, annual production increases were estimated to be 20 % in resin, 3.7 % in storax and 1.3 % in other non wood forest outputs during the same period.

At the end of the plan period in question, a total of \$ 13.235 non wood forest output export revenues was obtained from the non wood forest outputs such as storax, valonia oak and pine nuts. Consequently, the amount of import in the same plan period was a \$ 500. So in the second plan period, a total of \$ 10.823 net foreign exchange revenue was obtained from the non wood forest products for the national economy (SPO, 1985a).

## **III. FYDP Period (1973 - 1977)**

In third FYDP period, any principle and policies related to the non-wood forest products and services have not been noticed. But during this period, annual increases of non-wood forest outputs were estimated to be 3.1 % in the home demand and 10.8 % in the foreign demand. In the period in question, while it was reached to a 66 % of the annual increase proportion at the level of general production expected in the forestry sector, a 22 % annual increase rate aimed in the non-wood forest products was realised.

In the plan period, a total of \$ 34 723 revenue from exporting the non-wood forest outputs were obtained and a \$ 695 of the non-wood forest outputs was imported. So at the end of the third plan period, a total of \$ 34.028 net foreign exchange revenue was obtained from the non wood forest products (SPO, 1985a).

## **IV. FYDP Period (1979 - 1983)**

The targets in detail about the non-wood forest outputs were recognised in the fourth FYDP prepared for the 1979 - 1983 period. In this context, it was stated that a 7.4 % annual increase in the home demand of forestry sector outputs including fire wood and secondary products would be occurred ( 2.1 % in non-wood forest products) and about 150 million TL revenue from the exporting of secondary products would obtained and again among the targets, meeting the demand of forest products with the home (internal) production, but the importing of some tree species which are not growing in Turkey and required for some uses and some secondary products would be occurred.

In this period, a total of \$ 76 764 export revenues were obtained from the non-wood forest output s and a \$ 256 of the non-wood forest outputs was imported. So at end of the fourth plan period, a total of \$ 76.508 net foreign exchange revenue was obtained from the non wood forest products (SPO, 1985a).

## **V. FYDP Period (1985 - 1989)**

The forestry sector is accepted as a sub sector under the agricultural sector in the fifth FYDP. It was exposed that the management works related to the non-wood forest products including the non-wood products and services would be concentrated as an objective (SPO, 1985). In this plan period, annual average increases were estimated to be 0.2 in the demand of the non-wood forest products and 9.2 % in rubber. In the same period and also annual average increases were estimated to be 5.9 % in the non-wood forest products export and 7.7 % in their importation and 9.2 % in the rubber importing and lastly 1.2 % in the production of the non-wood forest outputs.

At the end of the period in question, a total of \$177 367 800 export revenue was obtained and a \$5 656 000 of the non-wood forest products was imported (SPO, 1985a).

## **VI. FYDP Period (1990 - 1994)**

After the fifth plan period, a written target related to non-wood forest products (especially finishing the non-wood products inventory works) is recognised in this plan. In addition, in the scope of the principles, policies placed in the plan; it was accepted that the organisation, the body of current law and education of forestry were reorganised according to all functions of the forest resources producing the wood and non-wood products. Furthermore, annual increases were estimated to be 1.9 % in the demand of non-wood forest outputs and 5.7 % in the rubber and 2.9 % in the production during this plan period (SPO, 1990).

On the other hand, at the end of plan period a \$ 141 720 000 of export revenue was obtained and a \$13 86 000 of non-wood forest products was imported (SPO, 1995; Konukçu, 1999).

## **VII. FYDP Period (1996 - 2000)**

Lastly in the seventh FYDP prepared for the 1996 - 2000 period, forestry sector was a sub-sector of agricultural sector as it was in the fifth FYDP. It was stated that the reorganising the management and silvicultural plans should be made considering to the non-wood forest products. However, it is possible to find some more information detailed in the Forestry Special Impression Commission Reports (FSICR) prepared for the period in question.

The improvements proposed for the seventh FYDP period as related to the non-wood forest products, which is the topic of research, are stated as the following:

- It is expected that conservation - cultivation and harvesting plan and projects related to the species completed the field and stock inventories were completed and put into practice;
- It is also expected that the cultivation of non-wood forest products that have high economic value subject to foreign trade is encouraged.

As the revenue from the produced non-wood outputs would be more than others, it is expected that the exporting the produced non-wood are increased.

At the end of first three years of the plan period, a total of \$ 119.586.000 revenue was obtained from the exporting of non-wood forest products and a \$ 27.562.000 non-wood forest outputs was imported and a total of \$ 92.006.000 net foreign exchange revenue was obtained from the non wood forest products (Konukçu, 1999).

## **Forestry Main Plan and Non-Wood Forest Outputs Production**

The sectoral developments mentioned in the national development plans including social and economic preferences related to forestry are examined at the macro level and it is not stated that how the improvements of sectors at the level and direction previously determined would be realised. Forestry Main Plan organises internal activities of forestry sector and deals with integration in itself. With this perspective, FMP aims to make connection between national plan's targets and detailed projects related to realise the targets to reach the sectoral development determined by the national plans.

In the FMP made for the 1990 - 2009 period, under the topic of secondary forest products harvesting activities, firstly the definition of non - wood forest products was made and then present position, the status and policy of employment made for this purpose and problems faced as related to the matter were examined. Then the improvements and achievements were reviewed according to the FYDPs. Lastly, the targets of 1990 - 2000 period, utilities to be provided and policies to be followed and precautions to be taken were determined. In this plan the policies and precautions related to non-wood forest products were determined as the following:

- The inventory works which were firstly done in 1978 should be done periodically for protecting the existence of forest secondary products in the nature and to be produced according to the principle of sustain yield;
- Co-operating with the various research organisations and universities;
- To be followed the books and periodicals related the subject;
- To be explained that these resource are needed to be used by protecting and planning by co-operating with the TRT (Turkish Radio Television);
- It is decided to be taken financial measures for the works which will be periodically done in the context of non-wood forest products and cultivation to be prepared in this area and assistant personnel, tool-equipment needed for these works.

## **Results And Recommendations**

The proportions of Turkish forestry sector's export and import in the national export and import are at the level might be ignored such as 0.0005 and 0.0006 per cent (Türker, 1999). However, a majority of forestry sector's export in the national economy is non-wood forest products export. As a matter of fact, in Turkish forestry sector in the period (1990 - 1998), about 98 % of forest product export and 2 % of its import were from non-wood forest products. In this case, non-wood forest products contain forest outputs that are produced to meet the foreign demand and a \$ 28.113.900 foreign exchange were obtained in related period.

On the other hand, as related to non-wood forest outputs in the Turkish forestry sector, although various objectives, principles and policy were determined in the FYDPs and FMP, many problems have occurred in the management activities of non-wood forest outputs production and their applications.

Among these problems, it is especially stated that the non-wood forest products are rapidly destroyed as a result of unplanned, unconscious, faulty, excessive utility and technical, legal and institutional arrangements to prevent the destruction made with the disappearing some important species and illegal collections can not be realised (SPO, 1995).

In this scope, that it is not attached importance to export the manufactured non-wood forest product and to be exported the wet or seasoned plant are other problems as related to non-wood forest products in Turkey. For this reason, considerable amounts of foreign exchange are lost and unmanufactured vegetable outputs are imported. On the other hand, enough research on the production techniques for non-wood forest products such as resin, storax have not been done far, economic loses are occurred for the national economy (Turkish Ministry of Forestry, 1994).

In addition, any detailed inventory information relating to the scope and potential amount of non-wood forest products are not available, existing inventory information are periodically repeated. Thus, as it has not been sufficiently attached importance to the non-wood forest products at the macro level in the FYDPs and FMP and accepted as secondary products, to be realised a effective and productive non-wood forest products management has been getting difficult at the level of forest enterprises.

By taking into consideration all difficulties and given earlier information, required recommendations to be improved the management of non-wood forest products can be stated as follow:

- Firstly, it should be attached into required importance to the exportation of the non-wood forest products by considering their proportion in the Turkish forest export. At this point, favourable

inventories relating to especially existing and potential products have to be constituted and these inventories should be regularly repeated and technical and legal arrangements that will diminish the unregistered production to minimal level have to be reviewed;

- The basis of increasing the exportation is to make the products suitable for world standards. Therefore, instead of marketing the non-wood forest products as a raw and unmanufactured material, maximum contribution to the national economy has to be obtained by importing the products as final crop manufactured in suitable places at the world standards. In addition, growing by cultivation works of crops which have high economic value should be encouraged and in this way, technical and economic assistance to forest villages should be made (SPO, 1995a);
- On the other hand, forest resources should be planned by considering the alternative production methods which the enterprise and local community are able to obtain more income and gain welfare in the frame of continuity principle. In this case, forest enterprises should be purposed, planned and managed by taking into consideration the non-wood vegetable crops. As related this matter, management plans should be extended to operation plans (Geray, 1998). In this context, the discrimination of main forest product - secondary forest product in Turkish forest management should be abandoned and the idea which a product might be a main or secondary product according to the management objective should be adopted and put into practice. For this purpose, the management objectives at the level forest enterprises should be clearly determined according to the targets, principles and policies mentioned in the FMP, FYDPs, and the non-wood forest products should take place among these objectives as depending upon time, place and socio-economic conditions;
- Lastly, as a necessity of modern forest management and multiple use benefits from forest resources, a new approach which will be adopted and applied to improve the non-wood forest products and their production and management should be developed as soon as possible.

## References

- GERAY, U., The Management of Forest Resources, 115p, 1998, SPO Publication, Ankara.
- KONUĞU, M. Statistical Profile of Turkish Forestry, SPO, 1998, Ankara.
- SPO, I. Five Year Development Plan, 1963, Ankara.
- SPO, II. Five Year Development Plan, 1968, Ankara.
- SPO, V. Five Year Development Plan, Forestry Special Impression Commission Report, 1985, Ankara.
- SPO, (a) V. Five Year Development Plan, 1985, Ankara.
- SPO, VI. Five Year Development Plan, 1990, Ankara.
- SPO, VII. Five Year Development Plan, Forestry Special Impression Commission Report, 1995, Ankara.
- SPO, (a) VII. Five Year Development Plan, 1995, Ankara.
- THE GENERAL DIRECTORATE OF FORESTRY, Forestry Main Plan 1990 - 2009, Publication No: 3, 1988, Ankara.
- THE GENERAL DIRECTORATE OF FORESTRY, Turkish Forestry in the 150th Year of Its Establishment, 1989, Ankara.
- THE TURKISH MINISTRY OF AGRICULTURE-[GDF], I. Five Year Forestry Development Plan, 1963, Ankara.
- THE TURKISH MINISTRY OF FORESTRY, The Production and Sale Principles of Forest Secondary Outputs, 1995, Ankara.
- THE TURKISH MINISTRY OF FORESTRY, I. Forestry Council, Decisions, 1994, Ankara.
- TOPAK, M. The Economic Value of Turkish Forest Products, AGM Technical Bulletin, September 1999, Ankara.
- TÜRKER, M.F. Forest Management Lecturer Notes, Karadeniz Technical University, Faculty of Forestry, Lecturer's Notes Number No: 59, 2000, Trabzon, Turkey.
- TÜRKER, M.F., The Determination of the Importance of the Forestry Sector in National Economy Using Input-Output Analysis, Turkish Journal of Agriculture and Forestry 23, Additional Issue 1, 1999, TÜBİTAK, Ankara.

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## ÉVALUATION DE LA GESTION DES PRODUITS FORESTIERS AUTRES QUE LE BOIS DANS LES PLANS DE DÉVELOPPEMENT QUINQUENNAUX ET DANS LES PLANS D'AMÉNAGEMENT FORESTIER

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### RÉSUMÉ

On a procédé à l'évaluation d'environ 9 500 espèces végétales en Turquie, qui a une flore riche par rapport à d'autres pays; 3 000 espèces sont endémiques. Certains produits forestiers autres que le bois qui ont une certaine importance dans la production mondiale sont également endémiques.

L'utilisation de ces ressources n'a cessé d'augmenter. La production s'adapte à la demande intérieure et extérieure. Le potentiel de production est très élevé pour la consommation intérieure. La Turquie a donc maintenant une possibilité d'exporter, qu'il lui faut saisir. Par exemple, entre 1990 et 1998, elle a exporté des produits forestiers pour un total de 300 937 000 dollars É.-U., dont 294 449 000 dollars É.-U. revenaient aux produits autres que le bois. Le reste (6 488 000 \$ É.-U.) était attribuable aux bois ronds. Dans ce cas, 98 % du total des revenus tirés de l'exportation des produits forestiers revenaient aux produits non ligneux.

Bien que la production de produits forestiers autres que le bois soit très importante pour la Turquie, les plans de développement ne contiennent pas beaucoup d'information à ce sujet. En revanche, des principes, objectifs et politiques prioritaires ont été énoncés clairement dans le sixième plan de développement quinquennal. Pour les plans pluriannuels, on a constaté que les objectifs de production de ces produits, récoltés systématiquement, avaient été atteints à la fin de la période.

Par ailleurs, les modes d'approche retenus pour les produits forestiers autres que le bois dans les principaux plans d'aménagement forestier établis pour une période de 20 ans ne sont pas différents de ceux qui sont utilisés pour les plans de développement.

Les auteurs de l'étude examinent les effets possibles des objectifs, de la stratégie et des politiques du plan de développement quinquennal et des plans d'aménagement forestier en ce qui concerne les produits autres que le bois, sur la gestion rationnelle des ressources forestières ligneuses et non ligneuses appartenant aux entreprises forestières publiques.

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## **ОБЗОР ПОЛОЖЕНИЙ, КАСАЮЩИХСЯ РАЦИОНАЛЬНОЙ ЗАГОТОВКИ НЕДРЕВЕСНЫХ ЛЕСНЫХ ТОВАРОВ, В ПЯТИЛЕТНИХ ПЛАНАХ РАЗВИТИЯ И ОСНОВНЫХ ПЛАНАХ РАЗВИТИЯ ЛЕСНОГО ХОЗЯЙСТВА**

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### **РЕЗЮМЕ**

В Турции, обладающей богатой флорой по сравнению с другими странами, произрастает примерно 9 500 видов растений, причем 3 000 из них являются эндемическими. Некоторым из турецких недревесных лесных товаров, занимающих важное место в мировом производстве, также присущи характеристики эндемических видов.

Ценность этих ресурсов постоянно возрастает. Их заготовка осуществляется в соответствии с внутренним и внешним спросом. Возможности заготовок чрезвычайно высоки и превышают потребности внутреннего потребления. В связи с этим значительная роль отводится экспорту недревесных лесных товаров. Например, в период 1990-1998 годов экспорт лесных товаров составил в целом 300 937 000 долл. США. На долю недревесных лесных товаров в этом экспорте приходилось 294 449 000 долл. США. Остальная часть (6 488 000 долл. США) приходилась на круглые лесоматериалы. Таким образом, недревесные лесные товары составляли 98% общего экспорта лесных товаров.

Хотя заготовки недревесных лесных товаров весьма важны для Турции, в планах развития не содержится значительной информации по этому вопросу. Однако в шестом пятилетнем плане развития впервые были четко указаны принципы, задачи и меры. Можно отметить, что плановые задания по заготовке недревесных лесных товаров неоднократно перевыполнялись.

С другой стороны, подходы к заготовке недревесных лесных товаров, которые определены в основных планах развития лесного хозяйства на 20-летний период, не отличаются от подходов, предусмотренных планами развития.

В настоящем исследовании рассматриваются возможные последствия реализации задач, стратегии и мер, определенных в пятилетних планах развития и основных планах развития лесного хозяйства, для рационального использования древесных и недревесных лесных товаров и лесных ресурсов, принадлежащих государственным лесохозяйственным предприятиям.

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# CONSERVATION OF MEDICINAL PLANTS IN IDUKKI DISTRICT OF KERALA BY COMMUNITY MANAGEMENT

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## Abstract

(Not available in French & Russian)

Rural people in the Asian countries are familiar with the medicinal properties of plants growing close to their homes, in the open fields, margin of the water bodies, waste lands and the near by forests. The herbal doctors in the villages are well acquainted with various plants they need for different ailments. The knowledge about these plants and the various formulations made were usually kept as family or professional secrets. They are passed on from the parent to the offspring orally and through demonstrations. Such professional practices are continued even today but many of this precious knowledge were lost as no written records were kept. The objectives of the study were:

- (1) To create awareness among local communities on the urgent need of conservation of medicinal plants;
- (2) Ensuring people's participation for conserving medicinal plants and traditional culture;
- (3) To conserve RET (Rare, endangered and threatened) plants.

A survey of medicinal plants in Idukki district was carried out. 1000 herbarium (434 species) were prepared from the sample collected. Seeds of 169 species and 50 raw drugs were collected and displayed in the medicinal plant museum. The establishment of herbarium, seeds and raw drugs museum is for the purpose of documentation, education, training and research on medicinal plants. The survey indicates that out of 116 RET species recorded in South India 56 was present in Idukki district. An Ethno-medicinal forest is established in 10-acre land containing 98 species of medicinal plants. These plants were either already existing in the area or introduced. The introduced plants are RET species or locally available ones. The Ethno-medicinal forest has two main objectives A priority list of species to be grown in the EMF is made based on the Ethno-medicinal needs of the local people. The various species grown in EMF is maintained with their natural association as a poly-culture simulating a forest ecosystem. A massive training programme was undertaken to create awareness in local communities on the urgent need of conservation and sustainable use of medicinal plants, preservation of the local Ethano-medical traditions and people's health culture. The target groups were women, village health workers, self-help groups, Schoolteachers, school children, medicinal plant cultivators and raw drug collectors. Training was given to 13946 persons on the importance and relevance of medicinal plants for the primary health care needs. Preparation of simple traditional formulations for head-ache, cough, fever, cuts, wounds, sore eyes, burning sensations, menstrual disorders, pregnancy care, increasing breast milk, scabies, fungal infections, general immunity, liver tonics and mental tonics using local herbs were also demonstrated. Cultivation of medicinal plants such as *Acorus calamus*, *Alpinia galanga*, *Curcuma domestica*, *Kaempferia galanga*, *Piper longam*, *Plubago rosea*, *Pseudarthria viscida* and *Zingiber officinalis* were promoted and taken up by 104 marginal farmers. 25 per cent farmers stooped the cultivation after a short time, 25 per cent continued as they were persuaded and the rest 50 per cent were really motivated and continue active propagation of the species they selected

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## Introduction

Rural people in the Asian countries are familiar with the medicinal properties of plants growing close to their homes, in the open fields, margin of the water bodies, waste lands and the near by forests (Rao and Rao 1998). The herbal doctors in the villages are well acquainted with various plants they need

for different ailments. The knowledge about these plants and the various formulations made were usually kept as family or professional secrets. They are passed on from the parent to the offspring orally and through demonstrations. Such professional practices are continued even today but many of this precious knowledge were lost as no written records were kept. (Rao and Rao 1998).

The bio-diversity of medicinal plants in India is associated with the rich cultural diversity related to traditional system of medicine. Besides the known reasons for the loss of plant bio-diversity, the disintegration of cultural diversity is also responsible for the destruction of medicinal plants. According to World Health Organization (WHO) more than 80 per cent of the world's population in the developing countries depend on traditional medicine for their primary health care. Over 1.3 billion people in the world can hardly afford to spend any money on modern medicine and therefore have to resort to local medicinal plants for their health needs. Out of the 350,000 higher plants identified so far about 35,000 (the estimates vary) species have at one time or other used by some people or cultures for medicinal purpose. Presently there is a resurgence of natural product-based industries and pharmaceutical products because of the interest created in the developed countries for traditional medicine and natural products. Consequently the traditional medicine has now becoming more costly and unaffordable to the poor. The revitalization of the local health tradition would therefore lead to the conservation of rich traditional knowledge and the species used by the local people. This also ensures availability of effective and cheap health care needs to the local poor.

Twenty-five per cent of all prescription drugs for developed countries consist of unmodified or slightly modified higher plant products. Reserpine from *Rauwolfia serpentina* as a tranquilizer and anti-hypertensive (Schlittler and Plummer 1965, Mukerji 1965, Bein 1970, Kobinger 1984), digoxin and digitoxin from *Digitalis* as cardiotoxic glycosides (Aronson 1984), quinine and quinidine from *Cinchona* (Szekeres and Papp 1984) for malaria are few examples. Many more medicines from plants are being introduced for treatment of human diseases. Diosgenin from Mexican yam (*Dioscorea*) which is not directly used as medicine but eventually led to the manufacture of contraceptive pill and corticosteroids (Djerassi, 1984). Vinblastin/vincristin from *Catharanthus roseus*, etoposide and taxol (van Seters 1997) and styrylpyrone derivative (Azimatol et al.1998) are anticancer drugs. Guglipid a hypolipidaemic agent is prepared from the gum-resin of *Commiphora wightii* (Satyavati 1991).

Tropical forests are the storehouse of bio-diversity and natural resources. Rainforest contains no less than 60 per cent of all higher plant species known on earth and they provide everything needed for human survival. Through many years of evolution plants have developed large numbers of chemical substance to defend themselves against pest and pathogenic diseases. These chemical substances, at least some of them, can act within the human body against micro-organisms and other causes of diseases. They represent important sources of natural drugs. They are highly complex and their molecular structures surpass the imagination of the chemists and cannot easily be reproduced in the laboratory (van Seters 1997).

### **Why conservation of medicinal plants?**

Well-reasoned arguments were made many years ago to raise public awareness that tropical rain forest and seasonally dry monsoon forest were destroyed in alarming pace. These arguments were largely ignored and today dramatic pleas were made to conserve our bio-diversity. They too are often falling on deaf ears except of a few environmentalist and organizations. The cry of ecological genocide, genetic erosion, biotic degeneration, global crisis, fragmentation, destruction, extinction of our biological heritage, all is consequence of inaction (Krikorian 1998). Nevertheless, the destruction of forest continues faster than ever pace.

Medicinal plants and their natural habitat are under greater threat of over exploitation than ever before. Indian herbal industry has an annual turnover of about 300 million US dollars. The world market of medicinal herbs for skin care and toiletries are worth US \$ 1billion (Farida Binti Ahmad Fadzil 1998). Several tones of medicinal plants are harvested every year from about 165,000 ha forest. An estimate in 1996 shows that India have 100 medium scale industries, over 5000 small scale industries including cottage level, using about 450 species of medicinal plants, 95 per cent of which are collected from wild.

More than 40,000 Air Dried Metric Tones (ADMT) of *Sida rhombifolia* is collected from wild per year and requirement may goes up to 80,000 ADMT in the next 10 years. *Rauwolfia serpentina*, *Dioscoria*, and *Cassia senna* are currently exported at the range of 10,000 to 50,000 ADMT per year. In addition local communities have been traditionally meeting their health needs using over 7000 species. 40,000 registered physicians of Ayurveda, Unnani, Siddha and Amchi systems also use substantial quantities of medicinal plants (Darshan Shankar and Majumdar 1997).

Kerala is one of India's largest producers of traditional medicines. There is an unprecedented sprout of manufacturing units of Ayurvedic products in Kerala and about 1700 manufacturing units are registered with Government. In Kerala alone 8000 to 10,000 ADMT of single species such as *Andrographis paniculata* is consumed annually. With the increasing demand of medicinal plants, there is a strong likely good that in the next decade their entire natural source will be wiped out. Little is done to augment their in situ and Ex situ source. Only less than 30 medicinal plant species are under cultivation in sizable acreage in India (Somashankar and Anandamurthy 2000).

Kerala has the highest population density in India (747 people /km<sup>2</sup>, 1300 people/km<sup>2</sup> in coastal area). Urbanization has cleared the native vegetation from inhabited planes and availability of medicinal plants is mostly confined to the Western Ghats. Southern stretch of Western Ghats is considered as one of the richest pockets of bio-diversity in the world and classified as a 'Hot spot' by IUCN. Deforestation has been rampant and the area under forest has shrunk. Encroachment projects and plantations have all contributed to the sorry state of affairs. Plants such as *Saraca asoka* (*Asokam*), *Conscinium fenestratum* (*Maramanjil*), *Aegle marmalos* (*Koovalam*), *Sida cordifolia* (*Bala*), *Emblica officinalis* (*Gooseberry*), *Tinospora cordifolia* (*Amruth*) and *Asperagus recemosa* (*Sathaveri*) which were abundant are now become rare. Therefore clear comprehensive, ecologically sound management plans based on scientific studies and long term strategies and practices should be evolved to ensure conservation and sustainable management of medicinal plants.

#### The objectives of the study were

- To create awareness among local communities on the urgent need of conservation of medicinal plants;
- To build on the strength of local Ethno-medical tradition of Idukki district and peoples health culture;
- Ensuring people's participation for conserving medicinal plants and traditional culture;
- To conserve RET (Rare, endangered and threatened) plants;
- To document medicinal plant bio-diversity and promote their ex situ conservation.

#### Physiography of Idukki district

Idukki district is part of the Western Ghats with steep slopes and undulations. The soil is laterite and brown. The altitude is 150 to 950 m, Latitude 10°N, and Longitude 77°E. The area receives rainfall from 2500 mm to 425 mm and the temperature range from 15°C to 30°C. Dry period is December to April. The forest types in Idukki are dry deciduous to moist evergreen. The details of the area studied are given in Table 1.

**Table 1: The details of the area studied**

Forest area	Division	Altitude (meters)
Ayyappancoil	Kottayam	750
Painavu	Kothamangalam	800
Thommankuthu	Kothamanagalam	150
Neryamangalam	Munnar	500
Vaguraram	Munnar	1800
Chinnar santury	Marayur	600
Thekkady	Thekkady	825
Koshikkanam	Thekkady	950

## **Establishment of Herbarium, Seed and Raw Drug Centre**

A survey of medicinal plants in Idukki district was carried out. 1000 herbarium (434 species) were prepared from the sample collected. Seeds of 169 species and 50 raw drugs were collected and displayed in the medicinal plant museum. The establishment of herbarium, seeds and raw drugs museum is for the purpose of documentation, education, training and research on medicinal plants. The survey indicates that out of 116 RET species recorded in South India 56 was present in Idukki district.

## ***Ethno-Medicinal Forest (EMF)***

An Ethno-medicinal forest is established in 10-acre land containing 98 species of medicinal plants. These plants were either already existing in the area or introduced. The introduced plants are RET species or locally available ones. The Ethno-medicinal forest has two main objectives.

### ***Conservation***

A priority list of species to be grown in the EMF is made based on the Ethno-medicinal needs of the local people. The various species grown in EMF is maintained with their natural association as a poly-culture simulating a forest ecosystem. The conservation value is enhanced as same species from various sites are introduced in the EMF, which would enhance genetic variability.

### ***Education and training***

EMF is used as an outdoor center of attraction. The medicinal plants especially trees; shrubs and herbs all are labeled. Pamphlets with suitable information are being made for distribution. The EMF will be used in future as a source of seeds for exchange and commercial purpose.

### ***Nursery***

A central nursery was established and 85 species (including the RET species) of medicinal plants were raised for meeting the local requirements of medicinal plants species for EMF.

### ***Community Participation***

As peoples participation is essential for any conservation programme the prime objective of the project was to develop activity to motivate and ensure the whole-hearted co-operation of the target group for the revitalization of the traditional health system and information to conserve medicinal plants. In order to document the local health care needs and the traditional health system, 72 traditional healers (Nattuvaidyas) and 225 households were interviewed. We also conducted a participatory assessment workshop involving 76 representatives from 10 villages to understand the primary health problems and health care needs for their villages. A rapid assessment workshop for three days was organized to assess the validity of the information collected on the traditional health care system and the efficacy of the treatment both the doctors and patients view. Sound practices were identified through open and transparent exchange of experiences. 82 knowledgeable women, 15 doctors from various systems medicinal practice such as allopathic, Ayurvedic and siddha, 8 traditional healers (Nattuvaidyas) and members from various organizations participated in the workshop.

It was not easy to implement community management programme in all 70 villages selected for the study simultaneously. Therefore we planned to train the villages stage by stage (table 2). Firstly we have selected 6 villages (including first and second phase) and 16 villages for the next four years (8 in the first half and 8 in the second half). The area covered is given in the figure 1. The 70 villages selected have total population of about 75,000 people.

Table 2: Year wise programme of selection of villages for training

Year	Phase	No. Villages selected
1995-1996	First	3
	Second	3
1996-1997	First	8
	Second	8
1997-1998	First	8
	Second	8
1998-1999	First	8
	Second	8
1999-2000	First	8
	Second	8

### Mode of Implementation

The target groups were identified through Peermade Development Society's network. We were able to reach the people through Self Help Group (SHG), Mahila Sangham (women's associations), forming new groups, interaction with PDS other developmental programme and schools. To motivate the people to grow medicinal plants, we offered a reward for people who have maintained a Kitchen Herbal Garden (KHG), and supplied medicinal plants in a subsidized rate and involved them in economic programme.

A massive training programme was undertaken to create awareness in local communities on the urgent need of conservation and sustainable use of medicinal plants, preservation of the local Ethano-medical traditions and people's health culture. We envisaged that this training would eventually lead to people's participation in the conservation of medicinal plants. The target groups were women, village health workers, self-help groups, Schoolteachers, school children, medicinal plant cultivators and raw drug collectors. Training was given to 13946 persons on the importance and relevance of medicinal plants for the primary health care needs. Preparation of simple traditional formulations for head-ache, cough, fever, cuts, wounds, sore eyes, burning sensations, menstrual disorders, pregnancy care, increasing breast milk, scabies, fungal infections, general immunity, liver tonics and mental tonics using local herbs were also demonstrated. To consolidate and co-ordinate this programme 59 meetings were conducted involving all village health workers and the training staffs. Sixteen exhibitions were conducted on medicinal plants and traditional medicines to motivate and induce awareness among local people about the importance of medicinal plant conservation. Cultivation of medicinal plants such as *Acorus calamus*, *Alpinia galanga*, *Curcuma domestica*, *Kaempferia galanga*, *Piper longam*, *Plubago rosea*, *Pseudarthria viscida* and *Zingiber officinalis* were promoted and taken up by 104 marginal farmers. 25 per cent farmers stopped the cultivation after a short time, 25 per cent continued as they were persuaded and the rest 50 per cent were really motivated and continue active propagation of the species they selected. Medicinal plants which are used for the preparation of "Murivenna" that is very effective for cuts, wound and ulcers are cultivated and preserved by the community without other motivation. Generally the local people conserve plants that are economic, health and spiritual use.

### References

- Aronson, J.K. 1984. Digitalis: In Parnham, M.J. and Bruinvels, J. (Eds) discoveries in Pharmacology. Volume 2. Haemodynamics, Hormones and Inflammation. Elsevier; Amsterdam, New York, Oxford. Pp163-184.
- Azimahtol, Hawariah, L.P. and Soliman, W. 1998. A gift of bio-diversity: an anticancer compound from traditional herbal plant. In: Nair, M.N.B. and Nathan Ganpathy (Ed) Medicinal plants cure for the 21<sup>st</sup> century. University Putra Malaysia, Faculty of Forestry. Serdang, pp 152-153.

- Bein, H.J. 1970. Biological research in pharmaceuticals industry with Reserpine. In: Frank, J. Ayd and Barry Blackwell, J.B. (Ed) Discoveries in Biological psychiatry. Lippincott: Philadelphia, pp 142-154.
- Darshan Shankar and Majumdar, B. 1997. Beyond the bio-diversity convention: the challenges facing the bio-cultural heritage of India's medicinal plants. Non-wood forest Products. 11. Food and Agriculture Organization of United Nations. Pp 87-108.
- Djerassi, C. 1984. The chemical history of pill. In: Parnham, M.J. and Bruinvels, J. (Ed's) discoveries in Pharmacology. Volume 2. Haemodynamics, Hormones and Inflammation. Elsevier; Amsterdam, New York, Oxford. Pp 339-361.
- Faridah Binti Ahmad Fadzil. 1998. The commercialization of local medicinal herb in skin care and toiletries products. In: Nair, M.N.B. and Nathan Ganpathy (Ed) Medicinal plants cure for the 21<sup>st</sup> century. University Putra Malaysia, Faculty of Forestry. Serdang, pp 130-132..
- Kobinger, W. 1984. Central anti-hypertensive. In: Parnham, M.J. and Bruinvels, J. (Ed's) discoveries in Pharmacology. Volume 2. Haemodynamics, Hormones and Inflammation. Elsevier; Amsterdam, New York, Oxford. Pp. 107-123.
- Krikorian, A. D. 1998. Medicinal plants and tropical forest: Some orthodox and some not so orthodox musing. In: Nair, M.N.B. and Nathan Ganpathy (Ed) Medicinal plants cure for the 21<sup>st</sup> century. University Putra Malaysia, Faculty of Forestry. Serdang, pp. 32-110.
- Mukerji, B. 1965. History of *Rauwolfia serpentina* and our early investigations. In: Chen, K.K., Mukerji, B. and Volicer, L. (Eds.) Pharmacology of Oriental plants. (Proceedings of the second International Pharmacological meeting, 1963, Prague, Czechoslovakia). A Pergamon Press Book. Macmillan Co. New York.
- Rao, A.N. and Rao Ramanatha 1998. Strategies for conservation of medicinal plants. In: Nair, M.N.B. and Nathan Ganpathy (Ed) Medicinal plants cure for the 21<sup>st</sup> century. University Putra Malaysia, Faculty of Forestry. Serdang, pp. 7-14
- Satyavati, G.V. 1991. Guggulipid: A promising hypolipidaemic agent from guggul (*commiphora waghii*) In: Wagner, H. and Farnsworth, N.R. (Ed) Economic and medicinal plant researches. Academic press, London.
- Schittler, E. and Plummer, A.J. 1964. Tranquilizing drug from *Rauwolfia*. In: Marwell, G. (Ed). Pseychopharmacological Agent Academic Press. New York. Pp. 9-34.
- Somashekhar, B. S. and Anandamurthy, G.V. 2000. Farming the formulations –cultivation in clutters. FRLHT'S Amruth, 4. (1): 3-10.
- Szekeres, L. and Papp. J. Gy. 1984. Discovery of antiaarrhythmics. In: Parnham, M.J. and Bruinvels, J. (eds) Discoveries in Pharmacology. Volume 2. Haemodynamics, Hormones and Inflammation. Elsevier; Amsterdam, New York, Oxford. Pp. 185-215.
- Van Seters, A.P. 1997.. Forest based medicines in traditional and cosmopolitan health care. Non-wood forest Products. 11. Food and Agriculture Organization of United Nations. Pp. 5-11.

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# HARVESTING OF *IRVINGIA GABONENSIS* AND *IRVINGIA WOMBULU* IN NIGERIAN FORESTS; POTENTIALS FOR THE DEVELOPMENT OF SUSTAINABLE SYSTEMS

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## Abstract

(Not available in French & Russian)

*Irvingia gabonensis* and *I. wombulu*; the bush mango are the sources of 'Ogbono', the Irvingia kernel which is popularly used as soup thickener in most West African countries. Less than 10% of the total annual crop of the fruit or the kernel is harvested from planted trees while the rest are collected from natural forests. Harvesting or collections in the forests are activities of women and children. They are also responsible for processing and substantial amount of marketing.

Irvingia kernel is now major export produce to Europe and the USA. The popularity of Irvingia kernels in the local and international markets has given it the potentials for a true commercial crop, with this resulting in more intensive collection in the forests.

Recently, an attempt at setting local quality standards for the kernels in trade has commenced. Standardization of this will help export promotion and the increase of financial returns to the rural farmers who collect from the forests and manually process (nut extraction) and sun dry for storage before marketing.

The various initiatives of ICRAF, NACGRAB and CENRAD on the collection of the remaining genetic resources of Irvingia in West Africa, its establishment in genebanks and the potentials to utilize selected lines in new planting provides hope for the future. It is believed that this will provide the seed for the sustainable production of Irvingia as deforestation and old tree age is already affecting wild resources.

Pure stand plantations and trees in agroforestry systems are attractive. Multistrata agroforestry system for production is presently being established in Nigeria within the southern forest zones where bush mango is well known.

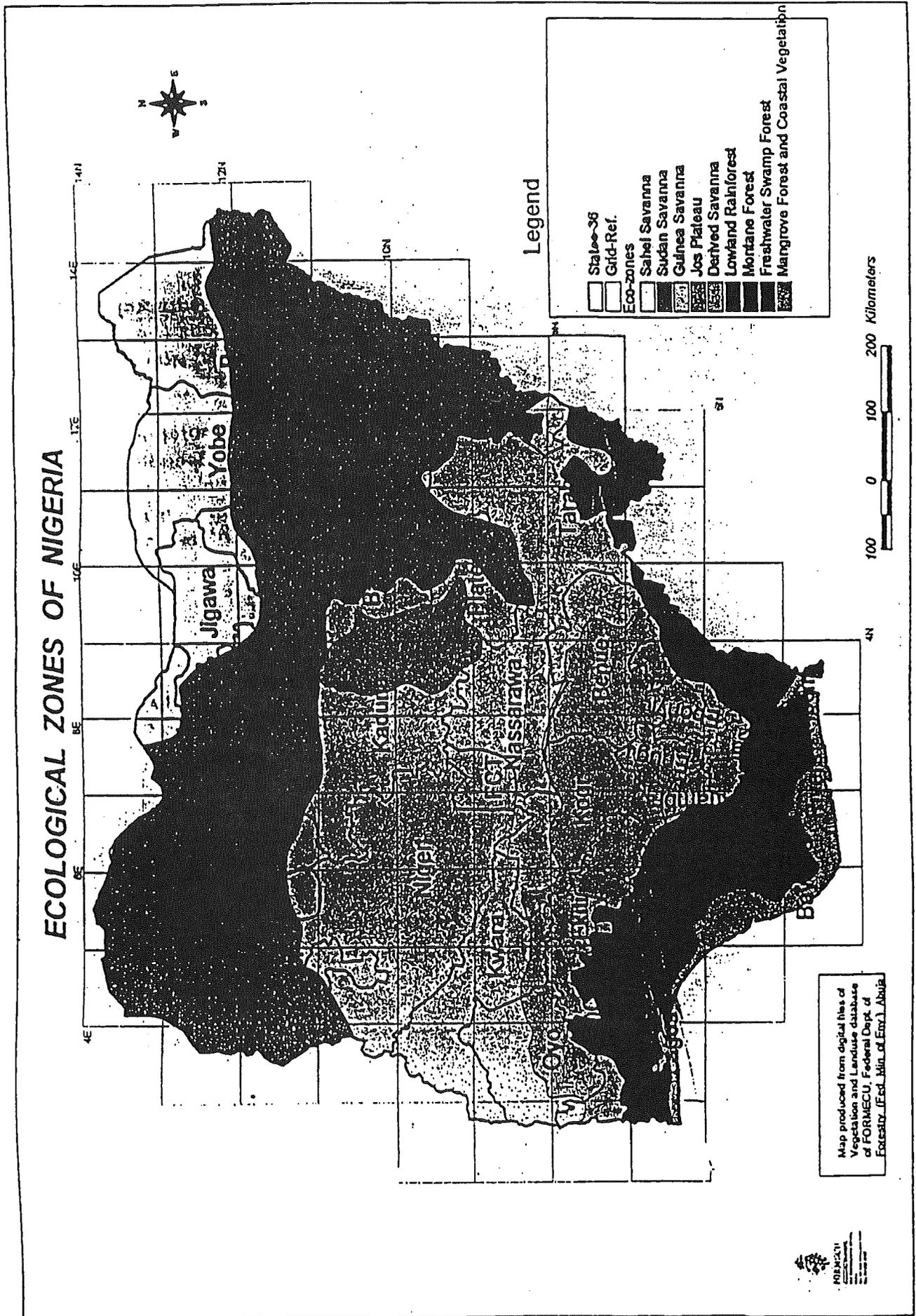
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## Introduction

Nigeria is a densely populated country with a population of about 120 million people. This country's dense population and its relatively enhanced economic development has resulted in vast increase in demand for food.

Nigeria is a diverse country socio-culturally and it is the same situation with its forests and forest resources particularly the extractive resources. Based on the 1993/95 land-use and vegetation assessment, there are nine ecological zones from the mangrove forests in the south to the Sahel in the far north (see Fig. 1). All these ecological zones are rich in non-timber forest resources and they are equally different and diverse. There are over 180 non-timber forest resources already described (Okafor 1988) but there are still a lot more. Recent estimates give 640 as the total figure including those newly described for medicinal uses and sources of natural colours.

Figure 1



These NWFP include:

*Chrysophyllum albidum* (the African star apple)

*Dacryodes edulis* (the African bush pear)

*Tetrapleura tetraptera*

*Xylopia aethiopiaca*

*Parkia biglobosa*

*Pterocarpus milbraedi*

*Pterocarpus erinaceus*

*Baionella toxisperma*

*Garcinia kola* and

*Irvingia* spp to mention a few

The high forest in the South contains more non timber resources than the other forest types. It is now realized that forests are a strategic source of food and other products for man.

Many plants, important for food and income in Nigeria, as it is the case in many other Africa countries (Ladipo 1988) are sourced from Nigerian forests. Despite the importance of our forests, Forests in Nigeria are under great pressure. These pressures have led to large destruction of natural forests and it is estimated that 5% of closed forests are cleared annually for other uses with negative repercussions. (Kio et al. 1989) FORMECU (1995) reports a significant increase in forest degradation in Nigeria with increase in desertification, savanarization and the forest which were erstwhile referred to as being rich in timber and non-timber resources are being turned into poor degraded forests that are poorer in species; especially those that could be useful for food in medicine, industry and agriculture. Particular concern are for those non-timber forest resources valuable for indigenous consumption and on which local food security depends.

These non-timber forest resources are sourced through seasonal extraction from the forests. Forest extractivism is an old enterprise in the forest areas of Nigeria. It is more active in the Southern forests where forest people live almost entirely on the forests and their products.

Forest people have substantial indigenous knowledge on the quantities of there NTFP in the forests and also on the phenology of production.

Many farmers can even predict mast years and good and bad trees are recognized.

Food gathered and hunted in the wild are important, and they will continue to be important in the diet of may forest or farming families in Nigeria (Ladipo 1998).

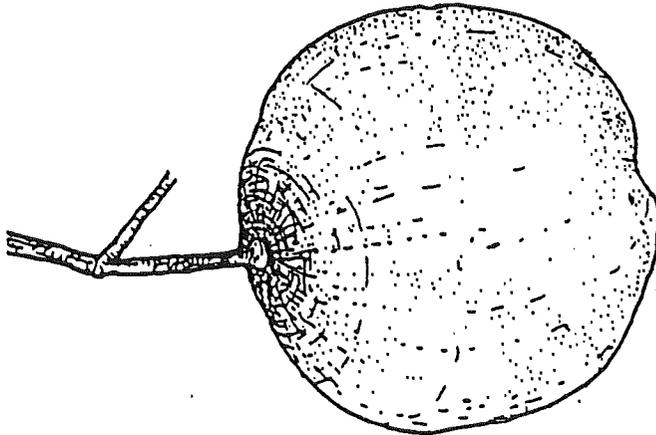
### **Irvingia Species**

*Irvingia gabonensis* and *Irvingia wombolu* are two of these non-timber forest resources which in recent times have become very important products. (See fig 2). The present paper reports their extraction from Nigerian forests, and discuss, potentials for their sustainable production.

The *Irvingia gabonensis* is the eating type which produces sweet/flesh (mesocarp). This is eaten fresh while the stone is usually split to reveal its kernell: the product that is used for soup thickening. The *Irvingia wombolu* is the type that has non-edible flesh. The flesh is sour and the fruit stone is also extracted to produce the kernell (ogbono). It is common to mix the two types of kernels. There is not much differences between the two species except for fruit sweetness and some tree morphological differences. The high demand situation for bush mango kernels has resulted in excessive exploitation in the bush at such a rate that the sustainability of these natural resources has been the concern of various workers (NRC 1991) particularly with the continued clearing and selective exploitation of forests, (Palmberg 1984).

## The Irvingia fruit

- A drupe (stone fruit)
- Usually one seeded.
- Fruit consisting of 3 distinct layers skin, flesh and stone (seed).



Fruit

Stone/Seed Coat (fibrous)  
can be split into two by force when dry

Fruit adopted for dispersal by mammals  
i.e. *Irvingia robur*

Seed

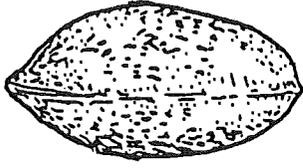


Figure 2

## The Irvingia Tree

*Irvingia gabonensis* (Aubry -Lecomte ex O" Rouke) Baill, the bush mango is a medium sized evergreen tree but large specimens are not uncommon in the natural forest from where a substantial quantity of its fruit or seed is still being sourced in Nigeria.

It belongs to the family *Irvingiaceae* (order-*Rutales*) a small tropical family containing two other genera (*Klaiedoxa*, *Desbordesia*) and the genus *Irvingia* which contains three species (see table 1) all occurring in West and central Africa.

Two varieties of *Irvingia gabonensis* have been identified (Okafor 1975) based on long phenological and reproductive phenological observations. He reported between these varieties in flowering and fruiting (Table 3), but it is now known (Ujor pers comm.) that flowering in this species could vary from site to site particularly when these are ecologically different. The examples of Enugu (derived savanna) and Onne (High forest) in Nigeria were cited.

The vegetative and reproductive structures of *I. gabonensis* has been described by Keay (1989). However, flowers are yellowish to greenish white in slender clustered racems or small panicles and ripe fruits yellowish-green to orange colour when ripe. (see Ladipo et. al. 1996)

**Table 1**

<u>Species</u>	<u>Habit</u>	<u>Natural habit</u>
<i>Irvingia gabonensis</i>	Tree (evergreen)	Forest
<i>Irvingia wombolu</i>	Large tree (evergreen)	Forest
<i>Irvingia smithii</i>	Tree (Deciduous)	Forest Transition and Sudan savanna woodlands
<i>Irvingia grandifolia</i>	Tree (Deciduous)	Forests

Members of the genus *Irvingia* in Nigeria

## Popularity of Irvingia Species

*Irvingia gabonensis* *I. wombolu* or their kernels; the food product are very well known in Nigeria and in the West African subregion, particularly in Togo, Dahomey, Cote d'Ivoire and Sierra Leone where fruit pulp and kernels are used as food (Okigbo 1981). Other uses of this socio-economically important fruit crop (Agbor 1986) are shown on table 2. These range from their use as food to medicine and environmental conservation including use as windbreaks in plantains of banana or in plant in production systems. *Irvingia* is well know amongst all the southern tribes, but its use as food (edible fruit and soup thickener) has become accepted all over Nigeria, and amongst even tribes that have never seen the tree.

The popularity of *Irvingia gabonensis* fruit also encompasses age classes as old, mature and the adolescent and juveniles like the fruit a lot.

## Trade in *Irvingia* Kernels in Nigeria

*Irvingia* kernels (ogbono) is produced in the Southern forest area of Nigeria, (see Fig. 3) and trade in this commodity is immense in the country. Ladipo and Boland (1994) reported on extensive trade in the kernels within the Southern forest area and between this area and the northern Savanna areas. Kernels

are transported to the North of Nigeria by whole traders (see Fig 4), and these are also traded internationally to various other countries (see Fig. 5). The immense commerce that has been built on this produce shows its importance in the economy of the producers (the farmers/collectors). Trade in ogbono to EEC countries and to the USA continues to grow with results obtained in airports, through where they are transported out. Recently efforts to standardize and to develop quality standard have commenced (Ladipo 1998). If the recommended system are followed it will be possible to get *Irvingia* kernels to higher levels of international trade and utilization.

**Table 2**

### Uses of *Irvingia*

1)	<u>Food</u> Fruit pulp - Fresh Consumption Kernel - Soup condiment
2)	<u>Traditional/Cultural</u> Split seed shell - Prediction
3)	<u>Environmental</u> Windbreak
4)	<u>Medicine</u> Leaf for dysentery and wound dressing
5)	<u>Other uses</u> Mature fruits for ripening bananas and plantains.
	1. Okafor 1975, 1981 2. Abbiw 1990

*Uses of Irvingia gabonensis and Irvingia wombolu in Nigeria.*

### Nutritional values of *Irvingia* Kernels

The consideration of *Irvingia* as a strategic 'crop' and one that has immense value for food security cannot be over emphasized if we consider its nutrient values. This is very important where resource poor farmers are involved and whose diet revolves mainly around starchy foods such as those made from cassava and yams (*Discorea species*) etc.

Eyo (1981) after Okafor and Okolo (1974) and Eka (1979) looked at the nutrient values of *Irvingia* kernels in comparison with other species from Nigeria. He reported that *Irvingia* is an important oilseed, and a very nutritious one too. The nutrient values are shown on table 3, for starch, protein and its amino acid content.

**Table 3**

<u>Starch</u> (% dry matter)	<u>Protein</u> (crude protein)	<u>Amino acid</u>
3.67%	80.9	aspartic acid 6.3
		Cystine 2.05
		Methionine 1.36
		Threonine 2.44
		Glumatic acid 12.24
		Proline 1.93
		Glycine 3.51
		Alanine 3.36
		Vialine 3.28
		Leucine 5.62
		Isoleicine 3.07
		Tyrosine 1.75
		Pheny lalanine 1.81
		Histidine 1.82
		Lysine 5.92
		HN3 1.77
	NX 6.25	Arginine 6.73

Nutrient content of *Irvingia* kernels (Eyo 1981).

Figure 3

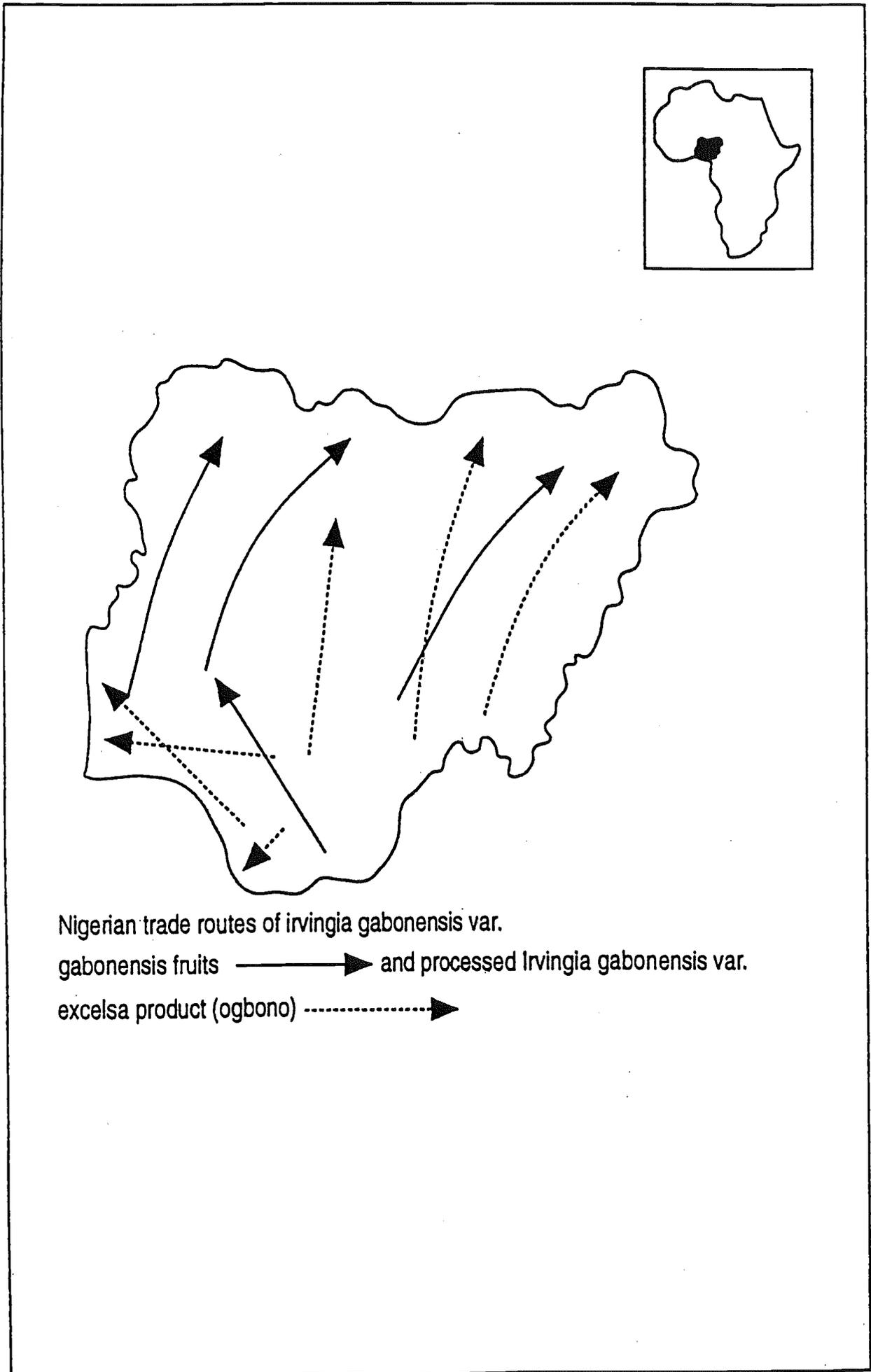
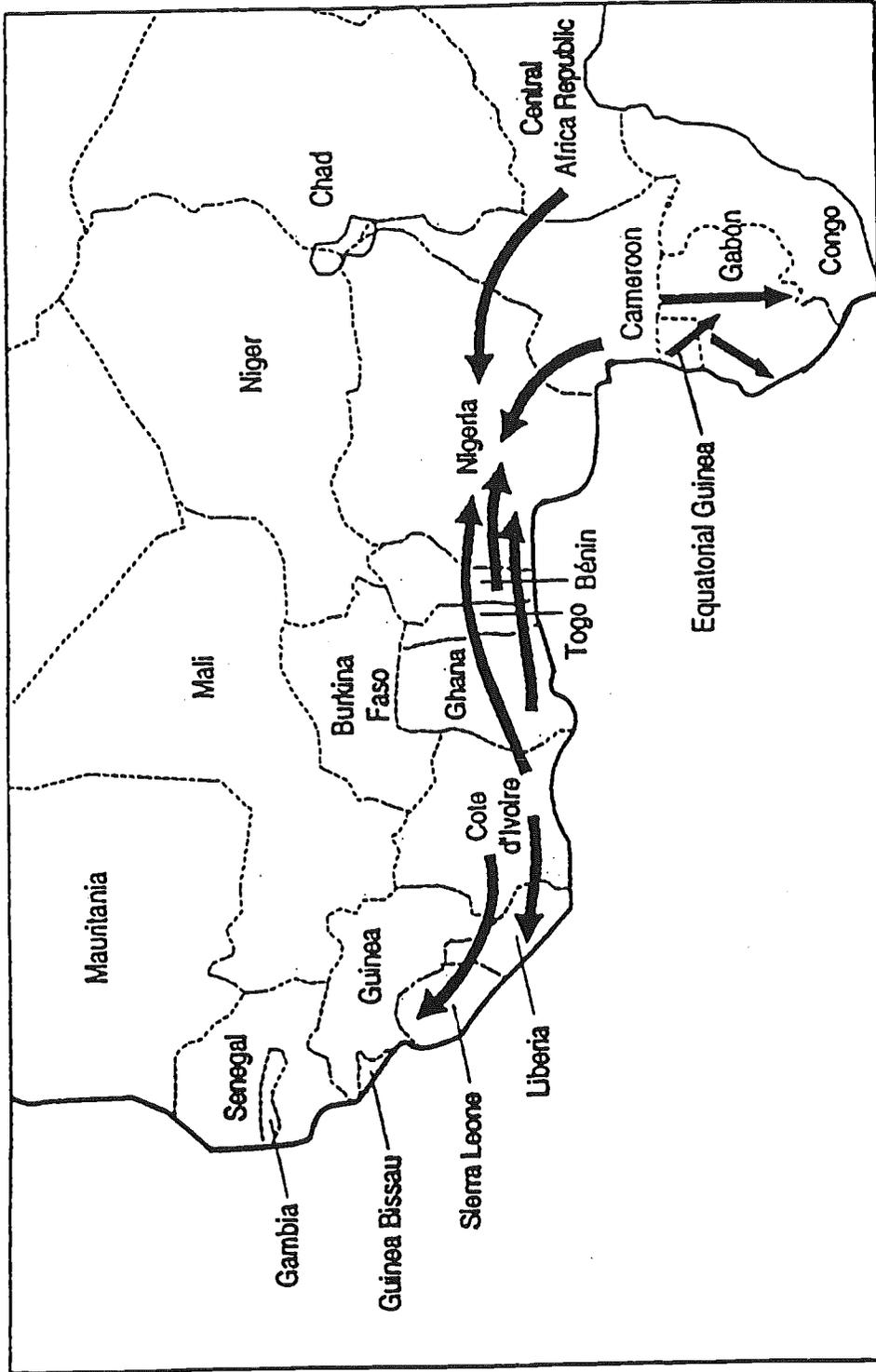


Figure 4



International trade routes of *Irvingia gabonensis* ('Ogbono') in West Africa.

## **Forest production (collection) of *Irvingia* fruits in Nigeria**

*Irvingia* species can be found, as earlier said, in the high forests and in transition forest area. They are specifically also found in compound farms and these days it is not uncommon to find *Irvingia* protected in Cocoa-cola and coffee plantations. However, *Irvingia* fruits, for fresh eating and for their kernels are collected from the wild forest (60%) and from the compound farm garden 10% and the outlying fields (30%). Within the high forests areas, many families depend on this enterprise for survival.

Agbor (1986) also reported on an economic assessment of *Irvingia gabonensis*, in Cross River State in Nigeria. He reported that a large quantity of *Irvingia* kernels are produced in the State but he never gave figures to back this conclusion up.

Agbor (1986) concentrated on the high density areas of *Irvingia* i.e. Ikom, Obubra, Akampa, Odukpani, and Calabar. Field collection of *Irvingia* from the wild take place between December to April (*Irvingia wombolu*) and between June - August (*Irvingia gabonensis*).

Estimates of production in a good year shows that over 750,000 tons of Fresh fruits are collected annually from the high forest zones, from all sources and this means 120,000 tons of kernels, which are then dried to help their storage.

This figure does not include the processed kernels which are imported into Nigeria from other countries in west and central Africa. With these, over 1,200,000 tons of *Irvingia* kernels are marketed in Nigeria, with this representing about 40% West Africa total production.

Collectors of *Irvingia* can be classified as follows; forest collection of *Irvingia* falls into groups:

- a) Children and women, and
- b) Young Adult (males.)

The children and women are restricted to the compound farms and to near village forests where they make daily runs to collect fruits from specified trees.

The young Adults (males) are involved in 'long-term' field collection. This group go into the forest for two weekly fruit collections trips and they usually process the fruit in the bush so as to reduce the load to be carried out to the villages at the end of the collection trips. Extraction of near home materials are usually the assignment for females (the mothers) and children both male and female.

## **Developments of Sustainable production of *Irvingia gabonensis* in Nigeria**

This paper will attempt to look at the development of a sustainable system for *Irvingia* from the angle of conservation and production where viable production and conservation are achieved at the same time. In other words, for the product of *Irvingia* to be sustainable, we need to be able to maintain sufficient product of *Irvingia* in its season while the genetic resources of the species are adequately consumed and protected. This initiative requires immense 'human action'. The research campaign of the international centre for Research in agroforestry (ICRAF) is relevant here (see Ladipo et al 1996). In addition to the above, ICRAF has embarked on a programme of genetic resources collection and conservation and the utilization of high value materials of *Irvingia* in agroforestry systems. The values of the multistrata system have been emphasized and this is the system that CENRAD has practised. Marcotting (air layering) and the product of seedling stocks selected from high value mother trees, new trees of *Irvingia* have been planted in farmers fields. It is proposed that these trees and the other flora will mature into viable multistrata system in the various ecologies where this has been practised. The present effort will definitely reduce the pressure on Nigerias natural forest trees, and the enhancement of product from the high value plantings in fields and compound farms where the resources have been tried out.

## Needs for the future

To ensure a viable and sustainable production system of *Irvingia* in Nigeria, we will require to further understand (research) the socio-economics of *Irvingia* in Nigeria. It will further be useful to adequately know the product demand situation in Nigeria so we can put in place proper and viable new 'supportive' plantings in the degraded forests.

In addition to the above we require to try the old systems of enrichment planting which will support the ecological status of the forests and also enhance its productivity (*Irvingia* kernels). Be these as they may, the need for the establishment of pure commercial plantations will help and ensure sustainable production of *Irvingia* in Nigeria, through, at the reduction of the pressure on the natural forest as population and external demand grow. We need to remind ourselves here that the various non-timber forest resources (NTFPs) which are being addressed today were sustainably extracted from the forest by farmers in the past, when population was not as high as it is today.

## References

- Agbor L. O. N. (1986). Economic assessment of *Irvingia gabonensis* in Cross River State of Nigeria. Msc dissertation Dept. of Forest Resources Management University of Ibadan. Ibadan. Nigeria. pp 160.
- Ladipo D. O., J. M. Fondoun and N, Ganga (1996). Domestication of the bush mango (*Irvingia* spp): some exploitable intra specific variations in West and Central Africa. In proceedings of an FAO ICRAF-IUFRO proceedings (Non-wood Forest Products FAO N0 9).
- Domestication and Commercialization of non-timber forest products in agroforestry system. Eds. Leakay RRB, A. B. Temu, M. Melnyk and P. Vantomme pp 297.
- Ladipo D. O. and Boland D. (1994). Trade in *Irvingia* kernels. Paper presented at the International workshop on *Irvingia* in West and central Africa International centre for Research in Agroforestry (ICRAF) 4pp.
- Eyo E. S. (1981). The composition of carbohydrates and proteins in the seeds of *Irvingia gabonensis*, *Cucumeropsis manii* and *mucuna sloanei* from Nigeria. Plant Research and Development (Institute of Scientific Cooperation) pp 107 - 113.
- Okafor J. C and Okolo H. C. (1974). Potentials of some indigenous fruit trees of Nigeria. Paper presented at the 5th Annual Conference of the Forestry Association of Nigeria Jos (1974) pp 60-71.
- Hyman E. L. (1995). Technology and the Organisation of production, processing and marketing of non-timber forest products. In Proceedings: current issues in non-timber forest products Research Ed. Perez M,R, and Arnold J.E.M (1995) pp 197.
- Kio P.R.O., B. A. Oguntala, D. O. Ladipo and FOC Nwonwu (1989). An analysis of the development of management systems in Tropical moist forest of Nigeria in management of Tropical moist forests in Africa FAO forestry paper N0 88 FAO. Rome pp 109 - 134.

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# **HARVESTING PRACTICES AND MANAGEMENT OF TWO CRITICALLY ENDANGERED MEDICINAL PLANTS IN THE NATURAL FORESTS OF CENTRAL INDIA**

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## **Abstract**

*(Not available in French & Russian)*

The destruction of vast expanses of tropical forests at accelerated rate is threatening the survival of many species that they shelter. The losses are alarmingly high in the tropical forest ecosystems. This loss may result into the disappearance of valuable genetic resources, which have immense possibilities of use in the future. The current pace at which the forests are being destroyed, may lead to a precarious decline in the bio-diversity. Some of the species bound to become endangered even before their medicinal properties are fully explored.

These species are also being collected for pharmaceutical preparations. Due to over use of economically important plants from the forests of central India many species have already become endangered and vulnerable. Due to this, the density of some of these plant species have declined in the natural forests because of high price of product in the market, which encourage immature harvest by the local population. There is thus an urgent need to conserve these fast disappearing plant resources, as some of them are medicinally and ecologically very important.

Central Indian tropical dry deciduous forests harbour several varieties of medicinal and aromatic plants. Some of the most important ones are *Curcuma caesia*, *C. aungustifolia*, *Asparagaus racemosus*, *Rauvolfia serpentina* and *Chlorophytum* spp etc. Apart from their extraction for use by industries in the pharmaceutical formulations, forest dependent populations also use them for their local health care based on their indigenous knowledge and practices. Among these plant species *C. caesia* and *R. serpentina* merit special attention for their economic value and present critical condition in the ecosystem due to unsustainable extraction. These species were reported to occur abundantly (IUCN,1994) about a half century ago in the natural forests of central India. However, due to growing economic importance of these species, unsustainable extraction became rampant. In a Conservation Assessment Management Planning workshop (Prasad & Patnaik,1998) 39 species of medicinal plants were evaluated for their ecological status as per IUCN categories. These two medicinal species were found to be in the category of Critically Endangered. This requires immediate and urgent attention to restore them by prescribing sustainable harvest regime and related management practices.

This paper attempts to highlight the distribution and current harvesting practices of these species and recommends measures for ensuring their sustainable extraction and use. Distribution pattern, phenology, production and current harvesting practices of *C. caesia* and *R. serpentina* being followed by the gatherers have been assessed in some natural forests of Madhya Pradesh, India. Existing marketing and distribution channel of the selected species have also been discussed so as a package of practices for value addition and consequent enhancement of gatherers income.

**Key words:** Medicinal and Aromatic Plants, Unsustainable harvesting, Exploitation, Regeneration, Endangered.

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## Introduction

A large number of highly useful herbaceous plants have little future, unless immediate steps are taken to arrest the causes leading to ecological and biological impoverishment. It is estimated by IUCN that about 20,000- 25,000 of the world's vascular plants species are dangerously rare or under threat. Thousands of life forms, are likely to vanish, if the current trend in population, land use, and pollution of air and water continues. It brings about irreversible alterations in the biosphere. The problem of habitat destruction is particularly serious in countries like India where a remarkable variety of species still await discovery.

Some of the plant species which were reported to occur commonly or abundantly about half a century ago have at present become rare or very rare due to over exploitation /habitat loss and have fallen in the category of endangered species. The glaring examples are *Dioscorea deltoidea*, *R. serpentina*, *C. caesia* etc.

Growing demand and irrational exploitation have resulted in the rapid depletion of these species from the natural habitat to a level of near extinction. The tropical forests of Madhya Pradesh are enriched with a large number of species of high medicinal value. A good number of these herbaceous plants of ethnobotanical importance are endangered due to various factors like overgrazing, new habitations, indiscriminate deforestation and over exploitation. This has resulted in the environmental stress in Central India. Consequently some common plants have become endangered and are on the verge of extinction.

About 350 medicinal & aromatic plants (MAPs) are collected from the wild sources in the country and used for various purposes. *C. caesia* and *R. serpentina* have been collected from time immemorial and in recent years the commercial exploitation is so high that these have become critically endangered. Both the species are very much used by the tribal people for various diseases and ailments in W.B, MP, Arunachal Pradesh, UP. In MP both the plants are regarded very auspicious and it is stated that the person who possesses it never experiences shortage of cereals & food.

### Species description:

*Curcuma caesia* Roxb. locally known as kalihaldi or narkachura, is a rhizomatous herbaceous plant. The plant height is about 1.2 M. and leaves 30-60 by 12.5-15 cm broadly lanceolate or oblong, glabrous, with a deep ferruginous purple cloud down the middle, which penetrates to the lower surface. Petiole and sheath about as long as blade. Spikes appearing rather before the leaves, about 15 cm long or altogether about 30 cm. high with the peduncle. Flowering bracts green with a ferruginous tinge. Corolla deep bright red, tending to crimson. Flowers pale yellow, reddish at outer border, and rather shorter than their bracts. Flower spike vernal or aestival, distinct from the leaves and usually developed before they appear.

**Distribution:** Mostly found in Bengal and northeastern part of the country including Arunachal Pradesh, Meghalaya, Mizoram. It is also found in some parts of central India like Raipur, Mandla, Amarkantak, Panhamarhi etc.

**Medicinal Uses:** The rhizome is pungent, bitter, fragrant, heating, appetizer, vulnerary, anthelmintic, antipyretic, alexiteric, destroys foulness of the breath, useful in leucoderma, piles, bronchitis, asthma, tumors, tuberculous glands of the neck, enlargement of the spleen, epileptic seizure. The rhizome has a bitter, sharp, hot taste and a good odor, laxative, tonic to the brain and the heart, aphrodisiac, alexipharmic, emetic, emmenagogue, expectorant, carminative; useful in griping of children, pains, inflammations, toothache (Kirtikar and Basu, 1975).

The roots are expectorant and useful in Diarrhea and dysentery. The Turkomans employ these roots as a rubefacient, to rub their bodies down with after taking a Turkish bath. In Bengal it is used in the fresh state like turmeric.

*Ravoufia serpentina* (Indian Snakeroot) is an important medicinal shrub plant. There are around hundred

species of which five are native to India. It is an erect glabrous perennial shrub, attain a maximum height of 75 cm. Leaves are arranged in whorls of 3-4 flowers are white or pinkish, peduncle deep red about 1.5 cm long, appear in small clusters. Fruits are round shaped, dark, purple or blackish. The plant can be grown in wide range of soil types.

**Distribution:** Occurs in Sub Himalayan tracts in Punjab, in lower ranges of Eastern and Western Ghats, Assam, Orissa, Bihar, U P, M P, Maharashtra etc.

**Medicinal value:** Roots are important source of drug. About 90% of the total alkaloids remain in the root bark. Most common alkaloid are reserpine, rescinnamione, deserpidine, ajmaline, yohimbine etc. Roots are bitter, acrid, anthelmintic, cardio-depressent and digestive and is used in insanity, insomania, epilepsy, dyspepsia, painful affections of the bowel, intestinal worms, sexual aggression, snake bite etc. The drug has been effectively tried in cases of high blood pressure, insanity and scizopherina. Decoction of the root is reported to be useful to increase uterine contractions and to promote expulsion of the foetus ( Kirtikar and Basu,1975).

**Objectives and Observations:** Distribution, harvesting practices and production study of two important critically endangered species were assessed in the natural forests of Madhya Pradesh, Central India. These plants have been in use by local people as traditional healing substances. These are also important commodities for export outside the state. The present study was undertaken with the following main objectives:

- 1) to study the distribution, phenology and production of the species in the forests of Madhya Pradesh ;
- 2) to study the present harvesting practices of the species in Central India, Madhya Pradesh;
- 3) to study the marketing aspects .

**Problems associated with selected species:** Total uprooting without maturation. Regeneration problem. Reduced production. Low medicinal value Low economic return.

## Material and Methods

**Study Area:** Seven districts of Madhya Pradesh were selected for the present study where both these species occur. These places are Raipur, Jabalpur, Mandla (Amarkantak), Bilaspur, Betul, Sarguja and Chhindwara(Patalkot) districts where these species are found in protected patches.

These study sites (Fig 1) happened to be forested areas with predominant tribal population derive their livelihood support from collection and sale of NTFPs like *Buchnanian lanzan*, *Embllica officinalis*, resin and gum yielding species etc. The forests in the study sites represent by tropical moist and tropical dry deciduous, mixed miscellaneous, teak (*Tectona grandis*) and sal (*Shorea robusta*) foersts(Champion and Seth 1968). The area is plain to gently sloping with small hills and few seasonal perennial water streams. Due to scanty rainfall (800-1100 mm) and drier climate, there are very few perennial streams. The climate of the area is monsoonic with three distinct seasons The rainy season extends from late June to late September, winter from December to February and summer from March to June. The summer temperature of the area ranges between 26° to 46°C and in winter it ranges from 2° to 17°C.

## Data collection and methodology

Phenological parameters, production & marketing: Based on the literature available, only those districts were selected where both the species are reported growing under the natural forest conditions in the state of MP. Observations were taken on distribution pattern of the two medicinal plants and the associated forest habitat. Phenology and harvesting time was also recorded. However, district wise production data, market rates etc. was obtained through enquires made from forest department staff including personnel of MFP (trade & Development) federation), local traders and villagers.

Harvesting practices: The information on plant harvesting methods adopted by the local villagers/gatherers was collected by interviewing local people engaged in collection. Current-harvesting practices adopted by the local collectors was noted district wise.

Economic analysis: The economics of *C caesia* and *R serpentina* was collected by interviewing the families and persons engaged in collection. The information about prevailing market prices was gathered from local villagers, middlemen and traders for economic analysis district wise. For analyzing the price differences of both the species from collectors to consumers, data was collected from the different groups involved at different levels in the marketing channels of the species.

## RESULTS AND DISCUSSION

Ecological parameters and prevalent market potential of *C caesia* and *R. serpentina* collected from the natural forests of Madhya Pradesh (central India) are given in Table 1. In the natural forests under study the two species are sparsely distributed and are not widely occur. There is a slight phenological variation (flowering and fruiting) in both species found in different districts because of varying moisture conditions.

**Table 1 - Phenology, production and market price of *C. caesia* and *R. serpentina* in Madhya Pradesh, India**

District	Place	Flowering-Fruiting months	Harvesting months	Collection rate in Rs./kg(wet)	Market rate in Rs./kg (dry)	Estimated annual production potential (in Tons)
<i>Curcuma caesia</i>						
Bastar	Dantew-ada, Bijapur	Fl. Aug. Sept Fr. Sept. Oct	Nov. Dec.	15-20	60.00	100-150
Betul	Ghoda-Dongri	Fl. Sept. Fr. Oct. Nov	Nov.-Dec.	13-15	55.00	0.5
Bilaspur	Amar-Kantak	Fl. Aug. Sept Fr. Sept. Oct	Oct.-Nov.	20.00	60-65.00	1.0
Chindwara	Patakot	Fl. Sept. Oct Fr. Nov-Dec	Nov.-Dec.	15-20	55.00	2.00
Seoni / Balaghat	Barghat	Fl. Oct. Fr. Nov.-Dec	October	12-18	55.00	0.5
Raipur	Udanti	Fl. Oct. Fr. Nov. Dec	October	18.00	50-55.00	NA
Mandla	KNP	Fl. Aug. Sept Fr. Sept. Oct	Oct.-Nov.	15.00	50.00	2.00
<i>Rauvolfia serpentina</i>						
Bastar	Dantew-ada, Bijapur	Fl. May-June Fr. July. Aug.	December-January	50.00	175-200	125
Bilaspur	Amarkantak, Lamni	Fl. June Fr. Jul-Aug.	Nov.-Dec	45.00	180-200	60
Jabalpur		Fl. July-Aug Fr. Aug.-Oct	October	50.00	165-185	100
Raipur	Udanti	Fl. June-July Fr. Sept. Oct	Nov.-Dec	60.00	170-190	120
Mandla	KNP	Fl. June Fr. July-Sept	November	40.00	180-200	75
Sarguja	--	Fl. Jun-July Fr. July	Oct.-Nov.	40.00	175-190	80

Sources: 1) Prasad and Bhatanagar, 1991; 2) MP MFP Federation (Trade & Development; 3) J L Shrivastava, 1998.

The district wise approximate production of *C caesia* was found varying from 01 to 100 tons in the entire district per year while production of *R. serpentina* under wild conditions was found more in almost all the studied districts (60 to 125 T/Year). The gatherers selling wet rhizome of *C caesia* get an average rate of Rs. 15-20/kg and get Rs. 40-60/kg for roots of *R serpentina*. After drying cleaning and grading the market prices increases manifold. After these value addition interventions mostly done by middlemen, the ruling market rate of *C caesia* is Rs. 50-60/kg and of *R serpentina* Rs. 290-312/kg.

Both the species are collected at early stages of maturity (i.e. before flowering/fruitlet) in all the places except Bilaspur district where the local gatherers harvest plants after flowering and fruiting stage. Field observations revealed that except in Bilaspur areas where gatherers leave young rhizome allow some seeds to fall (collection in this case takes place after fruiting) in all other areas the whole plant along with the roots are uprooted, not leaving any reproductive material behind.

Data in Table 2 shows the share of different middleman's in the marketing channel starting from gatherers to retailers. The average values of margins clearly indicate that there is a huge margin between gatherers and middlemen's at village level. The average market values for *C. caesia* to gatherers were Rs.17.00/kg. As against this, the middlemen with primary processing (drying, cleaning grading etc.) earned 35.29% higher values (Rs. 23.00/kg). At trader's level, the value goes upto Rs. 34.62 (50.52%). Subsequently, the market value further increased to Rs. 40.12/kg (commission agent), Rs.54.00/kg at whole seller level. At retailer level the market value goes upto Rs. 60.50 kg. The processors or big traders of *C. caesia* collect large quantities of the wet produce and sun dry the material. After cleaning and drying the cost increases many folds and they get maximum margin in the whole chain as depicted in Fig.2.

Figure 2 - Marketing channels of *Curcuma caesia* (Rhizome)

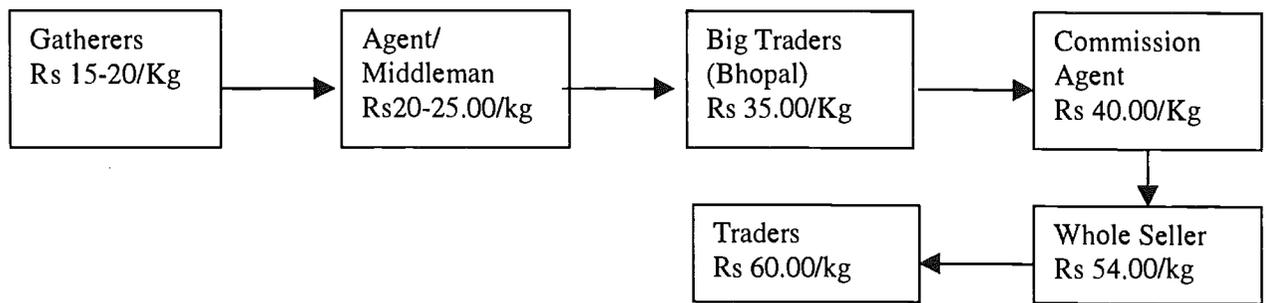


Table 2 - Showing percentage margins of middleman at village level middleman to the traders

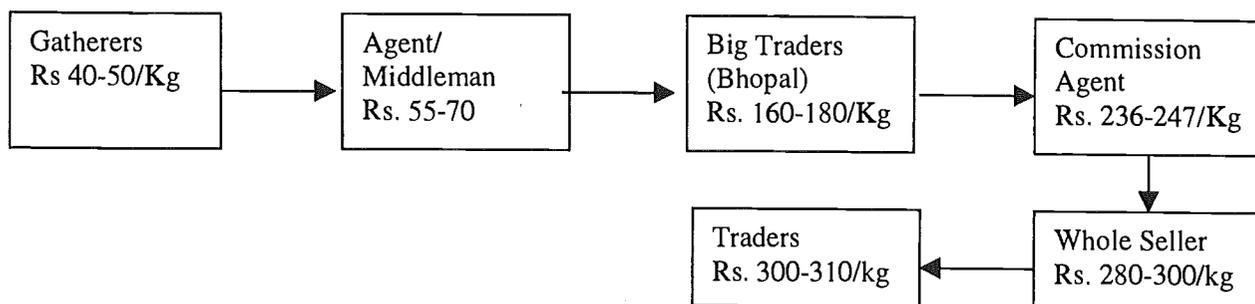
Name of Species	District/ Place	Gatherors/ Villagers (Rs./kg wet)	Agent/ Middleman	Processor*/ Big traders	Commission Agent in big cities	Whole saler	Trader/ Retailer
<i>Curcuma caesia</i> (Rhizome)	Bilaspur	20,00	27,50% (25,50)	45,09% (37,00)	14,86% (42,50)	18,82% (50,50)	12,87% (57,00)
	Balaghat	12-18	46,66% (22,00)	61,36% (35,50)	14,08% (40,50)	43,20% (58,00)	12,93% (65,50)
	Chindwara	15-20	40,00% (24,50)	42,85% (35,00)	12,85% (39,50)	39,24% (55,00)	9,09% (60,00)
	Mandla	15,00	33,33% (20,00)	55,00% (31,00)	22,58% (38,00)	38,15% (52,50)	13,33% (59,50)
	<b>Average</b>		<b>17,00</b>	<b>35,29% (23,00)</b>	<b>50,52% (34,62)</b>	<b>15,88% (40,12)</b>	<b>34,59% (54,00)</b>
<i>Rauwolfia serpentina</i> (Dried Roots)	Raipur	60	33,33% (80,00)	127,5% (182,00)	40,10% (255,00)	15,68% (295,00)	5,76% (312,00)
	Bilaspur	45	60,00% (72,00)	136,80% (170,50)	42,22% (242,00)	16,33% (281,50)	4,97% (295,5)
	Jabalpur	50	55,00% (77,50)	125,80% (175,00)	41,42% (247,50)	17,17% (290,00)	5,18% (305,00)
	Sarguja	45	55,55% (70,00)	137,85% (166,5)	44,14% (240,00)	16,66% (280,00)	5,35% (295,0)
	Mandla	40	70,00% (68,00)	136,02% (160,50)	47,35% (236,50)	17,12% (276,50)	5,06% (290,00)
<b>Average</b>		<b>48</b>	<b>53,12% (73,50)</b>	<b>132,38% (170,80)</b>	<b>43,22% (244,2)</b>	<b>16,54% (284,6)</b>	<b>5,23% (299,5)</b>

Values in the parentheses are value in RS./Kg

\* Processors dried the roots (value addition), clean and packed, then transported to big cities

In case of *R serpentina* (roots) the initial collection rate was Rs.48/kg in almost all the districts. As against this, the middlemen with primary processing (drying, cleaning grading etc.) earned 53.12% higher values (Rs. 73.50/kg). Similarly, margins increases manifold between gatherers to village level middlemen and processors (Rs.170/ kg or 132.38%). Consequently, the margins declined from commission agent at big cities (Rs.244/kg or 43.22%) to traders/ retailers (Rs. 299/kg or 5.23%). After drying the roots of *Rauwolfia*, processors get maximum margin as compared to the other middlemen in the channel (Fig 3).

Figure 3 - Marketing channels of *Rauwolfia serpentina* (Dried roots)



## Conclusion

The present harvesting practices *C caesia* and *R serpentina* in the natural forests of Madhya Pradesh are very deteriorating because of high price of product in the market and immature harvest by the local tribals. It was observed that both the species occurring commonly in the state are vanishing speedily because of immature harvesting and poor regeneration. During collection not a single plant was left behind on the forest surface for future regeneration. The reduced availability of both the species in the natural forests (especially Sal dominated) is gradually declining at a faster rate. There is urgent need to conserve *C caesia* and *R Serpentina* from the natural forests because of its better quality. Because of these reasons both the species are being exploited extensively from the natural forests.

Sustainability in production and harvesting is very important aspect in medicinal plants. The present practice of trade in MAPs is a secret affair. It is handled by local traders and middlemen. The high value plants like Sarpghandha and Kalihaldi are threatened with extinction in the wild. These medicinal herbs are considered as economically profitable in harvesting from wild state. Both the species are concentrated only in certain pockets, which are basically threatened in most places. The dynamics of medicinal plant exploitation depend on supply and demand. The studied species *R serpentina*, *C caesia* are in high demand for the local traders and also in the International markets

In conservation, area occupied by the species or the habitat is often a prime concern. According to Mac Arthur and Wilson, 1967 if the area of habitat is reduced by 90%, the number of original endemic species going extinct may be 10% and if the habitat is reduced by 50%. Therefore, habitat of a species matters the most in their survival and a large number of extinction's are often due to the impact of habitat destruction. Among species the intrinsic factors like population size appears to be very important, influencing survival of the species. It is well known that smaller populations are more prone to extinction. Once the population of an endangered species has become small, many problems related to its survival might occur. Once the population is at decline, it faces curtailment of gene flow which in turn, result in inbreeding, genetic isolation of population, inbreeding depression and genetic drift. This may further lead to inability to respond to further changes in habitat and eventually the population might go extinct. In many endangered plant species the population is far below the requirement for survival and most of them (nearly 120 species) are vascular plant species (IUCN red data book, 1978). Relatively very few species have the population estimates and among these species, information on proportion of mature individuals of the total sampled population is lacking (Mali & Ved, 1999). At certain time period the annual herbs grow maximum to reach their maturity. The difference between optimum and actual harvest time for several herbs is about

two months in advance. The second advantage is that seed production would be ensured. Large scale harvesting before maturity reduces the size of population and future regeneration of particular species due to immature harvesting.

The present deteriorating condition of both the medicinal plants in forest is very precarious and needs immediate attention not only for conservation but also for propagation. Standardize methods of cultivation would help the hesitating farmers to develop their nurseries and adopt cultivation on a large scale. It would eliminate unemployment and would prove as a tool for their social and economic upliftment. It would reduce our imports and promote exports.

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### **Selected Readings**

Mittal,G.D and G.S Jaryal.1999. How to cultivate medicinal and aromatic plants. Publication of CEDMAP,Bhopal (M.P). *Ed.* By Dr. GS Jaryal, CEDMAP ,Bhopal (MP), India.

I.U.C.N 1978. Red Data Book . International Union for Conservation of Nature (IUCN).

I.U.C.N. 1994. Guidelines on the conservation of medicinal plants. IUCN, Gland. 50 pp.

Kirtikar and Basu (1965). Indian Medicinal Plants. Vol. IV. International Book Distributors. Booksellers and Publisher, Rajpur Road Dehradun,(UP).India.

Mac Arthur and Wilson,J E. 1967. Island Geography theory.. In conservation biology. Editor M.E. Soule and B.A Wilcox. Sinauer Associates, Sunderlands, Massachsetts.

Mali,Subhash and D K Ved. 1999. Medicinal plant conservation; Number does matter. Amruth. August,1999. pp.15-18.

MPMFP Federation. 1996. Commercially important NTFPs of Madhya Pradesh. Madhya Pradesh Minor Forest Produce federation (Trade & Development), Bhopal. MP,India.

Prasad,R and Bhatanagar.P. 1991. Socio-economic potential of minor forest produce in Madhya Pradesh. State Forest Research Institute, Jabalpur,India. Technical Bulletin No. 26.

Prasad, R and Patnaik S .1998. Conservation Assessment and Management Planning (CAMP) workshop for Non Timber Forest products in MP. CAMP workshop briefing book. IIFM,Bhopal (MP),India.

Shrivastava,J L. 1998. Cultivation practices of some medicinal plants. State Forest Research Institute publication. Series no.38.

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# THE ESSENTIAL OIL FADE OF AROMATIC LAURUS NOBILIS IN THE MEDITERRANEAN REGION "

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## Abstract

(Not available in French & Russian)

Across the Mediterranean region aromatic plant species growing naturally. These species are producing essential oils and comprise an important economical indicator for the population. All aromatic plants emit volatile substances into the environment either during their life or during the decomposition process. These volatile constituents affect the top soil microflora and form specific environmental conditions for the recycle process. The aim of this study was to investigate the essential oil degradation and the release rate of the main compounds of the oil of *Laurus nobilis* during decomposition process.

**Key words:** *Laurus nobilis*, Essential oil degradation, Mediterranean region, Decomposition process

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## Introduction

One of the major plant categories growing in the Mediterranean region is that of aromatic plants which contain essential oils. It is obvious that essential oils do not survive forever in plant material and the fate of the oil following leaf fall is a question of interest.

Almost all plants, and mainly the aromatic ones, emit volatile substances. The oil represents 1-4% of the dry weight, and there are several ways that these secondary metabolites escape into the environment. According to Margaris and Vokou (1986) the terpenoid emissions participate in photochemical reactions leading to aerosol production. Plant essential oils are complex mixtures of different compounds, and their constituents are insoluble or almost insoluble in water. The oil constituents are influenced by the geographical location of the plant (Rhyu, 1979).

Essential oil decomposition can be occurred even when the plant put into a dark place. As Sombbrero (1992) stated, the percentage of oil in the leaves showed a gradual decrease the longer the plant remained in the dark losing approximately 40% of oil in a period of twenty-four days. He also reported that not only the total amount of the oil but also the different oil compounds presented a decrease whereas some others presented an increase (e.g.  $\alpha$ -pinene).

The decomposition of the essential oil is achieved by the presence of microorganisms which need to have the enzymatic capacity to break down the organic compounds of the litter. The litter and its components constitute source of carbon and nutrients (Melillo & Aber, 1984). The terpenoids which are characterized by their lability (Knobloch et al., 1989) have been found to interfere with enzymatic reactions of energy metabolism.

The most prominent among the organisms known to attack hydrophobic residues are members of the genus *Pseudomonas* and *Nocardia* (Gunsalus and Marshall 1974). It was also found (Stevenson 1967) that *Arthrobacter* spp. are able to utilize a great number of aromatic hydrocarbons as their sole carbon source. There are a number of reports dealing with the ability of *Arthrobacter* in degrading aromatic structures (Audus & Symonds 1955, Gunderson & Jensen 1956). Similarly a number of *Arthrobacter* have been shown to produce complex polysaccharides or enzymes involved in the transformation or cleavage of these structures (Cadmus et al. 1963). One hundred and thirty *Arthrobacter* isolates were

tested for their ability to utilize aromatic hydrocarbons as their sole carbon source. Of these organisms, 77% were able to grow on at least two aromatic substrates and many were capable of growing on a wide range of these compounds (Stevenson 1967). The fact that the members of the genus *Arthrobacter* occur as a major component of the autochthonous<sup>8</sup> flora of most soils coupled with the ability to utilize aromatics, suggests that this activity may be the major role of this group of organisms in soil.

Not only the oil but also the organic chemical constituents can affect the litter decay. The constituents of the litter can be divided into three broad groups which begin their net mass loss at different stages of decomposition (Berg et al 1982). The slight water solubility of terpenes would allow some leaching loss of these components. Cineole inhibits respiration (Muller et al. 1969) and alters the anatomy of the roots and seedling cells. As Halligan (1975) reported, camphor and 1,8-cineole were the two most toxic components and contribute to toxicity in the field .

## Materials and methods

The target of this study was to investigate the essential oil degradation during decomposition process of Sweet Bay (*Laurus nobilis*) and how the major compounds are released or decomposed.

The litterbag technique was used to evaluate the litter decay and the fade of the essential oil content and its components. The plant species used for this project was Sweet Bay (*Laurus nobilis*). Approximately 15g of fresh leaves were added to the plastic bags and sealed with synthetic thread. Three hundred bags were used and each bag had a code number. The bags were put on the ground, by removing the surface vegetation, so that the bags were slightly touching the soil.

The area of the investigation was in the North part of Greece at Chalkidiki peninsula with typical Mediterranean characteristics. Twenty replicates, of fifteen bags were installed in the experimental area. The first sampling was on the 1st May and then periodically, every month. Approximately 1g dw from the litterbags, containing the aromatic plant material, ground in a mill, is put into the capsule and covered by a cotton top. The extraction medium was diethyl ether with 10<sup>-4</sup> molar (M) of n-tetradecane to act as an internal standard for any losses. Then after the essential oil analyzed in a Gas Chromatograph. The chromatograph was injected with 2.5 µl of extract for each run. Three replications of each sample were analyzed. Traces and area integration was recorded on an automatic Pye Unicam PU 4810 computing integrator. It was programmed to record and calculate the percentage area of each peak , although ignoring the solvent peak. The extracts were analyzed by GC using the following pure compounds as markers; α-pinene, 1.8 cineole, limonene, fencone, linalol, camphor and eugenol. All data have been tested for statistically important differences with analysis of variance test (ANOVA).

## Results and discussion

During the period of the investigation the essential oil content (table 1) of buried *Laurus nobilis* present a remarkable decrease. A significant fade also observed in the main compounds of the oil (table 2).

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<sup>8</sup> Autochthonous is an organism type which lives naturally in a certain area.

**Table 1. The Percentage of the oil derived from the buried plant material is shown.  
The plant material was buried from April of 94 to November of 95.**

Date	Oil %	Fade %
Initial	3,3	0,0
May 94	3,2	3,0
Jun 94	3,1	6,1
Jul 94	2,8	15,2
Aug 94	2,4	27,3
Sep 94	2	39,4
Oct 94	1,9	42,4
Nov 94	1,8	45,5

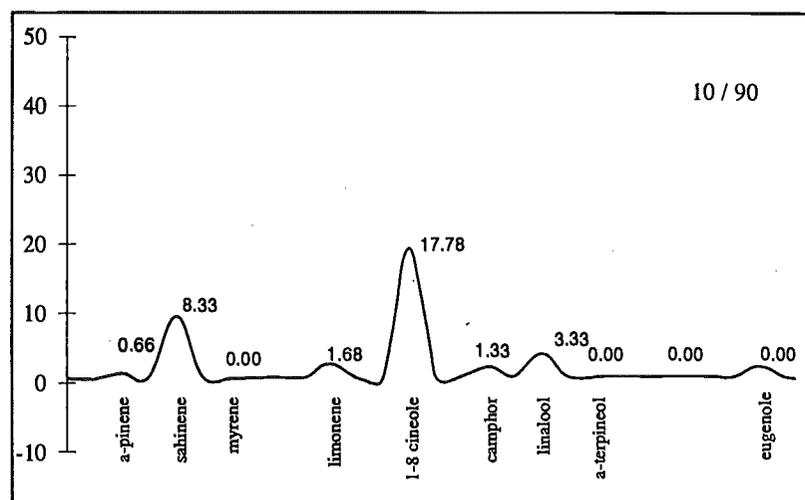
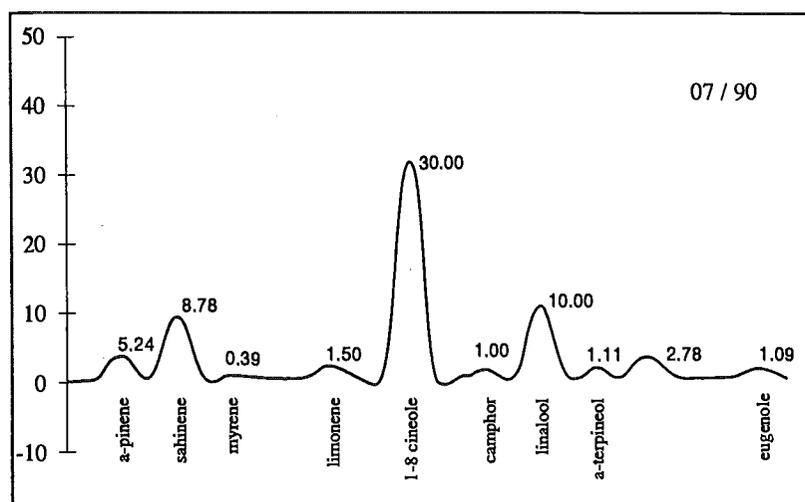
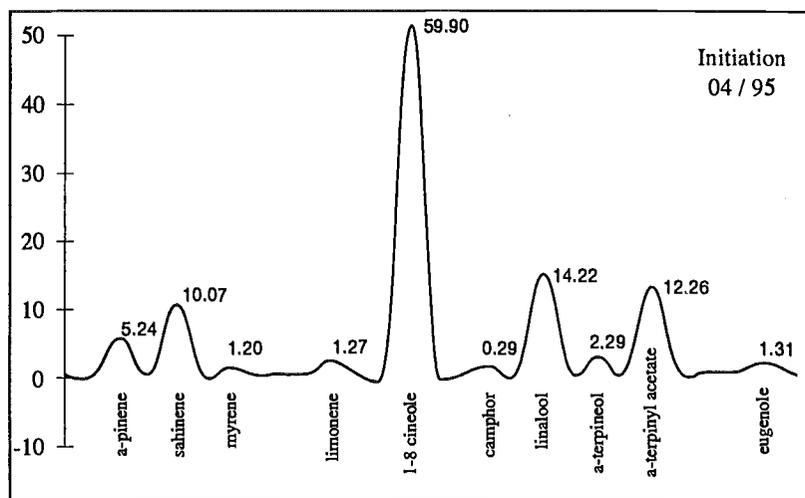
Date	Oil %	Fade %
Dec 94	1,7	48,5
Jan 95	1,8	45,5
Mar 95	1,6	51,5
May 95	1,0	69,7
Jul 95	0,8	75,8
Sep 95	0,8	75,8
Nov 95	0,8	75,8

**Table 2. The percentage of the main compounds found in the of buried *Laurus nobilis* is shown.  
The plant material was buried from April of 94 to November of 95.**

DATE	Compounds (%) in the oil concentration									
	a-pinene	sabinene	myrcene	limonene	1-8, cineole	Camphor	Linalool	a-terpineol	a-terpinyl acetate	Eugenole
Initial	5,2	10,1	1,2	2,0	49,9	0,9	14,2	2,3	12,1	1,3
05/94	5,0	9,4	1,2	1,9	44,4	1,0	12,3	2,2	7,8	1,2
06/94	3,9	9,2	0,9	1,8	38,9	0,9	11,1	1,6	4,4	1,2
07/94	3,2	8,8	0,4	1,5	30,0	1,0	10,0	1,1	2,8	1,2
08/94	1,3	8,3	0,1	1,6	24,4	1,1	7,8	0,9	1,0	1,1
09/94	1,1	9,0	0,0	1,6	22,2	1,1	5,6	0,0	0,2	1,3
10/94	0,7	8,3	0,0	1,7	17,8	1,1	3,3	0,0	0,0	1,3
11/94	0,3	6,8	0,0	1,8	15,3	1,1	0,0	0,0	0,0	1,0
12/94	0,0	7,2	0,0	1,8	12,2	0,9	0,0	0,0	0,0	0,9
01/95	0,0	3,4	0,0	1,9	11,1	0,4	0,0	0,0	0,0	0,7
03/95	0,0	1,7	0,0	1,2	10,0	0,3	0,0	0,0	0,0	0,3
05/95	0,0	0,0	0,0	0,9	8,9	0,3	0,0	0,0	0,0	0,0
07/95	0,0	0,0	0,0	0,0	8,9	0,3	0,0	0,0	0,0	0,1
09/95	0,0	0,0	0,0	0,0	7,6	0,1	0,0	0,0	0,0	0,0
11/95	0,0	0,0	0,0	0,0	5,6	0,1	0,0	0,0	0,0	0,0

Table 1 shows that there is a great loss of the oil content through the period of investigation. After eighteen months the buried plant material of aromatic *Laurus nobilis* lost about 76 % of the initial oil content. All the major compounds of the oil of *Laurus nobilis* decreased during the study and the differences were observed between the dates of samplings were statistically very important.

### Compound percentage

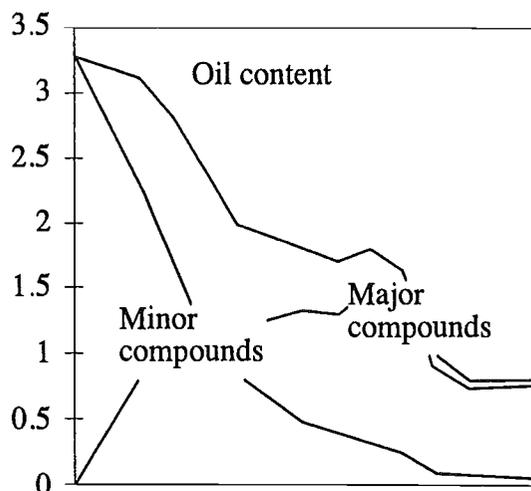


**Figures 1-3.** Representation of a chromatograph. In the charts the ten most important compounds found in the oil of *Laurus nobilis* are presented. In the charts the compounds as well as the percentage values are also reported. Each chart gives the percentage values of different dates from buried plant material.

The major compound is 1-8 cineole.

ANOVA					
Source of Variation	SS	df	MS	$F_{critical}$	$F_{99}$
Compounds between dates of samplings	1242.0	14	88.7	4.9	2.2

As is seen in the chromatographs after six months the percentage of cineole dropped from 49.9% to 17.8%, of linalol from 14.2% to 3.3%, of  $\alpha$ -terpinyl acetate from 12.1% to 0%. These compounds are catabolised easily from the buried leaves. Another important conclusion could be drawn is that the minor compounds or the subproducts of the major compounds are increasing during the study.



**Figure 4.** Essential oil and major compounds degradation of *Laurus nobilis* during the period of eighteen months.

The essential oils have been extensively reported to affect the microorganism populations and moreover the decomposition rates. Even 1,8 cineole, which is very toxic to microorganisms and major compound of sweet bay oil can be degraded by microorganisms. It is reported that 1,8 cineole and  $\alpha$ -terpinyl acetate were actively metabolised in mature leaves with the help of  $^{14}\text{CO}_2$ . However (personal results) among different plants *Laurus nobilis* oil had the highest inhibition against a series of microorganisms. 1,8 cineole was the most effective compound against *Rhizopertha dominica*, and *Oryzaepfilus surinamensis*. Similar results were obtained by Kivanc & Akgul (1986). They found that the most toxic oil against *Staphylococcus aureus* and *Proteus vulgaris* were the oils from Cumin, Laurel and Oregano.

The magnitude of the ability of microorganisms to decompose plant secondary metabolites is reported by Vokou and Margaris (1988). Under favorable climatic conditions (sufficient moisture) soil microorganisms have the capacity to decompose natural products, such as secondary metabolites, at a rate of at least  $1.7 \text{ g.m}^{-2} \cdot \text{d}^{-1}$ . Such a rate could hold in the field for a limited period of time, excluding that of the summer drought. It is also been suggested that monoterpenes may serve as carbon and energy resources particularly during periods of carbon stress. The secondary compounds emanate either from the live plant or from the leaf litter (Vokou et al 1984), and reach the soil, where they have a significant effect on microorganisms and mineralization of N, P, etc.

The view that the bacterial populations are able to use the volatile oils as a carbon source is supported by many researchers, experimenting with specific isoprenoid compounds such as b-pinene and camphor (Gibbon et al., 1972; Gunsalus and Marshall 1974). Muller and de Moral (1966) reported that if the volatile oils were to exert any effect, they should be primarily absorbed by or adsorbed on the soil particles or soil colloids.

Since the litter of aromatic plants contains large quantities of volatile oils it might be expected that the decomposition process in Mediterranean ecosystems is mediated by allelopathic interactions, causing shifting of the population balance in the soil fungi and bacteria, particularly in the surface horizons. This activation of bacteria by volatile oils might be considered as an adaptive mechanism where these systems develop.

## References

- AUDUS, L.J. & K.V. SYMONDS, 1955. Further studies on the breakdown of 2,4-dichlorophenoxyacetic acid by a soil bacterium. *Ann. Appl. Biol.* 42, pp.174-182.
- BERG, B., K. HANNUS, T. POPOFF & O. THEANDER, 1982. Changes in organic chemical components on needle litter during decomposition. Long-term decomposition in a Scots pine forest, I. *Can. J. Bot.* 60, pp.1310-1319.
- CADMUS, M.C., H. GASDORF, A.A. ANDERSON & R.W. JACKSON, 1963. New bacteria polysaccharide from *Arthrobacter*. *Appl. Microbiol.* 11, pp.488-492.
- GIBBON, G.H., N.F. MILLIS & S.J. PIRT, 1972. Degradation of  $\alpha$ -pinene by bacteria. *Proceedings IVth International Fermentation Symposium: Fermentation Technology Today*, pp.609-612.
- GUNDERSON, K. & H.L. JENSEN, 1956. A soil bacterium decomposing organic nitro-compounds. *Acta Agr. Scand.* 6, pp.100-114.
- GUNSALUS, I.C. & V.P. MARSHALL, 1974. Genetic regulation and mechanisms of P-450 oxygenase action. In: *Survival and toxic environments*. Academic Press, New York, San Francisco and London, pp.295-313.
- HALLIGAN, J.P., 1975. Toxic terpenes from *Artemisia californica*. *Ecology* 56, pp.999-1003.
- KIVANC, M. & A. AKGUL, 1986. Antibacterial activities of essential oils from Turkish spices and citrus. *Flavour and Fragrance Journal* 1, pp.175-179.
- KNOBLOCH, K., A. PAULI, B. IBERL, H. WEIGAND & N. WEIS, 1989. Antibacterial and antifungal properties of essential oil components. *Journal of essential oil research* 1, pp.119-128.
- MARGARIS, N.S. & D. VOKOU, 1986. Microbial decomposition of smog organic pollutants. *Bull. Environ. Contam. Toxicol.* 36, pp.15-22.
- MELILLO J.M. & J.D. ABER, 1984. Nutrient immobilization in decaying litter: an example of carbon-nutrient interactions. In: *Trends in ecological research for the 1980s* (J.H. Cooley and F.B. Golley, Eds), pp.193-215. Plenum Press, New York.
- MULLER, C.H. & R. DEL MORAL, 1966. Soil toxicity induced by terpenes from *Salvia leucophylla*. *Bull. Torrey Bot. Club* 93, pp.130-137.
- MULLER, W.H., P. LORBER, AND B. HALEY, 1969. Volatile growth inhibitors produced by *Salvia leucophylla*: Effects on oxygen uptake by mitochondrial suspensions. *Torrey Bot. Club* 96, pp.89-96.
- RHYU, H.Y., 1979. Gas chromatographic characterization of sages of various geographic origins. *Journal of Food Sciences* 44, pp.758-762.
- SOMBRERO, C., 1992. Environmental control of oil production in Mediterranean plants. PhD thesis, University of Reading, U.K.
- STEVENSON, I.L., 1967. Utilization of aromatic hydrocarbons by *Arthrobacter* spp. *Can. J. Microbiol.* 13, pp.205-211.
- VOKOU, D., N.S. MARGARIS & J.M. LYNCH, 1984. Effects of volatile oils from aromatic shrubs on soil microorganisms. *Soil Biol. Biochem.* 16, pp.509-513.
- VOKOU, D. & N.S. MARGARIS, 1988. Decomposition of terpenes by soil microorganisms. *Pedobiologia* 31, pp.413-419.

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# **SUSTAINABLE WILD HARVESTING OF MEDICINAL AND AROMATIC PLANTS: AN EDUCATIONAL APPROACH**

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## **Abstract**

Wild-crafting of medicinal and aromatic plants has been a major concern for conservationists since they see it as a threat to plant biodiversity. Although, rural development projects such as construction of dams, development of tourism areas, establishment of housing and industrial estates, overgrazing, conversion of pasturelands to cultivation fields, deforestation, etc. pose a greater threat, wild harvesting of medicinal and aromatic plants is also included in this debate.

Wild-crafting of herbal materials is a tedious and difficult job and requires manual labour sometimes necessitating the entire family to get involved in the process. Collectors are usually non-educated and this is the main cause of the destruction of biodiversity and the unnecessary loss of material. Collectors consist of poor peasants who need this practice as an extra source of income. The introduction of good harvesting practice for wild-crafted plant materials and the education of collectors on sustainable wild harvesting and post harvest treatment of medicinal and aromatic plants are seen as a safe way to minimize unnecessary destruction of the wild flora. The paper discusses these and related issues. A successful case of such a practice in Turkey is presented.

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## **Introduction**

Turkey has a rich biodiversity and a significant number of plant taxa. According to latest estimates, the vascular flora of Turkey contains over 12.000 generic taxa belonging to 173 families, 1244 genera and over 9150 species. Each year about 20 new species or taxa new for Turkey are recorded. The rate of endemism is over 35%. Over 3500 endemic taxa are recorded in Turkey.

An estimated 1000 species are used variously for medicinal purposes. The flora of Turkey also possess about 3000 aromatic plant taxa. About 200 of the medicinal and aromatic plants of Turkey have export potential and 70-100 plant taxa are annually exported from Turkey.

Since except for commercial crops such as poppy, anis, rose, fennel, cumin, coriander, dill, etc. cultivation practices for medicinal and aromatic plants are not common in Turkey. Therefore, the majority of exported herbs are harvested from wild sources.

## **Wild Crafting**

It is an established economical fact that demand creates supply. As demand for medicinal and aromatic plants is increasing, wild crafting of herbs are expected to continue. Legal restrictions to curb wild crafting may result in shrinkage of supply, however, this in turn inflates the price of that commodity. As long as the demand stays, wild crafting ought to continue despite the elevated risks for the collector.

It is more important to control and reduce the demand for wild crafted herbs. But this is not an easy task. The problem can only be solved at international level. However, it may not be necessary to restrict the wild crafting of every plant material. It may be advised to restrict those which are under greater threat of extinction as scientifically proven.

Being totally against wild harvesting bears the risk of depriving the country of its economic benefits. The ideal situation would be to cultivate all the plants in demand. This is the only safe way to supply pure and good quality plant materials. However, due to reasons such as unsuitability of the plant for cultivation, paucity of demand, lack of economic feasibility, etc. most medicinal and aromatic plants are wild crafted.

Conscious entrepreneurs can be successful in the cultivation of medicinal and aromatic plants with a good profit margin through incentives provided by the state under the guidance of scientists. But this ideal situation is not a magic solution to the problem. How about the forest villagers who rely on wild crafting as a source of income? Here, there is food for thought for the state, the citizens, scientists and scientific institutions. The state has to enhance the quality of life of its citizens who have to collect plants from the wild for their livelihood. If the level of affluence is raised conscious of the society regards wild crafting a shame, and without resort to legal restrictions, destruction of biodiversity due to wild crafting subsides. This is the situation observed in developed countries. In other words, wild crafting arises from economic necessities. Since the level of affluence of a country cannot be changed in one day, the only option left for the state is to devise a mechanism to control wild crafting. Here, the priority should be given to the preparation of an inventory of wild plants with economic value. Special reserves or conservation sites can be declared for endemic and highly demanded other plants. This *in situ* conservation enables these plants to survive in their ecosystems. Efforts to this end have been ongoing in Turkey.

Wild crafting is criticized as a threat to the conservation of biodiversity. Although, bioprospecting is encouraged and seen as an efficient way of tapping nature's resources through sustainable utilization of the environment for the benefit of mankind, conservationists are solidly against wild crafting of medicinal and aromatic plants. Even though, rural development projects such as construction of dams, development of tourism areas in and around nature reserves, establishment of housing and industrial estates, urbanization of the countryside, overgrazing of meadows and pasture lands, deforestation, conversion of pasturelands to cultivation fields, land erosion are bigger threats to biodiversity, however, wild crafting of medicinal and aromatic plants are also included in this debate.

Wild harvesting of medicinal and aromatic plants is practiced mainly in developing countries where the work is carried out by peasants. They do it for extra income and compete with each other for a bigger harvest. Collected plants are dried in open air and a certain degree of wilting (if necessary), sorting and cleaning is done before packaging for transport. If this is done without the supervision of a skilled worker, wastage of materials and destruction of the environment may be sizeable. Deliberate adulteration is also a common problem.

Rejection of the consignment by the buyer means immediate loss to the collecting party. It may not be possible to remove dirt and foreign plant materials from chopped, crushed or semi-powdered bulk of plant material. It is not only a loss for the collector but also for the country. Therefore, education of the collectors is an immediate necessity.

### **Good Harvesting Practice**

Recently, a guideline has been proposed with the title "*On the Commercial Collection of Plant Material from the Environment for Medicinal Purposes*". It is also named as "*Good Harvesting Practice (GHP)*" (Annex 1).

This guideline is aimed at educating the collectors and by introducing checks and rules for harvest and post-harvest practices. It is intended to reduce avoidable losses and to secure collection of the correct plant material in a sustainable way. It requires supervision of the collection by a responsible person knowledgeable in the particular plant harvested, its vegetative cycle, population density, correct time and mode of harvesting, etc. He educates the collectors on the recognition of the true plant, on the aspects of conservation and legal restrictions, and in ways to safeguard the production of high quality plant material suitable for pharmaceutical manufacturing. It is hoped that the drug collecting organizations will soon reorganize themselves to adhere to this guideline and a certain certification scheme will be developed to encourage, and ensure that these rules laid down in the guideline are strictly implemented and documented.

The preparation of the guideline is timely since the subgroup on Herbal Medicines of the European Medicine Evaluation Agency (EMA) requires for herbal materials the minimum standards set for synthetically manufactured active pharmaceutical materials. Proof for such a standard can be obtained by legally binding written documentation indicating that the true plant material is harvested, processed, transported and stored in an orderly manner. Since the guideline was drafted by an industrial manufacturer of herbal medicines realizing the fact that some order is necessary in obtaining

pharmaceutical grade plant materials from wild sources, there is a good chance that GHP will soon set the minimum standards in the trade of wild crafted herbs.

Another important aspect of sustainable wild crafting is to give the villagers of a region a “sense of ownership”. In other words, wild crafting rights should be given to certain groups such as village cooperatives in their own regions. The authorized group does not allow strangers to collect plant materials from its region. Furthermore, the group is encouraged to take precautions for sustainability.

## Some Examples

Here, I would like to give some examples from Turkey.

### **Kekik**

Kekik (Oregano) is an important export commodity of Turkey. Annually, Turkey exports 5.000-7.500 tons of dried oregano for a return of 13-15 million US dollars. Commercial oregano species are collected mainly in the Aegean and Mediterranean regions of Turkey. Turkish oregano (*Origanum onites*) (Labiatae) tops the list of commercial oreganos. The others include White oregano (*Origanum majorana*-Carvacrol-rich type), Sütçüler oregano (*Origanum minutiflorum*) [Endemic], Greek oregano (*Origanum vulgare* subsp. *hirtum*), Israeli oregano (*Origanum syriacum* var *bevanii*), and *Thymbra spicata*, *Satureja cuneifolia* and *Coridothymus capitatus* to a lesser extent. Contrary to the Harmonized List of Export Commodities of Turkey, *Thymus vulgaris* (thyme) and *Thymus serpyllum* (wild thyme) are not native plants of Turkey, however, kekik (oregano) is exported under their position numbers.

The biggest threat to wild growing oregano is early harvest. Some collectors are known to start harvesting very young oregano plants in February in contrast to its more usual harvesting period of July-September. Due to low content of carvacrol in essential oil of these early harvests, such consignments are rejected by the buyers. Another malpractice is harvesting of the herb with bare hands instead of using a sickle. Such a practice results in uprooting or damaging the roots, hence, killing the perennial plant.

An interesting practice for sustainable wild crafting of oregano exists in Sütçüler township and its villages in Isparta province. Sütçüler oregano is an endemic species with high essential oil yield and high carvacrol content. Realizing the economic importance of this species which grows only in their region in the world, the collectors in four villages have established village cooperatives. These cooperatives in collaboration with the regional Forestry Office have drawn up a set of rules for the wild crafting of this oregano species. These rules require the collectors not to start harvesting before a predetermined date which usually is the first half of September while the plants are in the stage of late flowering/early fruiting. The collectors are permitted to harvest the plants with sickles or other sharp tools 5 cm above the ground. During this period, the peasants move to the high plateaus which belong to their village with their families, do the harvesting in their specified areas by the Village Headman, and bring down their harvest after drying, pounding and packaging in sacs to sell to the cooperative. An important aspect of this practice is that it has been an improvised initiative by the villagers directed by common sense and not through dictation. Cooperatives are established in the following villages: Çandır, Sarımemetler, Gümü and Beydilli. Their harvests in 1998 were as follows: Çandır (70-80 tons), Beydilli (80-100 tons), Sarımemetler (50 tons) and Gümü (20-30 tons). This type of harvesting has been practiced in these villages in the last five years.

### **Laurel**

Laurel (*Laurus nobilis*) (Lauraceae) is a bush which grows along the entire coast line of Turkey stretching from Artvin to Hatay. Laurel leaves are harvested for export or essential oil production in most parts of Turkey, however, in İçel and Hatay provinces, fruits are harvested and an aromatic fixed oil (Laurel berry oil) [Tehnel oil, Gar oil] is obtained by boiling the crushed berries in water followed by scooping out the floating oil. This oil has excellent frothing properties and therefore used in locally made soaps, and exported mainly to Arab countries and Germany.

In mountain villages of Silifke in İçel province, it is possible to see well looked-after laurel trees owned by the villagers. Each villager harvests berries from his own trees in a manner similar to harvesting olives. While in other parts of Turkey where wild growing laurel plants are butchered by cutting their entire branches to pluck leaves, here, the cared plants can grow to the height of a tree and no more measure of conservation is necessary.

## **Sideritis**

*Sideritis* species (Labiatae) [Mountain Tea] are used as herbal tea in Turkey. Entire crop is obtained by wild crafting. They are sold locally and also exported mainly to Germany.

Since Turkey is one of the two main gene centres of *Sideritis* together with Spain, the rate of endemism is high. As dried inflorescences are used to make tea, plants are collected while flowering.

We have recently made an interesting field observation. The unusual abundance of the endemic *Sideritis vuralii* around the Kayrak village caught our attention. When asked, the villagers told us that they had been planted by them upon discovery of its bee-attracting properties.

If a plant is found useful then necessary steps are taken by the people concerned for its survival.

## **Salep**

Salep is obtained from the tubers of terrestrial orchids of the Orchidaceae family. The fat tubers of the species of *Orchis*, *Ophrys*, *Platanthera*, *Serapias*, etc. are collected. After washing, the tubers are either lined up on a string like beads or loaded on a skimmer, and dipped in boiling water for some time in order to kill the enzymes. Then, the tubers are dried in the sun until they become rock hard. When finely ground and boiled with milk salep makes a pleasant hot drink taken especially in winter months. In summer, salep is a key ingredient of Maraş Ice cream which is hung and cut by knife in hot summer days.

Salep plants grow in forests or meadows, and are considered endangered species. In most countries, their collection is prohibited. Although its export is banned in Turkey, it is somehow exported. Domestic consumption requires a sizeable quantity of salep tubers to be wild crafted. Its propagation poses problems as germination of its seeds require the occurrence of a certain fungus in the soil. Total dependence to the nature for its supply gives shivers to conservationists. However, it can be harvested in a sustainable way.

The plant yields two tubers one fat and hard and one weak and soft. After uprooting to collect the fat tuber, if the plant is replanted immediately with its weak tuber it survives and supplies another fat tuber next year. This example also clearly shows even simple education of the collectors can prevent unnecessary destruction or spoilage.

## **Conclusion**

As illustrated above, education plays an important role in sustainable utilization of natural resources. Simple educational materials such as illustrated leaflets or booklets, wall charts, videos, etc. can be very useful in creating public awareness and for the education of collectors. They can be printed and distributed by traders or trade organizations dealing with wild crafted medicinal and aromatic plants.

I personally find, the adoption and careful implementation of GHP rules useful and necessary for sustainable harvesting of medicinal and aromatic plants.

## **Annex 1**

### **Proposal for a guideline on the commercial collection of plant material from the environment for medicinal purposes**

#### **(GHP, Good Harvesting Practice for Collected Plant-Material)**

[By G.Harnischfeger, ICMAP News, No.7, 12-14 (June 2000)]

The following guideline describes requirements, which should be met in today's collection of medicinal plant material. Observance of this guideline constitutes an important step towards medicinal plant products of constant and sufficient quality.

Since demand for herbal starting material from a specific species is difficult to predict and climatic conditions influence greatly its quality, it is prudent for the trader or buyer to include as many different growing areas as possible. This allows equalization of quality by mixing individual batches of different provenances.

## **1. Collecting Personnel**

- 1.1 Collectors should possess extensive knowledge about the identification of the plant from which the drug is derived, its physiological specifics and its requirements for environmental factors like shade, moisture, soil etc.
- 1.2 Collectors should be able to distinguish clearly between the medicinal plant and its closely related relatives in order to avoid unwanted admixtures.
- 1.3 Collectors should have sufficient knowledge about optimum conditions for the time of harvesting, the best techniques for harvesting and also enough knowledge about the subsequent conservation process and storage conditions to insure high quality of the raw material gathered.
- 1.4 Collectors should adhere to a high degree of personal hygiene. They should not take part in collecting activities if suffering from infectious diseases transmittable by food, e.g. diarrhea, carry open wounds, inflammations of the skin etc. until their complete recuperation.
- 1.5 The knowledge of the collectors should be periodically reinforced and monitored by a competent specialist of the collecting organization. This education process should be documented.

## **2. Collecting**

- 2.1 Collecting should take place at a time when the plants with regard to their use are in optimum condition with respect to required pharmaceutical quality and therapeutical efficacy.
- 2.2 Collecting should take place under dry conditions. Wet soil, dew, rain or exceptionally high air humidity are unfavorable.
- 2.3 All equipment used should be clean and free of remnants of previously harvested plants.
- 2.4 Mechanical damage that results in undesirable quality changes has to be avoided, e.g. loss of essential oil in broken umbelliferous fruits.
- 2.5 Whenever possible collection should take place in such a way, that unnecessary damage to the plant is avoided. Care should be exercised to enable the plant to grow back to a normal state.
- 2.6 The period between collecting and arrival of the plant-material at the drying facility should be reduced to a minimum in order to avoid undesirable changes in external appearance, quality and microbial status.
- 2.7 The collected plant-material should be protected from pests, pets and domestic animals.
- 2.8 Special care should be taken to avoid over harvesting and through it the danger of extinction of the plant species in the particular collecting area.
- 2.9 No plants or parts of plants on the endangered species list, be it local or international, should be collected unless special permission is given by the competent state authorities.
- 2.10 The responsible collecting organization has to appoint at the local level a person charged with insuring the correct identification of the collected plant-material and the compliance of the collectors with provisions 2.1 - 2.9.
- 2.11 Information about the general area of collection, for example, a brief description of habitat, climate, soil type and other specifics which might influence the quality of the harvest should be documented by the responsible collecting organization for each campaign.
- 2.12 Appropriate documentation including season and date of the collecting campaign and an assessment on identity, macroscopic quality and purity of the collected plant material should accompany every shipment from the collecting area to the drying and/or processing facility.
- 2.13 Every shipment constitutes a batch. It should be labeled appropriately and be accompanied by the documentation outlined in paragraph 2.12.
- 2.14 The appointed person of paragraph 2.10, possessing adequate knowledge about the requirement on identity, quality and purity of the plant-material should sign the accompanying documentation and accept responsibility for those specifics named in paragraphs 2.12 and 2.13.

## **3. Drying/Processing**

- 3.1 Arriving at the drying/processing facility the collected plant-material has to be promptly unloaded and unpacked. It should not be exposed to the sun and must be protected from the elements.
- 3.2 Building-facilities used for drying/processing must be clean, well aerated and never be used for animal keeping.

- 3.3 Building-facilities must provide protection of the plant-material against pests, rodents, insects and birds as well as against pets and domestic animals.
- 3.4 Equipment like drying-frames etc. must be clean and regularly serviced.
- 3.5 In case of air-drying, the plant-material should be spread in a thin layer. The drying frames must be located in a sufficient distance from the ground to provide adequate air circulation and facilitate uniform drying.
- 3.6 For all methods used, adequate consideration should be given that drying conditions are chosen appropriate to the type of plant-material processed. These concern both the character of the active ingredients (*e.g.* essential oils) and the type of plant organ collected (*e.g.* root, leaf, flower etc.).
- 3.7 Drying directly on the ground under exposure to sunlight should be avoided.
- 3.8 The dried drug should be screened in order to eliminate discolored, moldy or damaged pieces and foreign admixtures and contaminants.
- 3.9 Clearly marked waste bins should be kept ready, emptied and cleaned daily.
- 3.10 The dried plant-material should be packaged immediately in bags or containers permitting air exchange in order to reduce the risk of pest attacks and mould.
- 3.11 Adequate documentation of the drying process, duly signed by a responsible person, should be added to the batch report.

#### **4. Packaging, equipment, facilities for storage, documents and quality assurance**

The requirements laid down in the Good Agriculture Practice (GAP) guidelines apply where appropriate.

**Table 1**  
**Important Wild Crafted Medicinal and Aromatic Plants Exported from Turkey**  
 [Volume (kg) / value (\$) / unit export value (\$ / kg) ]

HS Code	1992	1993	1994	1995	1996	1997	1998	1999
9104011+ 13+19+21	4,744,120	5,457,622	6,435,386	5,600,731	6,475,032	6,039,440	7,050,968	7,606,679
	10,786,479 2,27	13,272,399 2,43	16,103,655 2,50	13,686,109 2,44	15,151,109 2,44	13,237,372 2,19	15,492,109 2,20	16,556,474 2,48
9104030	2,452,997	2,507,553	3,349,929	2,870,418	3,202,612	3,762,788	3,473,075	3,782,765
	5,685,517 2,32	5,850,303 2,33	5,927,417 1,77	6,024,836 2,10	7,005,944 2,19	7,637,332 22,03	7,340,650 2,14	7,246,091 1,92
12119045 +70+75	563,863	576,257	400,220	547,821	681,044	720,550	923,325	1,114,728
	1,118,743 1,98	1,367,658 2,37	837,511 2,09	1,121,261 2,05	1,476,674 2,17	1,604,405 2,23	2,103,571 2,28	2,357,601 2,11
11062031	5,662	70,864	7,732	6,911	2,191	2,267	697	950
	12,840 2,27	87,490 1,23	17,372 2,25	18,865 2,73	11,469 5,2	8,056 3,55	1,812 2,60	3,630 3,82
12119044	128,538	75,319	348,611	469,599	336,225	-	191,681	125,852
	595,719 4,63	289,813 3,85	1,632,697 4,68	1,737,489 3,70	1,529,431 4,55	-	797,257 4,15	587,875 4,67
12111000	1,684,676	1,352,603	1,140,205	1,557,358	1,148,212	2,124,995	1,301,649	1,129,671
	1,346,150 0,80	998,938 0,74	853,982 0,75	1,072,274 0,69	743,157 0,65	1,531,457 0,72	933,162 0,72	759,623 0,67
14049021	93,990	267,376	142,803	98,186	65,481	98,252	92,121	89,609
	175,981 1,87	431,481 1,61	419,293 2,94	298,743 3,04	197,471 3,02	221,037 2,25	196,694 2,14	190,345 2,12
12119049 +95	815,401	1,298,011	1,272,455	1,479,411	900,776	565,500	1,840,584	1,020,568
	1,375,561 0,59	3,041,021 2,34	8,306,778 6,53	9,583,572 6,48	1,392,427 1,55	1,691,914 2,99	5,279,349 2,87	2,260,991 2,21
<b>Subtotal</b>	<b>10,489,247</b> <b>21,096,990</b>	<b>10,253,002</b> <b>24,340,165</b>	<b>11,957,136</b> <b>33,244,723</b>	<b>11,073,077</b> <b>32,470,875</b>	<b>8,382,795</b> <b>14,580,336</b>	<b>13,312,792</b> <b>25,931,573</b>	<b>14,874,100</b> <b>32,144,604</b>	<b>14,870,822</b> <b>29,962,630</b>



## RÉCOLTE SAUVAGE DURABLE DES PLANTES MÉDICINALES ET AROMATIQUES : ÉDUCER LA POPULATION

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### RÉSUMÉ

La cueillette sauvage de plantes médicinales et aromatiques préoccupe gravement les écologistes depuis qu'ils ont compris combien elle menaçait la préservation de la biodiversité. Certes, les projets de développement rural, comme la construction de barrages, le développement des zones touristiques, la construction de complexes immobiliers et industriels, le surpâturage, la transformation de zones de pâturage en champs cultivés, le déboisement, etc., représentent une menace plus grave mais la récolte sauvage des plantes médicinales et aromatiques est également un sujet de débat.

La récolte sauvage d'herbes est un travail laborieux et difficile qui ne peut se faire qu'à la main, ce qui fait que parfois une famille entière est employée à cette activité. Les cueilleurs n'ont généralement aucune instruction et c'est la principale cause de disparition de la biodiversité et de la perte, évitable, de plantes. Il s'agit de paysans pauvres qui ont ainsi une source supplémentaire de revenus. L'introduction de bonnes pratiques de récolte des plantes sauvages et l'éducation des cueilleurs, à qui on enseignera un mode de récolte assurant la pérennité des plantes et le traitement après la récolte des plantes médicinales et aromatiques, est considérée comme un bon moyen de réduire au minimum la destruction évitable de la flore. Le document traite de ces questions et des questions qui s'y rapportent. Un exemple réussi de ce genre d'éducation menée en Turquie sera présenté.

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## **ОТВЕЧАЮЩИЕ КРИТЕРИЮ УСТОЙЧИВОСТИ НЕОРГАНИЗОВАННЫЕ ЗАГОТОВКИ ЛЕКАРСТВЕННЫХ И АРОМАТИЧЕСКИХ РАСТЕНИЙ: ОБУЧЕНИЕ ЗАГОТОВИТЕЛЕЙ**

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### **РЕЗЮМЕ**

Неорганизованные заготовки лекарственных и ароматических растений вызывают серьезную озабоченность у защитников природы, поскольку они видят в этом угрозу для биоразнообразия флоры. Хотя такие проекты развития сельской местности, как сооружение плотин, создание туристических зон, жилищное и промышленное строительство, чрезмерный выпас скота, передача пастбищ под выращивание сельскохозяйственных культур, уничтожение лесов и т.д., создают более серьезную опасность, неорганизованные заготовки лекарственных и ароматических растений также вызывают тревогу.

Неорганизованные заготовки трав представляют собой утомительную и трудоемкую работу и требуют больших затрат ручного труда, в связи с чем целые семьи занимаются этим делом. Заготовителями обычно являются необразованные люди, и это – главная причина разрушения биоразнообразия и неоправданной утраты материала. Заготовителями обычно становятся бедные крестьяне, которые нуждаются в таких заготовках в качестве дополнительного источника доходов. Внедрение оптимальной практики заготовок диких растений и обучения заготовителей отвечающим критериям устойчивости методам заготовки и последующей обработки лекарственных и ароматических растений, как представляется, позволит свести к минимуму излишнее разрушение дикой флоры. В докладе рассматриваются эти и смежные вопросы. В нем приводится пример успешного применения таких методов в Турции.

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# TURKEY'S FOREIGN TRADE OF THE NON-WOOD FOREST PRODUCTS

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## Summary

With this study the analysis of Turkey's foreign trade of the non-wood forest products were aimed. Although non-wood forest products have an important share inside the forest products, especially inside the export, recently there has not been any detailed study related to the its foreign trade. Therefore considering the last 10 years data, this research aimed to find out the development of the non-wood forest products' trade inside the forest products' trade.

Figures of export and import related to non-wood forest products between the years of 1990-1999 which are belong to State Statistical Institute were transferred to MS-EXCEEL media and evaluated by questioning method. 23 non-wood forest products' items which are subject to export and import were included in this research. Development in the export and import of non-wood forest products at last 10 years (1990-1999), the first 5 countries which have priority at export and import, and the shares of 23 non-wood forest products items in the export and import were determined.

The results reveal that, share of the non-wood forest products inside 1.8 billion \$ total forest products export was 36%, while the share was 1.5% inside the 3.2 billion \$ of total forest products import between the years of 1990-1999. Balance of Turkey's of foreign trade non-wood forest products always progressed at positive direction between the years of 1990-1999. In this period about 682.7 million \$ export and 48.9 million \$ import were made. Considering foreign trade of non-wood forest products, Turkey established export and import links with 113 and 64 countries respectively.

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## 1. Introduction

Considering that the export is a very important concept in the development of the countries, the increase in the variety of the products is as much important. 20.703.122 hectares of land in Turkey consist of forests of which 10.547.987 hectares are normal and 10.155.135 hectares are spoilt. Thus, the main forest products are produced in these regions whereas the trees and the small trees growing in the forest ecology and the non-wood forest products, which are obtained from the sub-flora, can also be produced. (OGM Internet records, ÖRS 1999). These products which create an important export opportunity for Turkey are also valuable for the economy of our country and for the people living in the forest villages.

Non-wood forest products are produced in two ways. Firstly, products as resin, sweetgum, *Laurus leaf*, cane, stick, and bushes are produced yearly by the Office of Forestry and secondly, the above mentioned products are produced without a specific programme according to the demands. In the second way of production products are sold to the forest villagers in relation with the 37. Article of the Law of Forestry. Forest Villager Development Co-operatives or the villagers are privileged in relation with the 40. Article of the Law of Forestry. However, a conscious organization is not carried out in the collection of these products, which have an important export potential, and efforts remain at the individual level (ÖZER 1999).

Non-wood forest products have an important share in the foreign trade of forest products, especially in the export. However, a detailed study of foreign trade has not been prepared recently. Thus, this research aims to find out the development of the non-wood forest products in the foreign trade of forest products considering the data of the last decade.

## 2. Material And Method

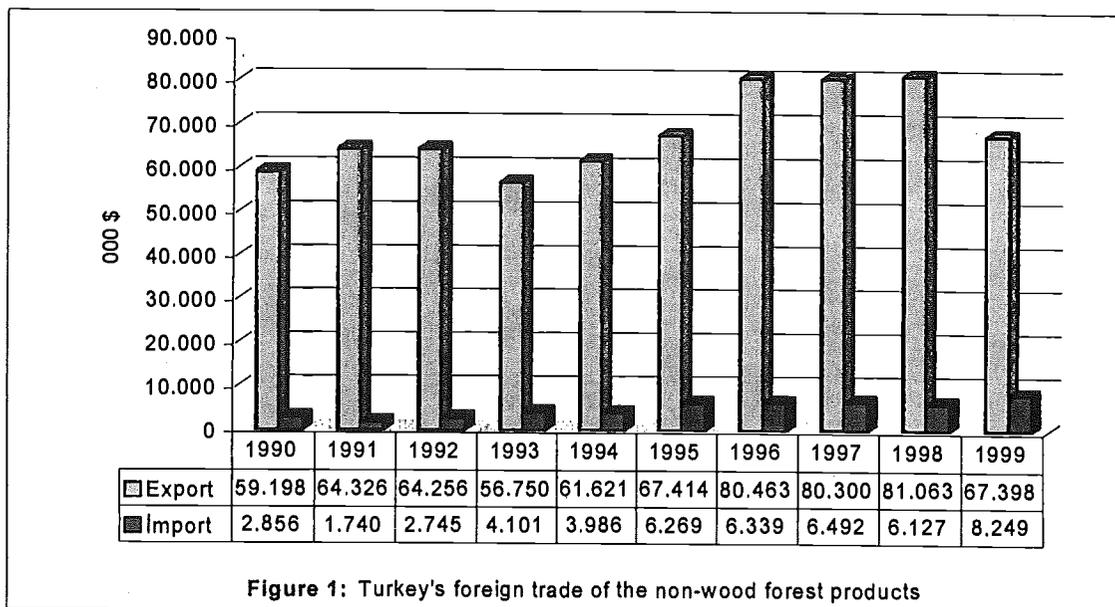
All data used in this study which aims to analyse the foreign trade structure of Turkey's non-wood forest products are the figures of export and import. Figures of export and import related to non-wood forest products between the years 1990 and 1999, which belong to State Statistical Institute, were transferred to MS-EXCEL media and evaluated by questioning method. 23 non-wood forest products, which are subject to export and import, were included in this research. Both literature information and the records of State Statistical Institute were considered in the determination of these 23 products (BOZKURT/YALTIRIK/ÖZDÖNMEZ 1982; BOZKURT/GÖKER 1996; ÖRS 1999). Development in the export and import of non-wood forest products at the last decade (1990-1999), the first 5 countries, which have priority at export and import, were determined.

## 3. Findings

### 3.1 Foreign Trade Balance of Non-Wood Forest Products in Turkey

Foreign trade of the non-wood forest products in Turkey is summarised in Figure 1. While the trading balance of some wood forest products was negative in Turkey, the balance of non-wood forest products was positive between the years 1990 and 2000. Export was at the level of 59 million \$ in 1990 and 81 million \$ in 1998 which was the year of the highest export. A decrease in the export was apparent after the progress in 1998.

Examining the import values, we can see that the import in 1990 was at the level of 2.8 million \$. This amount decreased to 1.7 million \$ in 1991. The import increased in the next years and reached the level of 8.2 million \$ in 1999. Export was 20 times the import in 1990 but this ratio was 8 in 1999.



### 3.2 Privileged Countries in the Non-Wood Forest Product Exports in Turkey

Five privileged countries in the non-wood forest products export are summarized at Table 1. As it is apparent in Table 1, the highest export was made to Germany between the years 1990 and 1992 whereas USA was the privileged country during the other years. The share of 4 UN countries, which are in the first 5 countries in the total export, is 40.5%. Export links have been established with 113 countries in the recent 10 years. This figure was 56 in 1990 and 80 in 1999.

The export shares of the 5 privileged countries according to the export figures of the last decade (1990-1999) are summarised in Figure 2. According to Figure 2, the total export was divided among the countries as follows: 21% USA, 14% Germany, 12% Italy, 9% France and 5% Spain. The export of approximately 682 million \$ was made to the mentioned 5 countries (61%) and to the others (39%).

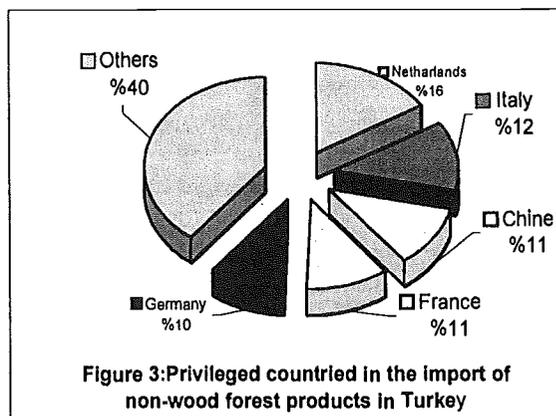
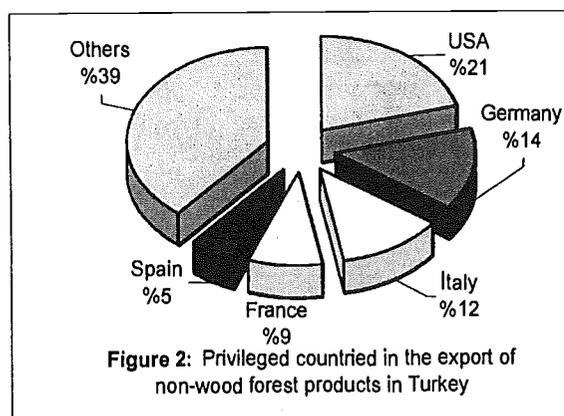
### 3.3 Privileged Countries in the Non-Wood Forest Product Importations in Turkey

Five privileged countries in the non-wood forest products' imports are shown at Table 2. Importation of 49 million \$ has been achieved in the last decade regarding 64 countries. The number of the countries was 21 in 1990 and 44 at the end off 1999. The privileged countries in import were the Netherlands in 1990, 1991, 1997 and 1998, Germany in 1992 and 1996, Italy in 1993 and 1995, and Albania in 1994.

Five privileged countries according to the total import figures in the last decade are shown in the Figure 3. According to this classification, the countries as follows: the Netherlands 16%, Italy 12%, China and France 11%, and Germany 10%. The share of the other countries was 40%. Imports of non-wood forest products were also achieved regarding the Free Zones though not as much as the others.

**Table 1. Privileged Countries in the Export of Non-Wood Forest Products in Turkey**

YEARS	1 %	2 %	3 %	4 %	5 %	Other %	Total 000 \$
1990	Germany 17.9	Italy 17.0	USA 14.9	France 6.2	S. Arabia 5.1	38.8	59.198
1991	USA 20.8	Germany 17.0	Italy 13.7	France 9.9	Netherlands 9.0	29.6	64.326
1992	Germany 20.3	USA 18.1	Italy 13.3	France 6.8	Switzerland 3.9	37.6	64.256
1993	USA 22.5	Germany 15.9	Italy 9.0	Spain 6.9	France 5.9	39.7	56.750
1994	USA 25.3	Germany 13.9	Italy 10.0	France 8.1	Spain 4.8	37.9	61.621
1995	USA 19.0	France 13.8	Germany 12.9	Italy 10.5	Spain 7.2	36.5	67.414
1996	USA 20.5	Germany 13.5	Italy 12.8	France 9.6	Spain 6.3	37.3	80.463
1997	USA 21.6	Germany 12.0	Italy 10.7	France 8.2	Spain 7.4	40.0	80.300
1998	USA 20.0	Italy 16.1	Germany 10.3	France 8.4	Spain 6.0	39.2	81.063
1999	USA 24.1	Germany 11.6	Italy 9.5	France 7.3	Netherlands 5.3	42.2	67.398
Total	USA 20.7	Germany 14.3	Italy 12.3	France 8.5	Spain 5.4	38.8	682.789



**Table 2. Privileged Countries in the Import of Non-Wood Forest Products in Turkey**

YEAR S	1 %	2 %	3 %	4 %	5 %	Other %	Total 000 \$
1990	Netherlands 52.6	Italy 9.9	Portugal 7.7	Germany 6.8	Chine 5.1	17.9	2.856
1991	Netherlands 34.8	Italy 11.2	Switzerland 10.1	Germany 9.4	Chine 8.4	26.0	1.740
1992	Germany 19.9	Netherlands 18.9	Chine 9.7	Switzerland 9.7	Italy 8.7	35.5	2.745
1993	Italy 27.9	Netherlands 16.0	Germany 8.2	China 7.9	France 5.8	34.2	4.101
1994	Albania 14.1	Netherlands 12.6	Italy 10.9	Spain 10.4	China 9.7	42.3	3.986
1995	Italy 23.4	China 14.9	Netherlands 14.1	Germany 14.0	France 5.6	28.0	6.269
1996	Germany 14.4	Portugal 12.6	France 12.4	China 9.5	Albania 8.6	42.5	6.339
1997	Netherlands 14.7	China 14.5	Portugal 13.2	Italy 12.6	France 8.5	36.5	6.492
1998	Netherlands 17.6	France 17.2	China 11.6	Italy 8.7	Germany 6.9	38.0	6.127
1999	France 21.5	China 13.0	Portugal 9.4	Netherlands 9.3	Italy 7.5	39.2	8.249
Total	Netherlands 16.1	Italy 12.4	Chine 12.2	France 10.8	Germany 9.8	39.5	48.903

### 3.4 The Share of the Product Groups in the Non-Wood Forest Product Exports in Turkey

Twenty-three non-wood forest products exported in Turkey and their yearly shares in the export are summarised at Table 3. Both the yearly % shares and the financial values of the products are shown at the table. The classification was made according to the total sales in the last decade. According to the table, thyme covers the 19.4% share of the 682.7 million US\$ of export. *Thymus* is followed by *Capparis* 16.7%, edible mushrooms 16.5%, pine-nut 10.8%, *Laurus leaf* 10.4%, *Castanea* 9.7%, and *Ceratonia siliqua* 4.9%. Share of liquorice, bulbous plants, *Foeniculum*, *juniperus cones*, *Cerasus mahalep* and *Salvia* is between 1.4% and 2.3% as in the table. The shares of *Tilia flowers*, nut-gall, sweet gum, tragacanth, resin, *Rhus*, bark mushrooms, *Orchis*, camatina, bushes and *Myrtus* are below 1%.

### 3.5 The Share of the Product Groups in the Non-Wood Forest Products Importations in Turkey

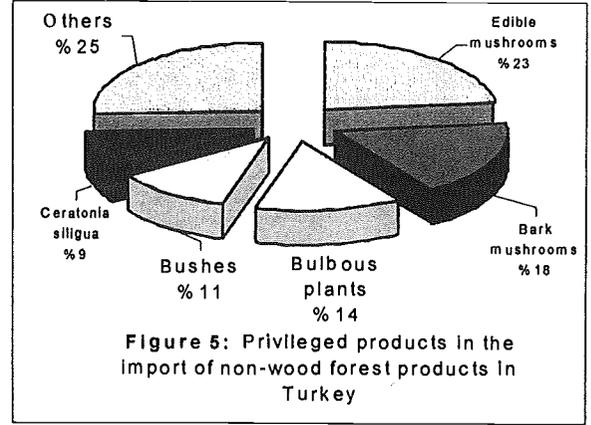
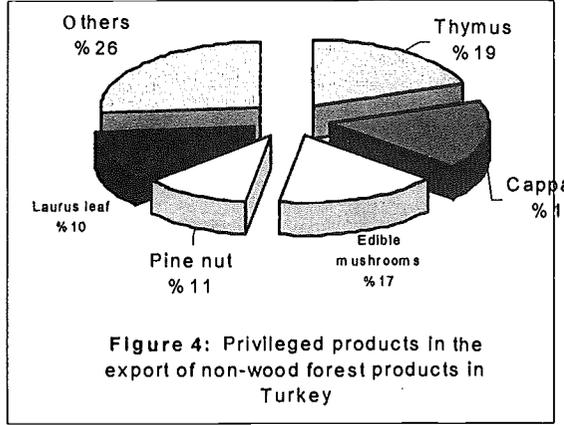
Twenty-two non-wood forest products, which are on the import market in Turkey, are classified according to their shares in import at Table 4. According to the table, the import of *Foeniculum*, *juniperus cones*, *Salvia*, pine nut, *Tilia flowers*, *Laurus leaf*, tragacanth, *Myrtus*, *Rhus* and *Cerasus mahalep* has begun in the recent years. Contrary to export, edible mushrooms cover an important share of the import (22.7 %). According to the other classification, 10 years of import include bark mushrooms 17.8%, bulbous plants 14%, bushes 11%, *Ceratonia siliqua* 8.8%, *Thymus* 8.1%, resin 3.3%, liquorice 3%, *Foeniculum*, *juniperus cones* 2.6%, *Salvia* 2.2%, pine nut 2%, nut-gall 1.3% and *Capparis* 1.1%. The shares of *Castanea*, sweet gum, *Tilia flowers*, *Laurus leaf*, tragacanth, *Myrtus*, *Rhus*, *Cerasus mahalep* and *Silene* in the import were below 1%.

Table 3. Shares of Products in the Export of Non-Wood Forest Products in Turkey

Nr	YEARS PRODUCTS												TOTAL
		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999		
1	Thymus	000\$	6.290	8.078	10.786	13.065	16.108	13.697	15.532	14.538	16.196	17.293	132.124
		%	10.6	12.6	16.8	24.0	26.1	20.3	19.3	18.1	20.0	25.7	19.4
2	Capparis	000 \$	11.064	10.232	10.046	11.626	12.093	12.069	13.298	14.108	10.741	8.502	113.778
		%	18.7	15.9	15.6	20.5	19.6	17.9	16.5	17.6	13.3	12.6	16.7
3	Edible mushrooms	000 \$	10.717	14.363	11.749	6.986	9.035	12.777	14.143	12.036	11.063	9.541	112.411
		%	18.1	22.3	18.3	12.3	14.7	19.0	17.6	15.0	13.6	14.2	16.5
4	Pine nut	000 \$	6.568	10.333	8.400	4.699	2.558	1.717	5.649	11.586	16.408	6.094	74.014
		%	11.1	16.1	13.1	8.3	4.2	2.5	7.0	14.4	20.2	9.0	10.8
5	Laurus leaf	000 \$	4.196	7.461	8.438	6.282	6.548	6.563	7.375	8.475	7.696	7.747	70.781
		%	7.1	11.6	13.1	11.1	10.6	9.7	9.2	10.6	9.5	11.5	10.4
6	Castanea	000 \$	5.651	3.571	4.010	4.714	5.250	8.966	10.033	8.602	7.729	7.963	66.490
		%	9.5	5.6	6.2	8.3	8.5	13.3	12.5	10.7	9.5	11.8	9.7
7	Ceratonia sillgua	000 \$	4.250	2.708	4.338	4.181	2.905	3.475	4.935	3.215	2.098	1.055	33.160
		%	7.2	4.2	6.8	7.4	4.7	5.2	6.1	4.0	2.6	1.6	4.9
8	Liquorice	000 \$	4.472	2.273	1.347	999	854	1.123	1.269	1.607	933	761	15.638
		%	7.6	3.5	2.1	1.8	1.4	1.7	1.6	2.0	1.2	1.1	2.3
9	Bulbous plants	000 \$	1.591	1.843	1.950	1.538	1.498	2.153	228	390	1.587	1.573	14.349
		%	2.7	2.9	3.0	2.7	2.4	3.2	0.3	0.5	2.0	2.3	2.1
10	<i>Foeniculum</i> , Juniperus cones	000 \$	611	712	688	623	577	852	2307	1.896	1.156	1.809	11.232
		%	1.0	1.1	1.1	1.1	0.9	1.3	2.9	2.4	1.4	2.7	1.6
11	Cerasus mahalep	000 \$	782	1.303	1.130	774	861	548	1563	1.178	1.275	562	9.975
		%	1.3	2.0	1.8	1.4	1.4	0.8	1.9	1.5	1.6	0.8	1.5
12	Salvia	000 \$	-	-	-	-	838	1.121	1477	1.604	2.104	2.358	9.501
		%	-	-	-	-	1.4	1.7	1.8	2.0	2.6	3.5	1.4
13	Tilia flowers	000 \$	-	-	-	-	1.633	1.737	1529	-	797	588	6.285
		%	-	-	-	-	2.7	2.6	1.9	-	1.0	0.9	0.9
14	Nut-gall	000 \$	1.032	424	503	440	259	87	676	456	457	622	4.957
		%	1.7	0.7	0.8	0.8	0.4	0.1	0.8	0.6	0.6	0.9	0.7
15	Sweetgum	000 \$	357	330	521	-	456	329	50	67	14	25	2.150
		%	0.6	0.5	0.8	-	0.7	0.5	0.1	0.1	0.0	0.0	0.3
16	Tragacanth	000 \$	706	249	254	62	58	69	110	69	3	101	1.681
		%	1.2	0.4	0.4	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.2
17	Resin	000 \$	0.022	0.189	1	10	17	13	113	301	415	579	1.449
		%	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.5	0.9	0.2
18	Rhus	000 \$	618	308	4	20	8	30	50	7.4	77	86	1.275
		%	1.0	0.5	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2
19	Bark mushrooms	000 \$	119	14	11	76	17	52	58	28	281	47	705
		%	0.2	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.3	0.1
20	Orchis	000 \$	105	94	55	84	28	35	33	9	2	4	450
		%	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1
21	Camatina	000 \$	19	27	24	21	17	1	19	42	26	27	223
		%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
22	Bushes	000 \$	50	2	1	-	3	0.125	9	18	0.390	8	93
		%	0.1	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	Myrtus	000 \$	0.272	0.135	0.218	10	-	-	5	-	4	52	71
		%	0.0	0.0	0.0	0.0	-	-	0.0	-	0.0	0.1	0.0
TOTAL		000 \$	59.198	64.326	64.256	56.750	61.621	67.414	80.463	80.300	81.063	67.398	682.789
		%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

**Table 4. Shares of Products in the Import of Non-Wood Forest Products in Turkey**

Nr	YEARS PRODUCTS		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	TOTAL	
			000 \$ %											
1	Edible mushrooms	000 \$ %	216 7.6	193 11.1	588 21.4	529 12.9	629 15.8	1.402 22.3	1.715 27.1	2.290 35.3	1.849 30.2	1.690 20.5	11.100 22.7	
2	Bark mushrooms	000 \$ %	578 20.2	367 21.1	422 15.4	694 16.9	344 8.6	734 11.7	1.953 30.8	1.806 27.8	- -	1.785 21.6	8.684 17.8	
3	Bulbous plants	000 \$ %	1.322 46.3	575 33.1	444 16.2	506 12.3	250 6.3	542 8.6	389 6.1	890 13.7	1.028 16.8	921 11.2	6.867 14.0	
4	Bushes	000 \$ %	308 10.8	139 8.0	203 7.4	1.045 25.5	612 15.4	1.664 26.5	95 1.5	51 0.8	472 7.7	813 9.9	5.400 11.0	
5	Ceratonia sillgua	000 \$ %	268 9.4	328 18.9	606 22.1	670 16.3	1.078 27.0	1.099 17.5	34 0.5	114 1.8	93 1.5	- -	4.290 8.8	
6	Thymus	000 \$ %	1 0.0	1 0.1	225 8.2	376 9.2	676 17.0	280 4.5	1.123 17.7	199 3.1	618 10.1	438 5.3	3.937 8.1	
7	Resin	000 \$ %	156 5.5	134 7.7	171 6.2	184 4.5	137 3.4	106 1.7	268 4.2	218 3.4	97 1.6	140 1.7	1.612 3.3	
8	Liquorice	000 \$ %	0.395 0.0	- -	59 2.2	71 1.7	53 1.3	72 1.1	110 1.7	227 3.5	410 6.7	454 5.5	1.457 3.0	
9	Foeniculum, Juniperus cones	000 \$ %	- -	- -	- -	1 0.0	1 0.0	4 0.1	11 0.2	72 1.1	430 7.0	747 9.1	1.266 2.6	
10	Saluia	000 \$ %	- -	- -	- -	- -	- -	- -	111 1.8	278 4.3	402 6.6	299 3.6	1.090 2.2	
11	Pine nut	000 \$ %	- -	- -	20 0.7	1 0.0	135 3.4	218 3.5	80 1.3	20 0.3	29 0.5	453 5.5	957 2.0	
12	Nut-gall	000 \$ %	3 0.1	- -	- -	5 0.1	- -	95 1.5	115 1.8	34 0.5	216 3.5	163 2.0	631 1.3	
13	Capparis	000 \$ %	1 0.0	- -	- -	- -	- -	2 0.0	65 1.0	148 2.3	249 4.1	84 1.0	549 1.1	
14	Castanea	000 \$ %	0.238 0.0	- -	3 0.1	13 0.3	4 0.1	8 0.1	84 1.3	36 0.6	88 1.4	46 0.6	282 0.6	
15	Sweetgum	000 \$ %	4 0.0	2 0.1	3 0.1	5 0.1	17 0.4	6 0.1	51 0.8	41 0.6	54 0.9	81 1.0	264 0.5	
16	Tilia flowers	000 \$ %	- -	- -	- -	- -	30 0.8	19 0.3	36 0.6	- -	43 0.7	81 1.0	209 0.4	
17	Laurus leaf	000 \$ %	- -	- -	- -	- -	- -	- -	63 1.0	1 0.0	28 0.5	39 0.5	130 0.3	
18	Tragacanth	000 \$ %	- -	- -	- -	- -	- -	14 0.2	18 0.3	15 0.2	3 0.0	15 0.2	85 0.2	
19	Myrtus	000 \$ %	- -	- -	- -	- -	- -	- -	5 0.1	39 0.6	- -	- -	44 0.1	
20	Rhus	000 \$ %	- -	- -	- -	- -	- -	- -	2 0.0	7 0.1	15 0.2	- -	23 0.0	
21	Cerasus mahalep	000 \$ %	- -	- -	- -	- -	- -	- -	11 0.2	3 0.0	3 0.0	- -	17 0.0	
22	Silene	000 \$ %	- -	- -	- -	- -	- -	4 0.1	- -	4 0.1	- -	- -	8 0.0	
<b>TOTAL</b>			<b>000 \$ %</b>	<b>2.856 100.0</b>	<b>1.740 100.0</b>	<b>2.745 100.0</b>	<b>4.101 100.0</b>	<b>3.986 100.0</b>	<b>6.269 100</b>	<b>6.339 100.0</b>	<b>6.492 100.0</b>	<b>6.127 100.0</b>	<b>8.249 100.0</b>	<b>48.903 100.0</b>



#### 4. Conclusion

Foreign trade of non-wood forest products has an important share in the foreign trade of forest products; especially in the export. In 1990 – 1999 period, 36% of the total 1.8 billion \$ of export and 1.5% of the total 3.2 billion \$ of import were achieved with the non-wood forest products.

Foreign trade balance of non-wood forest products in Turkey remained positive between the years 1990 and 1999. The highest export was achieved in 1998 in a 10 year period and 682.7 million \$ of export and 48.9 million \$ of import were achieved in the last decade.

Turkey has established export links with 113 countries regarding non-wood forest products and the privileged countries are USA 20.7%, Germany 14.3%, and Italy 12.3%.

Considering the import of non-wood forest products in Turkey, the Netherlands 16.1% is followed by Italy 12.4%, and China 11.3%. Importation links have been established with 64 countries in 10-year period.

Regarding the export of non-wood forest products, first 5 products are *Thymus* 19.4%, *Capparis* 16.7%, edible mushrooms 16.5%, pine nut 10.8%, and *Laurus leaf* 10.4%.

Regarding the import of non-wood forest products, the products above the share of 10% are edible mushrooms 22.7%, bark mushrooms 17.8%, bulbous plants 14% and bushes 11%.

The above mentioned figures reveal that the foreign trade of non-wood forest products in Turkey has an important potential in the export of forest products. Collection, treatment and the evaluation of the non-wood forest products are not only important for the protection of our forests but also valuable for the forest villagers. Thus, it will prove to be useful if the forest villagers expand by the means of organised and effective marketing methods and co-operatives.

#### References

- BOZKURT, Y; YALTIRIK, F; ÖZDÖNMEZ, M, 1982: Türkiye’de Orman Yan Ürünleri, İÜ, Orman Fakültesi Yayınları, İÜ. Yayın No: 2845, Orman Fakültesi Yayın No: 302, İstanbul.
- BOZKURT, A.Y; GÖKER, Y, 1996: Orman Ürünlerinden Faydalanma, Ders Kitabı, Üniversite Yayın No: 3946, Orman Fakültesi Yayın No: 437, ISBN 975-404-422-8, 2. Baskı, İstanbul.
- DİE 1990-1999 Dış Ticaret Verileri.
- ÖRS, B, 1999: Orman Ürünlerimiz ve Orman Köylüsüne Katkıları, Orman Bakanlığı Gazetesi, Yıl:2, Sayı:14.
- ÖZER, S, 1999: Orman Tali Ürünleri Üretimi ve ORKÖY, Kozalak, Orman Bakanlığı Gazetesi, Yıl:2, Sayı:15

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## COMMERCE EXTÉRIEUR DE LA TURQUIE EN CE QUI CONCERNE LES PRODUITS FORESTIERS AUTRES QUE LE BOIS

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### RÉSUMÉ

L'étude vise à analyser le commerce extérieur de la Turquie en ce qui concerne les produits forestiers autres que le bois. Si ces produits représentent une part importante dans le secteur des produits forestiers, et en particulier dans le secteur des exportations, il n'existe pas d'étude récente détaillée des caractéristiques de ce commerce. Par conséquent, à partir des données des dix dernières années, l'étude vise à dégager l'évolution du commerce des produits forestiers autres que le bois dans le commerce de l'ensemble des produits forestiers.

Les chiffres des exportations et des importations de produits forestiers autres que le bois de 1990 à 1999 conservés par l'Institut national de statistique ont été transférés sur MS-EXCEEL et évalués par la méthode du questionnaire. La recherche portait sur 23 produits forestiers autres que le bois qui sont exportés et importés. L'évolution des exportations et des importations des produits forestiers autres que le bois pendant les dix dernières années (1990-1999), les cinq pays les plus importants et la part des 23 pays forestiers dans les exportations et les importations ont été déterminés.

Les résultats montrent que la part des produits forestiers autres que le bois dans les exportations totales de produits forestiers, représentant 1,8 milliard de dollars, était de 36 % et qu'elle était de 1,5 % dans les importations totales de produits forestiers, représentant 3,2 milliards de dollars entre les années 1990 et 1999. La balance du commerce extérieur de la Turquie pour ces produits n'a cessé de s'améliorer au cours de la période à l'étude. Pendant cette période, les exportations ont atteint 682,7 millions de dollars et les importations 48,9 millions de dollars. En ce qui concerne les produits forestiers autres que le bois, la Turquie a exporté vers 113 pays et a importé en provenance de 64 pays.

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## **ТУРЕЦКАЯ ВНЕШНЯЯ ТОРГОВЛЯ НЕДРЕВЕСНЫМИ ЛЕСНЫМИ ТОВАРАМИ**

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### **РЕЗЮМЕ**

В настоящем исследовании анализируется турецкая внешняя торговля недревесными лесными товарами. Хотя среди лесных товаров значительное место занимают недревесные лесные товары, особенно в экспорте, в последнее время не проводилось подробного исследования по вопросам внешней торговли этими товарами. В связи с этим на основе данных за последние 10 лет в этом исследовании была предпринята попытка выяснить динамику торговли недревесными лесными товарами в рамках торговли лесными товарами в целом.

Показатели экспорта и импорта недревесных лесных товаров в период 1990-1999 годов, полученные от Государственного статистического института, были введены в программную среду MS-EXCELL и оценены методом опроса. В исследование были включены 23 наименования экспортируемых и импортируемых недревесных лесных товаров. Были определены динамика экспорта и импорта недревесных лесных товаров за последние 10 лет (1990-1999 года), пять стран, занимающих первые места в экспорте и импорте, и доли 23 наименований недревесных лесных товаров в экспорте и импорте.

Результаты показывают, что в период 1990-1999 годов доля недревесных лесных товаров в общей стоимости экспорта лесных товаров составила 36%, а доля в общей стоимости импорта лесных товаров равнялась 1,5%. В период 1990-1999 годов сальдо турецкой внешней торговли недревесными лесными товарами было всегда положительным. В этот период стоимость экспорта составила примерно 682,7 млн. долл. США, а импорта - 48,9 млн. долл. США. Турция экспортирует эти товары в 113 стран и импортирует их из 64 стран.

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# **CERTIFICATION OF NWFP, APPROACHES IN THE RUSSIAN FEDERATION**

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## **Summary**

The paper discusses some approaches that are being developed by the research institutes and the non-governmental organizations (NGOs) in the field of certification related to non-wood forest products (NWFP). The paper deals with issues of international tendencies and state of forest certification in general, certification and its relation with forest management, the relationship between forest management and NWFP, research projects and activities taken in Northwest Russia in general and in Arkhangelsk region in particular as well as the NGO led activities in Far East part of Russia, and in particular Khabarovsk region and in the WWF led pilot/model forestry projects.

Globally the pressures for forest certification as well as for chain-of-custody for NWFP originating from international markets have been so far very limited. The main concerns in western industrialized markets have dealt with the organic content of the products and how to verify it. In the case of Russia the reply and proof of sanitary control has been most usually used certificate so far. The main issues to be dealt with in these certificates have discussed the pesticides, lead content, and the probable radio-active contamination. All of these factors have to be analyzed before getting certificate for the exports of berries or mushrooms. This type of certificates have been inquired by the western wholesalers and retail networks of organic food. In regional markets, for instance, between the Baltic States and Finland this type of certificates are not commonly demanded.

Forest research dealing with NWFP has a long tradition in the Russian Federation. The research has concentrated mainly in the biological side of the problem framework tackling issues such as factors influencing the production of berries and mushrooms, impacts of forest management practices to yield of various NWFP and inventory methods of NWFP. Now the research is gradually also integrating market and marketing aspects, and thus market and consumer analyses will become more frequent. This has been the case already in practical export marketing efforts taken by the NGO led activities, particularly in Far-East part of Russia.

NGO led activities have also tried to include sustainable forest management into the marketing of NWFP. But for instance in Khabarovsk region it has occurred in a negative way. There has been a text in the labels of NWFP that the harvesting of this product represents the only sustainable mode of forest harvesting in the region. So through negative or critical approach, the promotion of NWFP has taken place and gained clients.

Through the World Bank forestry pilot project the marketing will be transferred towards more a positive approach for practical forestry and the NWFP will be taken more into account in the overall forest management planning, for instance using the land-scape ecological planning method. WWF led activities have concentrated so far in Russia into the forestry activities, but for instance in the pilot/model forestry project in Komi Republic, also NWFP have been included as an essential element in developing forest management in general, and forest certification in particular in the pilot area.

However, there are numerous measures taken internationally in this field. That is why it is essential that both the Russian research institutes and the NGOs will follow the international development in these issues. But it is also essential that practical foresters who often themselves are active harvesters and users of NWFP will be taken actively part in the development work. The development should occur in integrating the NWFP as an equal mode of forest use compared with the conventional economic use of forests for the forest products, and comparing these values with other environmental values the forests represent. After these steps we might be closer to more wisely and objectively measured utilization of

forests than so far. And the method how to implement the plans in practice has to occur through integrated and more comprehensive forest management planning methods. This is likely the way both forest certification and chain-of-custody for NWFP can be developed in the most reliable and verified way.

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## **1. Introduction**

### **1.1 International interest in NWFP**

Use of Non-Wood Forest Products (NWFP) has existed as long as the mankind has lived in the Earth, but it has gained increasingly emphasis in international development programmes only during the last decade. Rural people have always utilized various types of NWFP in their living and in difficult times these products have acted as the main field of livelihood based on which the poorest people have survived. NWFP have acted as source of food and nutrition, medicine, ornaments, fibre materials for construction, utensils, clothing and packing, and more lately as raw materials for further processing at artisan and industrial levels (Vantomme 1998).

NWFP were, however, given only very limited interest and attention in international organizations. FAO discussed NWFP in some rural development studies, but strategically they were integrated into the forest sector development only after 1985's (Lintu 1986) by the Committee of Forestry of FAO which was the main international advising body of forest sector development till the 1980's in the world. NWFP were included in Tropical Forest Action Plans (TFAPs) in many developing countries after that. However, the bilateral donors did not support too often the development of NWFP in their development projects, and also other international agencies, almost neglected them. Unfortunately NWFP was not integrated either in any concrete ways to the FAO Mode Code of Forest Harvesting Practice (1996) which provided guidelines how to apply forest harvesting in accordance with international conventions and sustainable forest management, but only limiting the concrete recommendations to forest industrial activities. Yet the harvesting of both types of products have to take into account already at the forest management planning phase if a balanced and comprehensive practice is to be developed and achieved.

Internationally funded forest sector development activities started in larger scale in Europe in the beginning of 1990's when the countries in transition started concretely acquiring external assistance for their development. However, NWFP, were seldom tackled either in bilaterally or multilaterally funded projects. The major contributions that led concretely to an increasing emphasis on NWFP in Europe were the International Expert consultation of NWFP organized by FAO in Indonesia in 1995 and the international seminar " Sustainable Development of Non-Wood Goods and Benefits from Boreal and Cold Temperate Forests" organized by FAO, the European Forest Institute and the Government of Finland in Finland in 1998. Since then the NWFP have been included for instance in the Finnish funded bilateral development projects in countries in transition (Alhojarvi 1998). Some countries have much longer tradition in emphasizing NWFP in their development projects, such as the Netherlands. Usually NWFP have been tackled in and by the rural and agricultural development projects, and seldom by forestry ones.

The international financing organizations, IFIs, have rarely emphasized or even tackled NWFP in their development projects. A good exception is the World Bank financed forest development project in Turkey in which the use of forests as NWFP proved to be more beneficial than as traditional forest products ( See World Bank 1999). However, there is, no doubt, a change of emphasis to take place in the WB financed projects in countries in transition, for many reasons. The first reason comprises the increasingly broadening and more comprehensive approach concerning the utilization of forests. Mainly because of the strong recent emphasis on biodiversity aspects and need to develop more objective and comprehensive basis for valuation of forests, based on which different options of forest use could be analyzed, projects comprise more variation in use of forests than before. Second reason has been the need to change the planning pattern from top to bottom has in recent years changed from bottom to top, and the

participation of all stakeholders, especially the local people, have been emphasized. The international organizations have tried to take this seriously. Third major reason originates from the international environmental processes where the recognized role of forests in the global carbon balance have changed the factors and methods how to value the forests. Fourth main reason is no doubt international markets of NWFP which are growing much faster than that of any other uses of forests at present.

## 1.2 Role of NWFP in the Russian Federation

Too often donor agencies neglect or deny the history and tradition of local research and development efforts when they start planning the development programs and projects. They want to invent the wheel again and too seldom understand the value of finding out the lessons to be learnt. This has been very much the case also in developing the NWFP in countries in transition and especially in the Russian Federation. As a matter of fact Russia has a very long tradition in research on NWFP. The federal organization responsible for forest inventories has long timeseries of yields of NWFP per region (Kukuyev 1999). However, there are variations in reliability and validity of this data at the region level. To a large extent it correlates with the number and scale of difficulties and constraints research institutes and regional forest inventory units have met during the 1990's and how they have managed to cope with the continuously decreasing research funding.

This recent data can be combined with the ones collected during the Soviet time. Research carried out in the Baltic States within NWFP is based on the Soviet time research methods which have proved to be internationally of the highest quality. For Estonia see Paal and Saastamoinen 1998, for Latvia Vilkriste 1998 and for Lithuania Rutkauskas 1998. The Russian statistics and interest have mostly concentrated on wild berries, mushrooms and nuts.

Paal (1998) also describes how the local and regional forestry enterprise and districts collected most of the honey produced in the Soviet time and how they owned processing plants for jam, alcoholic beverages, herb tea mixtures, natural oils and extracts in which mainly small quantities were produced to local traditional recipes. In addition also the forestry department's large organizations such as Lekrasprom, Tsentrosojuz and the bureau of Drugstores were also active in organizing the gathering of medicinal plants. In rural areas school-children used to have an obligation to gather certain amount of medicinal plants, too (Paal 1998).

Owing to Chibisov and Demidova (1998) mushrooms and berries were more widely utilized in Russian in olden days than nowadays. In the 1930's the local population gathered on the average 1830 tons of berries and 2040 tons of mushrooms in a year in the Arkhangelsk region. At the end of 1960's the local consumption was exceeded 250 tons of berries and 200 tons of mushrooms. Both Kukuyev (1999) and Chibisov and Demidova (1998) conclude that a remarkable increase in harvesting of NWFP could take place in Russia without endangering the sustainability of forests. But how to do it?

## 2. Developing NWFP in the Russian Federation

### 2.1 Major problems

Kukuyev (1999) points out several impediments that hinder the utilization of NWFP in Russia. Firstly he points out as the accounting of NWFP is carried out in full by forest inventory and planning enterprises through the forest management units (leshozes) and as there is a lack of standard publications such as yield tables based on data collected for many years, there are difficulties to compile data and have aggregate figures for all regions. So the problems exist in evaluating the real potentiality and resource basis of NWFP in various regions both in real terms and in comparing the collected data with other regions' data. The second large problem deals with market information and data. How to collect it as some part of the products are aimed at industrial markets for processing and some to the consumer markets? The markets differ to a large extent from each other and the factors to be analyzed vary thus to a large extent as well (see. Lintu 1998 and 1999 and Alhojarvi 1998 b.). Kukuyev (1999) does not see any major problems that would be of technical character dealing with processing technologies, equipment or packaging. However, he considers, that the most serious problem is how to circulate the assets in the

various production chains. One measure to improve the situation in this respect would be to develop the forest use patterns such as establishing cultivated areas to be granted on lease which would according to Kukuyev (1999) enhance internal funds and replenish forest income.

Chibisov and Demidova (1998) point out several urgent problems to be solved within harvesting of NWFP. Most of these problems can be explained by natural and socio-economic reasons in addition to the seasonal and territorial inconstancies in production. The major problems to be tackled include:

- Low level of financial interest in the NWFP harvest and delivery by various types of potential investors and current actors;
- Difficulties and low productivity of gathering berries and mushrooms manually;
- Low purchase prices on wild berries and mushrooms;
- Diminishment of rural population and concentration of population in a few cities;
- Lack of reliable and comparable inventories on NWFP;
- Insufficient weather prognoses;
- Lack of resource studies of berries and mushrooms at forest management planning level;
- Absence of effective protective measures of berries and mushrooms;
- Protection of high productive areas against overharvesting is not organized.

Most of the factors originate from the underdeveloped markets and are due to lack of sufficient capital flows. This problem is accelerated by the general problem of the lack of local financing mechanisms for rural businesses (World Bank 2000 and EBRD 2000). This fact has also attracted international interest and concern and thus for instance EBRD has developed financing instruments for Small-and Medium size businesses, suitable to be used also for NWFP. The World Bank Group has also developed instruments for SMEs, and these are mainly used by the International Financing Corporation (IFC). The World Bank has identified with the stakeholders in its Pilot Forestry Project in Russia focusing NWFP development in the Khabarovsk and Krasnoyarsk regions, some other urgent problems that should be tackled in developing the NWFP. These findings mainly concentrate on the market and marketing side of NWFP including the lack of market and marketing research both for industrial and consumer markets as well as insufficient knowledge on phyto-sanitary and other similar regulations in target markets which may become non-tariff barriers for NWFP exports.

Both Russian researchers (Chibisov and Demidova 1998) and the World Bank with its local stakeholders in the regions point out that training and upgrading the skills of NWFP harvesters is of utmost importance in reducing and eliminating the above mentioned problems. At the harvesting level it can be concretized that the training and development of more productive harvesting methods with modern equipment, deepening the knowledge about various types of mushrooms and their potential use as well as the preparation and storage of them, concern about the forest fires, as well as how to estimate the optimal harvesting methods and rates in the forests. At the forest management level more training is needed at the forest management planning issues; For instance how to integrate forest management and harvesting of NWFP in a more appropriate and long-term way, how to protect forests from overharvesting and how to optimize the harvesting, storage and transportation of NWFP especially in remote areas.

As the problems of sustainable harvesting and use of NWFP relate to ecological, harvesting and market problems and factors, the problems are aimed to be tackled in the World Bank project by a chain-of-custody approach where the whole of various production chains could be certified as representing patterns of sustainable development.

Forest certification has been more or less the main emphasis of World Wildlife Fund, WWF, in its forest related projects in Russia in recent years. Mostly the WWF activities have concentrated on practical forestry and forest management, but NWFP have been included increasingly in WWF projects lately. The problems the WWF and other Non-Governmental organizations emphasize in Russia, deal mostly with forest management and forest harvesting issues, merely from the ecological point of view, lack of participation of local stakeholders in identification, preparation and implementation of forest related projects, inappropriate forest harvesting and road construction technologies, corruption and illegal harvesting, insufficient network of protected forests including ecological corridors, underfinancing of forest protection and the lack of independent monitoring of forestry and economic activities in it.

Lately the organizational changes in the Russian administration in the environmental and forestry sectors have raised the concern of the need of independent evaluation and monitoring of the conservation and utilization of natural resources. Certification has become a concrete measure to be promoted by the Russian NGOs in the field of forestry as to describe the sustainability of this economic activity. WWF Russia is using the approach the WB/WWF Alliance has developed and applied, namely to include certification development via and by large international companies through which a large number of hectares of Russian forests could be certified and controlled.

However, some recent studies in conflict areas, such as in North-West Russia conclude, that most of the environmental and socio-economic problems created by foreign harvesting and processing companies, are created out by smaller companies, those who are independent on the influence of international markets and thus from the market mechanism (Taiga Rescue Network 1999). And as the foreign companies claim that most of the illegal and unsustainable operations are carried out by local Russian forest harvesters, one could argue, if forest certification is an appropriate measure to develop forest management at all when products, either the forest products or NWFP, end to the local markets.

## **2.2 Development of sustainable harvesting of NWFP**

### **2.2.1 Management planning methods**

Kukuyev (1999) points out that remote sensing is the most appropriate solution in assessing the NWFP resources. He considers that especially the application of aerial photography in compiling resource maps is the most useful tool for carrying out resources explorations, inventory and planning work, especially in the Taiga forests that are difficult to assess. Owing to him remote sensing has also proved to be useful with the leasing of plots of Forest Fund and carrying out ecological monitoring. Chibisov and Demidova (1998) claim for more reliable and exact assessments which should be integrated to weather prognoses, historical timeseries of harvesting levels with certain key factors and more allocations to research work within these respects. Their conclusions can be supported by the Nordic experiences in developing forest inventories and forest management planning. For instance, Kangas (1998) points out that multiple-use planning of forests is not only a valid planning system in theory, but very much applied in practice in Finnish and Nordic circumstances similar to the northern Russian regions.

Owing to Nordic experiences in the same types of ecological conditions, there is a necessity to collect data on forests and trees at the ground level by using sample plots. There are nowadays data concerning trees, vegetation (flora) and fauna, NWFP and biotypes that are collected. Based on this exact and verifiable data forest management planning can take these factors into consideration. The priority list of factors analyzed reflect the priorities of the land owner within the limitations of environmental and forestry legislation and regulations. Forestry oriented towards the economic use of forests, has to take into consideration the other alternative uses of forests and trees, either as other products (NWFP) or as services (protected biotypes, watershades, flora and fauna, eco-tourism etc.). The assessed data is converted into plans in this way. The most recent method developed is called the land-scape ecological planning.

It is evident that both the World Bank and the WWF projects support the development of sustainable forest management also within NWFP and the conclusions of Chibisov and Demidova (1998), but in different ways and approaches. The same applies other bilaterally financed forest related projects as well.

### **2.2.2 Approaches in WWF projects in Russia**

WWF emphasizes the importance of the European markets and their influence in developing both the certification and sustainable forest management. This close connection has not always been natural and the European markets are neither united as for instance Alhojarvi (1999) has pointed out. The European markets and their diversity has been discussed and described by several studies, some of which have been carried out by or within the framework of the European Forest Institute, EFI.

WWF has been implementing several pilot or model forestry projects in Russia. The most relevant with also an approach and interest in NWFP has been the one in Komi Republic. The Model Forest in Komi has comprised a large area, totaling to 800 000 hectares, and the results gained in it has become the basis for the National FSC Working Group and four regional FSC Working Groups ( in the Republics of Komi and Karelia and the regions Khabarovsk and Krasnoyarsk). WWF has also had a Model Forest in Altay region in South Siberia and in Novgorod region in North-West Russia. WWF has also developed a Model Forest in Pskov region also in North-West Russia, and it has been developed together with StoraEnso, which is the second largest foreign forest industrial company operating in Russia. There are also other large companies involved with WWF promoted FSC projects in Arkhangelsk, Novgorod, Vologda and Altay regions. So far FSC certificate has been given to one company operating in Altay region only, but according to Ptichnikov and Voropaev (2000) there will be several companies in the certification process already. Certification of forest management is estimated to take 1-2 years per company owing to the experiences gained so far. The Altay certification included forest management, harvesting, wood processing, transportation and export operations (Ptichnikov and Voropaev 2000).

There are no certifications being developed in or without the connection with forest management within NWFP in the WWF projects. However, there has been inventories of berries and mushrooms within the Komi Model Forest project. The main problems in using these efforts and results in development of forest management and forest certification deal with the lack of potential investors in the region owing to Demidova (2000). The lack of interest has reflected to the project so that the development of NWFP is awaiting to be started in all parts of the production and marketing chain.

### ***2.2.3 Approach in the World Bank Pilot Forestry Project***

The component of the WB financed pilot forestry project that concern the development of NWFP has been identified and mostly prepared by the local NGOs and the regional administration. The role of the WB staff and experts has been to summarize and express the needs in concrete forms of procurements and technical assistance expressed by the local NWFP enterprises and the regional NWFP associations. The needs for procurements have directly originated from the pilot enterprises. These needs have partly they have been designed on the basis of market studies carried out by the local associations and enterprises. Products to be covered include wild berries, mushrooms, honey, upland fern and nuts, the main focus being in processing of berries and mushrooms.

The target export markets to be tackled comprise Japan and Republic of Korea for companies in Khabarovsk region, but yet the main market identified is the one in Khabarovsk city for their products. For companies in Krasnoyarsk region the main client is estimated to be the major metallurgical company which has a huge demand of these products in its facilities and in the city. Krasnoyarsk will emphasize in the longer term either the Asian or the European markets. This will be defined during the implementation of the project.

Technical assistance is mostly directed in assisting the enterprises in their market analyses, installation and use of new technologies, phyto-sanitarial aspects and training of personnel of the pilot enterprises. All levels of employees will be covered by using the trainers' training approach. The whole of various production chains will be taught and the emphasis per employee group depends on their background, experience and skills as well as tasks in the future. Training will mostly take place in the field, in harvesting stations and the forests.

Certification of NWFP will be tackled as well. How to do it in principle is clear: by the chain-of-custody as the production chain has to be covered fully. How to do it practice, will be clarified during the first year of the project after the market analyses and trade barriers have been finished. This will be conducted by the local/regional associations for NWFP. It is evident that the enterprises need the associations mostly in the market and marketing oriented activities such as in promotion of NWFP, in converting market and consumer needs into practical advice to the pilot enterprises, in special issues such phyto-sanitarial regulations and other probable barriers in the target markets, in carrying out market research, building contacts and in helping the enterprises in penetrating new markets etc. In fact, these tasks represent similar needs other SMEs have in the forest sector. These problems are common for all the SMEs in these regions. Another factor to be developed which is not tackled in the WB project, is the

development of the financing basis for these enterprises. The WB is approaching this mainly by training the selected personnel in business management and especially the business plans, in which financing is one of the key elements. However, EBRD and other international financing institutions have recently been developing new instruments, appropriate for these types of SMEs as well.

Marketing of NWFP has comprised conflicting elements in Khabarovsk region so far. Some of the products have been marketed by claiming that NWFP represent the only sustainable form of forest use in the region. This has and will attract many critical consumers in the region. However, the WB pilot project aims at changing the concept and content of marketing towards more positive approach. Nevertheless, this new approach must be based on development of forest management practices in the region. This will occur by developing pilot forest enterprises, leshozes, and the pilot industrial enterprises, either lespromhozes or NWFP harvesting ones, at the same time, at the same locations and using more integrated forest management planning methods as the basis of all the forest related activities in the project. As there are difficulties to organize these aspects through land tenure, it will thus take place artificially, aiming at presenting encouraging examples of forest utilization for local and foreign investors as well as the public. This is why the most important issues in the project is the motivation of the project personnel including the stakeholders in working together towards the common goals. In Russian conditions it will mean rather open-minded, flexible and more comprehensive approach than so far has been the tradition in the forest sector.

#### ***2.2.4 Other externally financed projects related to NWFP***

NWFP have not received much attention in externally and publicly financed projects so far in Russia. The Canadian Government has been a co-financer of a well managed Model Forestry Project, called Gassinskyi, in Khabarovsk region. It has comprised, e.g. support to local SMEs, working in sawmilling, carvery and NWFP. The project has included development of mainly berries and upland fern to local markets as well as to the city of Khabarovsk. These products have not been exported yet. No certification scheme has so far being developed within this project, yet the project belongs to the most comprehensive ones ever developed together and by expatriots. Gassinskyi model forest has emphasized the socio-economic factors more than any other externally partly financed forest sector development projects so far.

The US Government has implemented in recent years forest sector development projects mainly in the Far-East of Russia and in Siberia. One of the key aspects in their approach has been the development of SMEs in the regions. The support has been allocated both to forest industrial and NWFP enterprises. The approach is rather similar than the one described in the WB project. The major obstacles so far have been the poor institutional structure supporting SMEs in the regions and the lack of market orientation and understanding of foreign markets' mechanisms. The latter mentioned problems have been attempted to be solved through market research and analyses. However, especially within NWFP, the task is rather difficult, and problematic. In order to be able to carry out studies that the pilot enterprises can utilize in practice, the market niches should be clearly identified, and preferably in the very beginning of the work. Companies cannot afford general sector type of analyses, which most of the foreign consultants offer them. This has partly led the enterprises, especially within NWFP, to concentrate on the urban and local markets.

NWFP have been included in the Finnish financed development program in North-West Russia since 1998. Mostly the approached used have comprised support to identify the main problems in developing the NWFP, then the main problems within research related to them and after which they have been included as elements into the practical forestry and national park projects. Earlier NWFP were also analyzed through the socio-economic dimension of forests, such as in the Taiga-model forest in the Republic of Karelia (see Saastamoinen 1998). There has also been an effort to develop the forest certification in the Taiga model forest, but it has not yet included NWFP (Kouki etc. 2000). There has been a long tradition within forest research between Finland and Russia, but NWFP, were not usually included in that cooperation in olden days, yet the bilateral agreements of the Governments have supported it ( Agreement... 1995). Usually the activities within NWFP were product specific and it occurred through exchange of researchers through the above mentioned agreements.

NWFP have been essential elements in the latest EU financed TACIS projects in Russia. These products have been recently emphasized for instance in the Republic of Burjaty, and in the Republic of Karelia and Arkhangelsk region. These development activities have mainly occurred by developing forestry activities towards so called multiple-use forestry which comprise many targets to be set for the use of forests ranging from conservation to economic activities including harvesting and processing of NWFP. This approach has included also analysis on the responsibilities that the National Park Organizations should have themselves, and what type of activities should be allocated to local entrepreneurs, for example. The concrete forest management planning method has been the land-scape ecological planning applied in Russian management methods and forest inventories.

### **3. Harvesting of NWFP and Its Relation to Certification and Verification of Forests**

#### **3.1 International development of forest certification/verification schemes**

The original purpose of market-oriented certification is two-fold: 1. To improve the quality of forest management, and 2. To provide market advantage or improved access for products from sustainably managed sources (Bass and Simula 1999). In assessing forest management quality, it is established whether, in a defined forest area (often a forest management unit), the performance requirements expressed as criteria and indicators (standard) are complied with. The criteria are generally associated with SFM concept and they often consider various sets of internationally agreed criteria and indicators as well as national legal requirements as a starting point.

Labelling of forest products is defined as a process which results in a claim which may be used on-product referring to the quality of forest or forest management in the origin of the raw material (wood, fibre) of which the product is made. In this case the labeling is based on a. certification of forest management, b. verification of chain-of-custody. Information on certification can also be communicated off-product, i.e. in various promotional materials and communication media not attached to the product on sale.

A forest management certificate or label refers to one single-issue characteristic of the processing and production methods (PPM), i.e. to the quality of forest management. The chain-of-custody refers to all the changes of custodianship of forest products and products made thereof during the transportation, processing and distribution chain from the forest to the final end use. When the chain-of-custody is verified, the origin of forest products is established.

Certification of forest management in a defined area is based on performance requirements. Another option is to certify the environmental management system (EMS) of a forest organization, which is typically made according to the respective international standards (ISO 14001/14004). EMS does not lead to product labeling.

Accreditation is recognition against published criteria of capability, competence and impartiality of a body involved in conformity assessment. With a few exceptions, accreditation is granted by national accreditation bodies, which can be governmental or private. To facilitate mutual recognition at international level, ISO has set out recommendations that accreditation bodies should follow (Indufor 1997, ISO/IEC Guides).

The above mentioned definitions refer to voluntary certification systems, which are typically driven by market forces. The international requirements set for certification schemes can be summarized as follows (Bass and Simula 1999):

1. Open access and non-discrimination,
2. Credibility,
3. Transparency,
4. Freedom from conflict of interest,
5. Participation and acceptability to interested parties,
6. Non-deceptiveness,
7. Reliable and independent assessment,
8. Objective and measurable criteria,
9. Goal orientation and effectiveness,
10. Performance standards defined at national level within generally accepted SFM principles,
11. Adapted to local conditions,
12. Cost-effectiveness.

Owing to Bass and Simula (1999) there were 12 countries in the world where market oriented certification/verification schemes had taken place to a remarkable extent. Most of the schemes had been worked out within the umbrella of FSC system or the Pan-European Criteria and Indicators developed through the Pan-European and national processes, but especially the regional effort in Europe creating a Pan-European Forest Certification council, or a system, was expected to take place soon. It would also increase remarkably the total numbers of hectares to be covered by various certification/ verification systems.

Owing to FAO/ECE ( Hansen etc. 1999) nothing remarkable had happened in the Russian certification of forests by the summer 1999. However, there has been many efforts in Russia that have not been shown outside yet, or at least by that time. The main unique phenomenon has been the development of mandatory certification which is based on the on the Federal Law of mandatory certification. It has a potentiality to become a powerful tool in improving the enforcement of rules and regulations, but it can also lead to increased and complicated bureaucracy. From the export markets point of view it is unlikely that the mandatory certification would meet the requirements set internationally for the certification schemes. Thus it is likely that the Russians will have to develop the voluntary, market based scheme as well.

But what is the most appropriate scheme of certification/verification to be applied in the Russian Federation meeting the international requirements? It is evident, that the Russians will have to decide themselves which prevailing international, market based schemes their one(s) have to be comparable with. If the country opts for joining PEFC, their specific requirements should be considered. In case of FSC is targeted at, their procedures should be followed. But from the NWFP neither of them might be the right one.

According to the second meeting of international certification experts of NWFP working in with agro-forestry and NWFP, there are plenty of problems in all the prevailing schemes used in the forest sector. Only FSC provides an application for NWFP certification at present (Certification ... 1999). The options have to be found from food products or by developing a modified and applied version from the prevailing ones in which NWFP have fully been taken into account, as equal modes of use of forests than the forest products.

### **3.2 Other schemes for certification/verification of NWFP**

Perhaps the most relevant process and practices applied from which lessons could be learnt is the certification of organic agriculture. Though the organic agriculture has been practiced already for decades in many countries, it is only recently when the growing interest by consumers has necessitated the development of common standards for production and processing as well as criteria for regional and national programs in order to provide consumers with quality guarantees for organic food products. With the increase in international trade in organic foods, the need for a comprehensive and formalized regulatory system became necessary to ensure uniform production standards as well as inspection and certification procedures as a basis for this trade.

The International Federation of Organic Agricultural Movements (IFOAM) is a not-a- profit federation involved in production, certification, research, education and promotion of organic agriculture with about 500 member organizations in some 100 countries (Blake 1996). IFOAM sets standards and carries out program evaluation, accreditation, research, education, publishing, lobbying and other promotional activities. The IFOAM standards cannot be used on their own but they provide a framework for certification bodies to develop their own standards. Their standards have been adopted as the basis of reference for national organic standards throughout the world.

The IFOAM standards define: 1. The principal aims of organic agriculture; 2. Conditions in which standards apply; 3. Conversion to organic agriculture; 4. Crop production methods (including environmental conditions, choice of crops and varieties, rotations, manorial policy, pest, disease, and weed management, growth regulators, use of plastics, wild and natural products, traditional agriculture and landscape); 5. Animal husbandry; 6. Storage, transportation and processing; 7. Labelling and consumer information. IFOAM has also developed and approved guidelines for a. social rights and fair

trade, b. coffee, cocoa and tea, c. evaluation inputs to organic agriculture (IFOAM 1995).

IFOAM has also developed an accreditation program through which means are provided whereby national certification programs can submit themselves for evaluation against internationally agreed criteria, thereby enabling them to gain accreditation status. The accreditation contract will be with the certification body only. Certifiers of organic agriculture vary by country and they can be private companies, associations or government bodies.

As an example of such a body acting in the US, is the Florida Certified Organic Growers and Consumers, Inc. which is a not-for-profit grassroots membership organization. It provides certification covering the whole production chains and thus it provides criteria in every production phase of the product. In relation with NWFP it describes its principles and actions in the following way ( Florida ...2000). Mushrooms (Shiitake): Where these mushrooms are grown on the wood harvested and wood used may not have been previously treated with any prohibited herbicide, pesticide, or fungicide, or fertilized with prohibited synthetic fertilizers within previous three years. If the mushrooms are grown on the sawdust, it should be derived from wood harvested in chemically untreated woodlands. If the origin of the logs can not be determined, sawdust should come from sawmills that debark the logs before sawing. Spawn and supplements used they should originate from an organic source. Natural waxes such as beeswax are allowed to be used in the process whereas the use of latex paint or paraffin wax is restricted and for instance, synthetic fungicides or oil based paints are prohibited.

With wild plants the collection area must be documented that no prohibited materials have been applied to the area in the three years prior to collection. If the collection area has a past history of chemical use, residue testing may be required for certification. The claimed organic plan should address continued management of the area as well as address how harvest will be done in a manner that sustains the ecosystem. The harvest of wild plants as organic is allowed if these criteria are met. In principle, food growing in a natural ecological situation is organic (Florida ...2000). In practice, the Russian exporters have to provide the US buyers a test certificate where the residues of various herbicides, pesticides, lead and nuclear contamination has been measured (Demidova 2000).

All herbs not started from an organic source are considered a restricted material and must be listed on the Restricted Substance Form. The first cutting to be sold as organic from a non-organic source must be a third generation cutting from that non-organic source (Florida ...2000). There are also strict criteria concerning honey. Bees may be designated as organic livestock and products from them can be sold, labeled or represented as organically produced, if managed in accordance with organic standards for at least 60 days prior to the collection or organic apiculture products. Documentation of bee stock sources and colonies are to be recorded in the organic farm plan. The use of colonies that have combs containing existing honey produced from nectar collected from non-complying foraging areas is prohibited. There exist also very specified restrictions concerning the feed supplements and health-care practices of bees, the foraging areas, beeswax, storage, harvesting, extraction facilities, honey treatment, labels and record keeping (Florida ...2000). All these factors should be analyzed before any production or export marketing efforts will take place, as the production chain should meet the criteria and requirements of the target market, and its niches ( see Alhojarvi 1998b and Lintu 1998 and 1999)..

The EC and the US markets occupy the largest share in the global trade with organic agricultural products. These markets are regulated by the EEC Regulation (No 2092/91) since 1991 and by the US Organic Foods Production Act since 1990. The EEC regulation establishes official recognition of organic farming and it lays down uniform, common rules for operators while guaranteeing consumers with a means of unmistakably identifying genuine organic produce, thus eliminating the abuses previously frequent in the sector. The EEC rules cover a) principles of organic production on agricultural holdings, b) food products obtained by processing organic produce, c) controls, d) labelling of consumer products (Baillieux and Scharpe 1993). These principles were largely derived from IFOAM standards, but they are more rigid providing clear definitions on the minimum performance levels. This has also been a cause of concern by the organic movement, together with the bureaucracy involved. Nevertheless, it has reduced the role of grey market and false claims, and offered a direct channel for the organic movement to influence legislation (Blake 1996). At the same time the role of self-regulation in the sector has diminished in the EU and the small-scale producers have been dropping out of the schemes due to too

cumbersome and costly procedures of certification. The EEC control system consists of: A. A competent authority in each member state, B. Inspection bodies who carry out annual and other inspections under detailed rules, C. An authority responsible for the approval and supervision of such bodies, D. Obligations of the applicant notifying of the schedule of production, detailed accounts of inputs bought and products sold, and separation of parallel production of organic and non-organic products, E. Inspection measures for importers.

Rules on labelling and advertising are very strict recognizing four categories of organic products. Only products which have at least 95% of the agricultural ingredients produced according to organic principles may be labelled as "Organic Farming-EEC Control System". If the share ranges between 50 and 95% the reference to organic methods can only appear in the list of ingredients. Processed products with less than of 50% of ingredients deriving from organic agricultural cannot be labelled and no other indication on organic production can be included. In the case of imported products the EC Commission must be satisfied, after investigation, that the rules applied to organic farming are equivalent to the Community rules. The EC Commission may specify the regions or production of origin, or the bodies whose inspections are deemed to be equivalent. In this respect IFOAM Accreditation Program is likely to offer a useful instrument for outside producers of the EEC. However, there exists a problem in the control system that the responsibility of audit trails of products to retail shops is left to the authority and not entrusted to inspection bodies. This is comparable to the problem of chain-of-custody verification in forest products.

In the EEC Regulation (No. 2092/91) the main issues that are discussed concerning edible plants and parts thereof, concern the prohibited treatments during the last three years and the need to sustain the ecosystem. Mushrooms will be analyzed in similar type of context as in the US described above.

Codex Alimentarius (CA) is a control mechanism of FAO and WHO concerning food products. The purpose of CA is to guide and promote the elaboration and establishment of definitions and requirements for foods to assist in their international harmonization and in doing so to facilitate international trade. The harmonized regulations are expected to protect consumers' health from threats caused by food stuffs and ensure fair practices in the food trade. The CA targets are tried to be achieved by promoting the coordination of all food regulation, preparing food standards as well as amending and updating published standards. The CA Commission has produced sets of standards, guidelines and principles bound including more than 200 food commodity standards and about 35b hygienic and technological practice codes. The CA standards are recommendations by nature. CA has provided guides for good agricultural practices, including how to use pesticides, commodity food standards for processing products, and hygiene codes of making food safe for consumers and acceptable in international trade. CA Commission has been in the process of developing guidelines for organic agriculture which are likely to be quite similar to the EEC Regulation.

CA has recognized the importance of labelling products and has developed model regulations to control outrageous and unsubstantiated claims made on labels, as well as special regulations on nutrition labels and health claims. A Codex food label which is widely used in international trade has to contain: name of the food, list of ingredients, net contents and drained weight, name and address of manufacturer, country of origin, lot identification, date marking, storage instructions, and instructions for use. The guidelines on claims seek to preclude foods from being wrongly presented from nutritional or health standpoint. For example, claims that foods have medicinal properties are prohibited.

## **4. Trade and Marketing Aspects**

### **4.1 General**

The commercial value of NWFP vary to a large extent. There are at least 150 different NWFP that are of major significance international trade. In addition there exists a large number of botanicals, ranging from 4000 to 6000, that enter international markets (Iqbal 1995, FAO 1995).

As a whole the markets for NWFP are large and for some products the markets are growing much

faster than that of forest products. In general the world market for natural rubber, the imports of which exceed US\$ 1 billion annually, is the biggest one. World trade of essential oils is of the order of US\$ 1 billion and is growing fast. The ones for natural honey exceed US\$ 300 million annually, but the growth is more moderate than that of the above mentioned ones. The fourth largest product group traded internationally comprise various medicinal plants whose trade is diversified and in rather fast increase because of boosting medicinal industries and search for local, environmentally healthy, origins of rawmaterial for the industries. Besides these products and industries, the increased use in petro- and chemical industries favor the investments within the NWFP (Iqbal 1995). Wild berries and mushrooms are typically delivered and marketed to the local consumer or industrial markets. Nevertheless, certain types of mushrooms, especially truffles and morels/black mushrooms, have significance role in international trade, particularly in the US and Western European markets. Wild berries have a role to play in border markets in the international context, e.g. for instance in trade between the Baltic States or Russia to the Nordic countries, mainly due to the big price differences of the berries.

In spite of the great prospects of NWFP in trade, there exist also various restrictions and impediments in it. Generally taken the tariffs of NWFP are quite low. For instance, in the EU and the US there has existed more than 90 tariff lines in both markets in recent years. Approximately 40% of these product lines in Europe and 47% in the US market, have been free of import duty, and in both markets over 50% of the lines have faced nominal duty ranging from 1 to 10%. Only certain product lines such as natural honey, truffles and spices in Europe and some bamboo or cork products in the US have faced higher duties. In Japanese markets the import duties have been much higher and it has applied GSP treatment (favoring developing countries) only within certain, very few products. However, in China and India, the import duties have traditionally been at very high level, usually within the range of 30-60% of ad valorem prices (Iqbal 1995). China and India have also claimed for import licences and inspection from many of the NWFP.

There has been a global tendency to reduce tariffs in general in international trade, and also within the NWFP. The reductions have not been sufficient from the developing country standpoint, claim for instance Binswanger and Lutz (1999). They claim that especially the slow pace of reduction of tariffs and the tariff escalation (the practice to set increase of tariff rates with the degree of processing) have favored mostly OECD countries and not the developing countries. They point out that Anderson etc. (1999) have estimated that various subsidy supportive systems in OECD countries and trade restrictions cause annual welfare losses of US\$ 19.8 billion for developing countries. This is more than twice the losses that developing countries incur due to OECD countries' import restrictions on textiles and clothing. This amount is also more than three times as large as the grant aid flows and about twice as large as grant aid and export credits combined in OECD countries to wards developing countries. (Binswanger and Lutz 1999).

Concerning the EU markets for agricultural products, Binswanger and Lutz (1999) estimate that only the reduction or outright ban on export subsidies would be effective measure enough for developing countries to penetrate the EU markets. However, they do not foresee to take place in the near future, but some changes are to be awaited also in this sense in the enlargement of the EU in the coming years. As this affects also some products groups of NWFP, this development has to be taken into account in those markets.

Western industrialized markets have applied increasingly non-tariff measures while diminishing the import duties of NWFP gradually. The most common ways to control the trade is the use of CITES (The Convention of International Trade in Endangered Species) within plants and animals, and the various health and safety regulations in the form of Codex Alimentarius (CA) as explained in the chapter 3. In western industrialized markets especially pesticide residues are being watched at. Regulations and requirements regarding identification of medicinal qualities as well as well characteristics and storage for medicinal plants and their derivatives are well defined and observed in national pharmacopoeias and formulary standards in the major EU, North-American and Japanese markets. For most edible products national food legislation is the main criterium, and obstacle to be overcome for many foreign NWFP producers. Quality considerations are of primary importance in the trade of culinary herbs and also other edible products. The international trade is being promoted also by the product group based associations, such as CENTA (The Combined Edible Nut Trade Association) which has compiled and published such

national and regional rules and regulations that assist developing countries to penetrate the industrialized markets. For essential oils there exist numerous bodies that monitor product quality and trading procedures and draw up specifications for these products. The most widely recognized standards are those set by the International Organization for Standardization (ISO).

International marketing of NWFP requires much more detailed and specified market research than that of forest products in order to be able to support the penetration of markets. Without an assistance of industrial and trade associations the efforts are too huge for a single producer in a developing country or in a country in transition. Added with the tariff escalation and by other protective measures for its own industries in the importing country, the lack of such institutional industrial-trade support is likely to slow down the development of NWFP in developing countries and in transition.

## **4.2 Russian Federation**

It is very evident that the producers of NWFP meet hard and fierce competition within NWFP in all the major international markets. Asian markets will be increasingly penetrated by Asian producers in the near future and in the EU markets the enlargement of the EU will support the role of new coming members of the Union. However, there are ways to overcome the difficult situation, at least gradually and partly.

The strong and rich history of research of NWFP in Russia has to be converted through more applied research to pragmatic actions and projects. As long as the Russian Federation is not a member of WTO it can also use export subsidies and other supportive measures to increase its exports, but this path cannot last long, as the country is seriously considering its membership to WTO. The supportive measure legal also in the WTO context and in the long run, is to develop industrial and trade associations for NWFP which will have strengths and expertise in issues that the individual enterprise cannot afford or that are more appropriate to be carried out by associations. These tasks include market and consumer research at targeted markets and their niches, further processing, labelling, export deliveries at least in the beginning, organized and long term financing and promotion of NWFP to potential investors.

These are steps and tasks that have already been started by the local NGOs such as the one in Khabarovsk region, by the private investors, such as in the Arkhangelsk region, or by externally financed development projects, such as the World Bank Pilot Forestry Project. But at the same time, the improvements in the investment climate in Russia, which can mostly and only tackled by appropriate macroeconomic policies must take place. Without the change in the investment climate, most of the efforts are only partial and restricted measures having limited impacts on the development of the sector.

## **5. A Case Study in Arkhangelsk Region**

### **5.1 NWFP resources**

Forests of Northwest Russia are rich in various Non-Wood Forest Products. They historically play an important role in the life of the local population, especially in the Arkhangelsk Region.

The main reasoning for sustainable use of NWFP resources in the Northern regions could be determined by the following:

- They are ecological processes;
- Natural processes and conditions;
- Biological diversity and its conservation;
- Reception of the profit for the people (food, finance).

The main volume of NWFP resources (80%) is found in the state forests, which belong to the Ministry of Natural Resources. Forest covers the area of 27 million ha.

The annual yield of mushrooms in the Arkhangelsk Region can amount to 114 th. tons, the harvesting crop being equal to 65 th. tons, including such species as boletus, milk agaric, saffron milk cap, orange cap boletus brown mushrooms, butter boletus, coral milky cap, moss mushrooms, russule, russule foetens (Lukin and Chertovskoi 1981). The biological crop is strongly influenced by weather conditions. In favourable years, the crop may be ten times higher than in unfavourable ones.

The annual yield of berries makes up 78,6 th. tons, and harvesting crop is estimated as 39,3 th. tons, including cranberry - 5,6, cowberry - 7,5, bilberry - 24,7, cloudberry - 1,5. About two thirds of forests are not accessible for picking because of the lack of roads owing to Lukin (1988).

The problems which exists in the question of NWFP resources are the following:

- not complete knowledge about minimum influence on forest system by man endured factors;
- not enough research in biology, species correlation, berries and mushrooms sustainable yield prognosis;
- social and economic aspects are even more important in the questions of NWFP resources utilisation than ecological.

These problems can cause following consequences:

- natural forest systems are managed very weakly;
- natural and social systems are not in correlation in each other;
- management system has not been developed at regional level;
- NWFP resources productivity has stagnated and a reduction of biodiversity in the forests occur;
- small practice in sustainable NWFP management;
- not equal influence of nature and people on forest ecosystems.

That is why we need to develop strategy of action in order to diminish the problems connected with lack of information in NWFP resources. It is important to support the research on the main directions such as biology, NWFP yield prognoses and ecosystem management.

Strategy of NWFP resources utilisation would include:

- to deepen knowledge about required berries and mushrooms production for various types of markets by financial support of additional research;
- information collection and its analysis, knowledge and database exchange in the field of sustainable NWFP management;
- to work out the plans of sustainable NWFP management at regional level by participation of all interested institutions in order to determine future prospects;
- to improve connection between the practice and research of utilization of NWFP.

## **5.2 NWFP harvest**

The share of commercial harvesting and processing of NWFP is very low in the Region. Local population carries out the main volume of these activities for household consumption. Part of mushrooms and berries harvested by local population is redistributed through the street trade, partly is purchased to different local, non-local and foreign commercial companies.

Following factors influence sustainable NWFP management:

- prime-producers that have demand for resources;
- local utilisation resources;
- local (foreign) companies' involvement into the process;
- existing requirements (commercial);
- the rates of harvesting.

Up to 1990's the commercial methods were used for harvesting and processing of NWFP. Arkhangelsk Consumer Union (co-operative trade institution), Arkhangelsk Forest Service and some other trade organisations carried out this kind of work. These institutions used to open a network of purchasing units during the ripening period of mushrooms and berries. The total purchasing volume for

commercial processing of mushrooms constituted 300 tons, 500 tons of berries or 7-8% of the total volume of NWFP collected in the forest.

There are following problems in the NWFP harvesting in Arkhangelsk region:

- there is no information and means for new technologies and methods of NWFP harvesting;
- there is no competition between companies in practice;
- roads have big influence in resources accessibility;
- products selection depends on the distance to the place of purchase;
- network of harvesting and purchasing units does not exist now;
- not enough information about end consumers ( about market demands and its preference).

Some changes in the situation in NWFP business appeared during last year. New harvesting companies appeared in Arkhangelsk Region. They are working separately on the market using local population for picking NWFP. Unfortunately, the Forest Administration has no influence on that process. According to this, we will get following consequences on existing problems and with the expected increase of NWFP harvesting since 2000:

- non-efficient NWFP harvesting will continue and destruction of resources will take place;
- destruction, caused by harvesting, could limit in some extent sustainable forest management;
- non established and regulated relationships between harvesters and consumers leads to the weak buyers knowledge about resources conditions.

In order to improve the situation it is important to make clear how technical and scientific information about resources can be accessible for harvesters. Regional Administration and Forest Service, who are responsible for decisions adoption on sustainable forest management, have to support the creation of different associations of harvesters,.

### **5.3 NWFP primary and secondary processing**

NWFP primary processing is carried out mainly in the forest or purchasers' units. It consists of the most simple operations: berry freezing and drying; mushrooms salting and drying. There are some problems in primary processing, especially for the remote villages. Small and medium primary processing enterprises have not access to the finance and modern technologies. They have weak position because of that.

Secondary processing is carried out on cannery factories and big enterprises. They produce different kinds of products such as juices, drinks, concentrates, jam etc. Such enterprises are purchasing raw- or half-processed material for further processing and produce products which could be used by the end consumers. They usually use equipment and technologies, which suit for production of different kinds of products and lower the pollution of the environment. They have higher profit in comparison with primary processing enterprises.

A network of mushroom cooking workshops was in operation for the primary processing of the harvested resources (before 1990's). The sorting of raw material, salting and mushroom cooking, packing and half-finished products took place in these workshops. The manufactured products were sent to the trade network (shops, restaurants, canteens) or for further processing at the canneries.

At that period in other regions of the former Soviet Union the commercial processing of NWFP was also well and even better developed than nowadays. Special attention was paid to the most common and efficient products in the specific region, e.g. pine nuts and sea-Buckthorn in Siberia, honey-bearing and medical plants in the central zone of Russia, mushrooms and berries in northern regions.

Ten mushroom cooking workshops and one processing cannery of mushrooms and berries were in operation in 1970-1990's in the Arkhangelsk Forest Service. Wide assortment of foodstuff was produced at the cannery: rubbed and crushed cranberry and cowberry with sugar, cowberry drink, dog rose drink, cowberry jam, crushed cowberry with apples, salted milk agaric and coral milk caps, pickled orange cap

boletus, dried mushrooms. The production volume made up 720 th. cans in 1992, 212 th. cans in 1993. The marketing of the production was carried out through municipal trade organisations in the towns of Arkhangelsk Region. Since 1994 the cannery has been out of operation due to the reorganisation process in the forestry system. The main idea of that process was to transform the canneries into government monitoring service, free from economic activity. As the result, all the production structure was withdrawn from lesхозes and was dissolved in the market chaos. The government motivation to be involved into such type of activity has disappeared.

The commercial production of NWFP in forestry and other areas fell into decay. It was caused by many reasons. First, we experienced the intensive "intrusion" of foreign products of vegetable origin. Secondly, during the process of privatisation the priorities were given to big high-tech enterprises, whereas small and medium business failed in the competition in the new system of taxation. Thirdly, the mechanism of credit allotment was limited thus depriving small and medium enterprises of the possibility to modernise their equipment.

#### **5.4 Relationship between forest management and harvesting**

However, much has been changed in the last years. Favourable conditions are being created for the revival of the commercial processing of NWFP in the Arkhangelsk Region at present. Firstly, the government does not meet the dependence of the food market on imported foodstuff and it should be expected that the local food producer would get priority. This would also improve the unemployment situation and promote the increase of local budget.

Secondly, the forestry bodies are again forced to undertake the economic activity with the aim of finding additional resources for financing the activity directly related to forestry. High demand is still preserved for food products as a whole and for local and ecologically safety in particular.

Thirdly the trust to the Russian government has appeared from the western investors recently, which is likely to influence to a large extent the development of NWFP processing in the northern parts of Russia, too.

There are no restrictions for NWFP utilisation in the federal and local legislation. There exist scientific recommendations to increase the productivity of the forests twice or three times from this point of view. There is much cheap labour force available in the rural areas that would allow for organising multi-scale harvesting of NWFP. The unemployment level in the region varies between 10 and 30%.

Urban people collect berries and mushrooms mainly for their own household consumption. They often compete for the same accessible resources with the local population who, besides their home consumption, collect NWFP for sale to purchasers and directly for the market places. Trade is carried out spontaneously, without laws and regulations. There are voluntary labourers who are interesting in selling berries and mushrooms to commercial enterprises and to different firms from central part of Russia. They purchase mostly berries from local population. Because of that, it is impossible to register the harvested volumes of berries nowadays. It is very important to organise controlled use and utilisation of accessible NWFP stocks.

Harvesting of NWFP increases every year and the problem of berry and mushroom sites protection may occur very soon. The increased harvesting has resulted in over-exploitation of certain areas, decreasing their quality and finally reducing the number of accessible areas.

The need for establishment of tariffs for industrial NWFP harvest appears nowadays. The lease payment for NWFP harvest could be set by the Regional Administration on the basis of Russian Federation Forestry Legislation (1993) and Forest Code (1997). The following measures could be suggested for that in Arkhangelsk region:

- to divide all territory on NWFP harvesting zones based on accessibility and various distance from market (leasing territory for NWFP harvest);
- to establish a fix percentage of the delivered price;

- to make an agreement with harvesting enterprises on NWFP use.

Trade between licensed purchasers and local collectors could create a utilisation chain from the forest to the export markets. It is necessary to widen the net of purchasing points and to invest in their reconstruction for foreign and local buyers.

### **5.5 Main problems in developing sustainable use of NWFP in the Northwest Russia**

1. Insufficient support of development of this branch of economy, both at regional and local, as well as at federal levels;
2. Insufficient level of legal regulation in the questions of NWFP use;
3. Forest Service carries out a weak control on NWFP use and the correct level of harvest;
4. Insufficient information about NWFP resources and weak attention to the resources inventory and control of their use from local authorities and at a Federal level;
5. Lack of the information about the forecast of a NWFP crop;
6. Lack of the trained qualified experts in all parts of the production chain from inventory of resources till harvesting, primary and secondary processing and marketing to the end users and consumers;
7. Harvesters have not sufficient information about the requirements of the certification and of the quality of production; or about each others activities or about similar enterprises outside the region;
8. Lack of the specialised NWFP trade in the region;
9. Weak work with the rural population about harvesting and protection rules;
10. Lack of certificated production.

### **5.6 Certification/sanitary control of NWFP**

NWP production requires realization of the laboratory control. It can be carried out by the local sanitary station. It is necessary to receive the certificate on made production, which can be received at the Standard and Metrological Center and Sanitary Center. These Centers are responsible for making following certificates: hygienic, conformity (for non-processed raw material) and quality (for processed product). These certificates are needed only for the export markets. For the domestic and local markets only phyto quarantees are needed.

All companies deal with raw material need to get two certificates: hygienic and certificate of conformity at present.

The hygienic specification (allowable norms of mg/kg, no more) for frozen berry (concentrate): Lead - 0,4; Arsenic - 0,2; Cadmium - 0,03; Mercury - 0,02; Copper - 5,0; Zinc - 10,0; Hexachlorocyclohexane (C<sub>6</sub>H<sub>6</sub>Cl<sub>6</sub> - 0,05); D.D.T. (dichlorodiphenyltrichloroethane) and its metabolite - 0,1; Radionuclides - non. There are other characteristics which have to be determine such as microbiological.

There are different government standards which is need to follow for harvester enterprises in order to get the certificate of conformity. There are standards for NWFP resources and products (19): for fresh and dry berries (separately for different species); for fresh, salted, dried, semi-processed and processed mushrooms. There are standards for product package (17), labeling and transportation (14).

The selling of the NWFP production usually carries out by a limited number of the industrial enterprises of the appropriate structure, with the majority from which the co-operation is already adjusted. Therefore selling have strictly focusing character and carried out as scheduled contract deliveries. The NWFP market does not require certificate on sustainable forest management yet.

Government, research, industrial enterprises and voluntary organizations have focused their attention on the management on timber resources. There are no any requirements for NWFP certification in the existing forest certification systems. But NWFP play an essential role in the sustainable forest management. NWFP producers have to understand and meet the requirements for certification and consumers to what they are supporting through the buying of certified products.

**Packaging, labelling and transportation** - Usually berries are packed into plastic boxes, netto 12 kg, or plastic bucket, netto 10 kg. Frozen berries could be packed into paper bags (50 kg). All packing material is produced in the Russian Federation. Every NWFP batch has hygienic and conformity label. It is impossible to know where berries were picked, purchased, frozen and how they were transported.

Purchasing companies create harvesting net in order to accelerate the process of NWFP purchase, as usually berries and mushrooms need to be processed within a short time. A transportation schedule is needed to be worked out. Not all companies have their own harvesting net and transportation. They organize several purchasing occasions where rural population can sell their berries and mushrooms. The quality of such products is not good enough for export. Wholesalers play a role as mediators between harvesting, processing and shipping. They depend very much from geographical NWFP distribution. These companies do not worry about sustainable forestry and how it is possible to support it. Wholesalers have the control on transportation and can influence the prices and make pressure on resources by that.

NWFP harvesting have big socio-economic meaning for rural population in Arkhangelsk region. Its development according to the existing resources would allow to involve more than 6 000 people into the process of picking berries and almost 400 people are estimated to get a permanent job through that. Commercial gathering of NWFP provide sustainable incomes to those people engaged in the business.

Local processing is important to the well-being of the rural population. The benefits from it accrue locally. Regional authorities have to support local businesses by buying and selling products close to home. Forest service (leshoz, lesnichestvo) together with private purchasing companies need to restore their good tradition on NWFP harvest and processing in the North. The co-operation between them is still difficult. There still exists a special mentality: a look from the side. The development of co-operation would bring about only positive result for local people, Forest Administration and harvesting companies.

## Literature:

- Agreement between the Ministry of Agriculture and Forestry of Finland and the Federal Forest Service of the Russian Federation in the field of Forestry. 1995. (In Finnish and Russian).
- Alhojärvi, P. 1999. The Role of Governments and the Markets in relation with Sustainable Forest Management and Forest Certification in the Russian Federation. A presentation published by the WWF in the Proceedings of the International Conference: " Voluntary Certification of Forest Management for Timber Export in the Russian Federation" held in Petrozavodsk, Russia, 12-14.11.1998.
- Alhojärvi, P. 1998. Non-Wood Forest Products in the International cooperation Financed by Finland. In the Proceedings of the International Workshop: "Sustainable Development of Non-Wood Goods and Benefits from Boreal and Cold Temperate Forests" organized in Joensuu 18-22.1.1998 by FAO, European Forest Institute and the Ministry of agriculture and Forestry in Finland. In EFI Proceedings No.23.
- Alhojärvi, P. 1998b. International Trade and Restrictions of the Non-Wood Forest Products. In EFI Proceedings No. 23.
- Anderson, K., Hoekman, B. and Strutt, A. 1999. Agriculture and the WTO: Next Steps. Revision of a paper presented at the Second Annual Conference on Global Economic Analysis, Aversa Conference Centre, Helsingør, Denmark, 20-22 June, 1999.
- Bailleux, P. and Scharpe, A. 1993. Organic Farming. Green Europe. European Commission.
- Bass, S. and Simula, M. 1999. Independent certification/verification of Forest Management. Prepared for the WB/WWF Alliance Workshop 9-10 November 1999.
- Blake, F. 1996. Certification - Control Body or Campaign Tool. 10<sup>th</sup> IFOAM National Conference on Organic Farming, Cirencester, Gloucestershire.
- Binswanger, H. and Lutz, E. 2000. Agricultural Trade Barriers, trade Negotiations and the Interests of Developing Countries. Paper prepared in the World Bank.
- Bourke, J. and Leitch, J. 1998. Trade Restrictions and Their Impact on International Trade in Forest Products. FAO. Certification and Marketing Workshop. 1999. Agroforestry and Non-Timber Forest Products. Organized in Falls Brook Centre, Oaxaca, Mexico, in 20-22.6.1999.
- Chibisov, H. and Demidova, N. 1998. Non-Wood Forest Products and their Research in Arkhangelsk, Russia. In EFI Proceedings No. 23.
- Demidova, N. 2000. Working Papers for the Komi Model Forestry Project and for NWFP development in the Arkhangelsk region..

- EBRD. 2000. Instruments to Develop Small- and Medium Size Enterprises. Working documents and brochures. European Bank for Reconstruction and Development.
- European Commission. 1998. Forest Strategy of the European Union.
- European Commission. 1997. Working Papers on Forest Certification.
- FAO. 1996. Mode Code of Forest Harvesting Practice.
- FAO. 1995. Report of the International Expert Consultation on Non-Wood Forest Products. Yogyakarta, Indonesia, 17-27.1.1995.
- FAO/WHO. 1995. Codex Alimentarius Commission. Procedural Manual. Joint FAO/WHO Food Standards Programme.
- Florida Certified Organic Growers and Consumers, Inc. 2000. FOG Crop, livestock and Processing Certification Program.
- Hansen, E., Forsyth, K. and Juslin, H. 1999. Forest Certification Update for the ECE Region, summer 1999. Geneva Timber and Forest Discussion Papers. The United Nations.
- IFOAM. 1995. Basic Standards of Organic Agriculture and Food Processing and Guidelines for Social Right and Fair Trade; Coffee, Cocoa and Tea; Evaluation of Inputs. Christchurch, New Zealand.
- Indufor Oy. 1997. Options for International Institutional arrangements in Certification of Forest Management and Implications for ACP Countries. Independent study report prepared by Indufor Oy commissioned by European Commission Directorate General for Development DG VIII-A-I. September. Helsinki, Finland.
- Iqbal, M. 1995. Trade Restrictions affecting International Trade in Non-Wood Forest Products. FAO Non-Wood Forest Products No. 8.
- Kangas, J. 1998. Non-Wood Forest Goods and Benefits and the Choice of Forest Management Practices. In EFI Proceedings No. 23.
- Kouki, J., Laakso, T., Sakovets, V. and Gavrilov, U. (Eds.). 2000. Forest Certification in the Matrosy Taiga Model Forest Area, Russian Karelia. Publication of the University of Joensuu.
- Kukuyev, Y. 1999. Non-Wood Forest Products in Northwest Russia. In the Proceedings of the International Workshop: "Research approaches to Support Non-Wood Forest Products Sector development: Case of Arkhangelsk Region, Russia", organized in Arkhangelsk, Russia in 18-21.9.1999 by the European Forest Institute and the Ministry of Agriculture and Forestry in Finland. EFI Proceedings No. 29.
- Lintu, L. 1999. Trade and Marketing of Non-Wood Forest Products: Principles and Applications. In EFI Proceedings No. 29.
- Lintu, L. 1998. Development Issues Related to the Marketing of non-Wood Forest Products. In EFI Proceedings No. 23.
- Lintu, L. 1986. Marketing in the Forest sector. *Unasylva* 153 (38).
- Lukin, I. N. 1988. Recommendations of NWFP usage. Arkhangelsk Forest and Forest Chemistry Institute. Arkhangelsk. 22.p. (in Russian).
- Lukin, I.N. and Chertovskoi, V.G. 1981. Wild Berry Resources and Organisation of their Use. In: Chuprov, N.P., Chibisov, G.A. (eds.) Economic Questions of Forest Management Development in the European North. Arkhangelsk. Pp. 62-29. (In Russian)
- Lukin, I.N. and Demidova, N. 1999. Location and Accessibility of Major Non-Wood Forest Products in Arkhangelsk, Russia. In EFI Proceedings No. 29.
- Paal, T. 1998. Utilization and Research of Non-Wood Products in the Former Soviet Union. In EFI Proceedings No. 23.
- Paal, T. and Saastamoinen, O. 1998. Non-Wood Plant Products in Estonian Forests. In EFI Proceedings No. 23.
- Ptichnikov, A. and Voropaev, A. 1999. Development of FSC Certification and Sustainable Forest Management in Russia. WWF Russian Programme Office Publication.
- Rutkauskas, A. 1998. Non-Wood Resources and their Utilization in Lithuania. In EFI Proceedings No. 23.
- Saastamoinen, O., Kangas, J., Naskali, A. and Salo, K. 1998. Non-Wood Forest Products in Finland: Statistics, Expert Estimates and recent Development. In EFI Proceedings No. 23.
- Simula, M. 1999. Forest Certification: Overview of the International Situation and Implications for the Russian Federation. A Paper presented in the International workshop on sustainable development and certification in the Russian Forest Industry, organized in St. Petersburg in 13-14.12.1999 by FAO/ECE of the United Nations.
- Taiga Rescue Network. 1999. Finnish Forest Industrial companies in Northwest Russia.
- Vantomme, P. 1998. Non-Wood Forest Products from Boreal and Cold Temperate Forests. In EFI Proceedings No. 23.
- Vilkriste, L. 1998. NWFP Resources and their Future Utilization in Latvia. In EFI Proceedings No. 23.
- World Bank. 2000. Project Document of the Pilot Forestry Project in the Russian Federation.
- World Bank. 1999. Turkey Forestry Development Project.

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## **CERTIFICATION DES PRODUITS FORESTIERS AUTRES QUE LE BOIS : MODES D'APPROCHE APPLIQUÉS EN FÉDÉRATION DE RUSSIE**

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### **RÉSUMÉ**

Le document porte sur certains modes d'approche élaborés par l'Institut de recherche et les organisations non gouvernementales (ONG) dans le domaine de la certification des produits forestiers autres que le bois. Il traite des tendances et de la situation de la certification forestière en général au plan international, de la certification et de son rapport avec l'aménagement forestier, de la relation entre l'aménagement forestier et les produits forestiers autres que le bois, des projets et activités de recherche entrepris dans le nord-ouest de la Russie en général et dans la région d'Arkhangelsk en particulier ainsi que des activités menées par les ONG dans la partie extrême orientale de la Russie et en particulier dans la région de Khabarovsk et enfin des projets pilotes de foresterie du WWF.

Globalement, la pression des marchés internationaux pour obtenir une certification forestière et la mise en place d'une chaîne de responsabilité dans le cas des produits forestiers autres que le bois a été jusqu'ici très limitée. Dans les pays industrialisés occidentaux les principales préoccupations ont porté sur la teneur en matière organique des produits et les moyens de la vérifier. Dans le cas de la Russie, jusqu'ici la preuve des contrôles sanitaires a consisté le plus généralement en certificats. Les certificats portent essentiellement sur les pesticides, la teneur en plomb et la contamination radioactive probable. Tous ces facteurs doivent être analysés avant la délivrance du certificat d'exportation pour les baies et les champignons. Ce type de certificat est demandé par les grossistes et les détaillants de produits alimentaires organiques occidentaux. Sur les marchés régionaux, par exemple entre les États de la Baltique et la Finlande, ils ne sont pas couramment demandés.

La recherche forestière dans le domaine des produits autres que le bois est une activité traditionnelle en Fédération de Russie. Les chercheurs se sont axés principalement sur l'aspect biologique du problème, en s'intéressant à des questions telles que les facteurs influençant la pousse des baies et des champignons, les incidences des pratiques en matière d'aménagement forestier sur le rendement de plusieurs produits et les méthodes d'inventaire des produits forestiers autres que le bois. Maintenant, la recherche porte aussi progressivement sur les aspects relatifs au marché et à la commercialisation; les analyses du marché et de la consommation vont donc être de plus en plus fréquentes. C'est déjà le cas dans les efforts de commercialisation des exportations entrepris par les organisations non gouvernementales, en particulier dans la partie extrême orientale de la Russie.

Les activités menées par des ONG ont également visé à inclure l'aménagement forestier durable dans la question de la commercialisation des produits. Mais, par exemple dans la région de Khabarovsk, cela s'est fait de façon négative : un texte figurait sur les étiquettes des produits forestiers autres que le bois indiquant que la récolte de ce produit représente le seul mode d'exploitation forestière durable dans la région. Ainsi, par un mode d'approche négatif ou critique, les produits forestiers autres que le bois ont bénéficié d'une promotion et ont gagné des clients.

Le projet pilote de foresterie mis en œuvre par la Banque mondiale permettra d'aborder la commercialisation de façon plus positive pour la foresterie, et les produits forestiers autres que le bois seront davantage intégrés à la planification de la gestion globale, par exemple en utilisant la méthode d'aménagement écologique du paysage. Les activités menées sous l'égide du WWF se sont jusqu'ici concentrées sur la foresterie mais dans le projet pilote de foresterie par exemple mis en œuvre dans la République de Komi, les produits forestiers autres que le bois ont également été intégrés et constituent un élément essentiel de l'aménagement forestier en général et de la certification en particulier dans la région expérimentale.

Toutefois, de nombreuses mesures sont prises dans ce domaine au plan international. C'est la raison pour laquelle il est essentiel que les instituts de recherche russes et les ONG suivent l'évolution internationale. Il est tout aussi essentiel que les forestiers, qui se livrent souvent activement à la cueillette et à l'utilisation de produits forestiers autres que le bois, prennent une part plus dynamique à ces activités. Il faut ainsi considérer les produits forestiers autres que le bois comme un élément de l'utilisation forestière au même titre que l'utilisation économique classique des forêts, exploitées pour le bois, et comparer la valeur qu'ils représentent avec les autres utilités que la forêt a pour l'environnement. Ensuite, on sera peut-être plus proche d'une utilisation plus avisée et mesurée selon des critères objectifs des forêts que ce n'est le cas aujourd'hui. Pour déterminer comment mettre en œuvre les plans il faudra mettre au point des méthodes d'aménagement forestier intégrées et plus complètes. Ainsi, la certification et la chaîne de responsabilité pour les produits forestiers autres que le bois se développeront de la façon la plus fiable et vérifiable qui soit.

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## **СЕРТИФИКАЦИЯ НЕДРЕВЕСНЫХ ЛЕСНЫХ ТОВАРОВ (НДЛТ): ПОДХОДЫ В РОССИЙСКОЙ ФЕДЕРАЦИИ**

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### **РЕЗЮМЕ**

В докладе обсуждаются некоторые разрабатываемые научно-исследовательскими институтами и неправительственными организациями (НПО) подходы к сертификации недревесных лесных товаров (НДЛТ). В нем рассматриваются международные тенденции и положения в области сертификации лесных товаров в целом, сертификация и ее связь с управлением лесным хозяйством, взаимосвязь между управлением лесным хозяйством и НДЛТ, научно-исследовательские проекты и работы, выполняемые в северо-западной части России в целом и в Архангельской области, в частности, а также деятельность НПО на Дальнем Востоке России, в частности в Хабаровском крае, а также опытно-показательные лесотехнические проекты, выполняемые Всемирным фондом природы.

До настоящего времени требования в отношении лесной сертификации, а также сертификации НДЛТ на международных рынках были весьма низкими. Основные требования на рынках западных промышленно развитых стран касались содержания органических веществ в товарах и того, как его проверять. До настоящего времени в России для сертификации в основном использовались данные санитарного контроля. Основные данные в этих сертификатах касаются пестицидов, содержания свинца и возможного радиоактивного загрязнения. Для получения сертификата на экспорт ягод и грибов эти товары должно пройти анализ, который подтвердит отсутствие вышеупомянутых загрязнителей. Такие сертификаты требуется предъявлять оптовым и розничным торговым организациям, занимающимся сбытом пищевых продуктов органического происхождения. На региональных рынках, например в государствах Балтии и в Финляндии, обычно не требуется предъявлять сертификаты этого типа.

Лесохозяйственные исследования, касающиеся НДЛТ, имеют большую историю в Российской Федерации. Эти исследования обычно касаются биологических аспектов проблемы и направлены на выяснение факторов, влияющих на производство ягод и грибов, воздействия определенной практики лесопользования в целях заготовки различных НДЛТ, а также выработку методов инвентаризации НДЛТ. В настоящее время исследования постепенно начинают охватывать аспекты рынка и маркетинга, в связи с чем чаще будет проводиться анализ потребностей рынка и потребителей. Этим уже практически занимаются НПО, возглавляющие работы по экспортному маркетингу, в частности на российском Дальнем Востоке.

В рамках проводимой под руководством НПО работы была также предпринята попытка включить аспекты устойчивого управления лесами в маркетинг НДЛТ. Однако, например, в Хабаровском крае для этого использовался негативный подход. На этикетках для НДЛТ было указано, что заготовка данного товара представляет собой единственный устойчивый метод заготовки лесных продуктов в крае. Таким образом, благодаря негативному или критическому подходу удалось расширить сбыт НДЛТ, увеличив число заинтересованных покупателей.

Благодаря опытно-показательному проекту Всемирного банка, вопросы маркетинга будут переводиться в плоскость более позитивного подхода к практическому лесопользованию, а НДЛТ будет уделяться большее внимание в рамках комплексного планирования управления лесами, например, с использованием метода ландшафтно-экологического планирования. Работы, возглавляемые Всемирным фондом природы, в основном касались лесоводства в России, но, например, в опытно-показательном проекте в Республике Коми НДЛТ также фигурировали в качестве важного элемента при разработке вопросов управления лесами в целом и лесной сертификации в частности.

Вместе с тем на международном уровне в этой области проводится большая работа. По этой причине российским научно-исследовательским институтам и НПО следует придерживаться главных направлений международной деятельности по этим вопросам. Кроме того, важно, чтобы работники лесохозяйств, которые на практике часто сами являются активными заготовителями и потребителями НДЛТ, принимали широкое участие в разработке новых методов. Заготовка НДЛТ должна стать одним из способов ведения лесного хозяйства наравне с традиционным экономическим использованием лесов (получение лесоматериалов), учитывая их ценность наряду с прочими экологическими ценностями лесов. Только после этого, мы, вероятно, сможем более разумно и более объективно измерять целесообразность использования лесов. Вопрос о том, как перевести планы в практическую плоскость, должен решаться с помощью методов более комплексного и всестороннего планирования. Это, очевидно, является наиболее надежным и верным способом развития лесной сертификации и сертификации НДЛТ.

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# THE PRESENT STATE AND POSSIBILITIES OF COLLECTION AND SUBSEQUENT UTILISATION OF NON-WOOD FOREST PRODUCTS IN THE CZECH REPUBLIC

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## Summary

There is a possibility of collecting different species of forest fruits and medicinal plants in the forests of the Czech Republic. Only utilisation of about one quarter to one half of biological yield of forest berries for commercial purposes, in yearly volume about 25,8-51,6 million kg and in total value about 39,3-78,7 million US dollars, could represent receipts about one sixth to one third of yearly timber volume sold on market. There was state support to the purchase and subsequent supply of non-wood forest products (NWFP) to processing industry before 1989. Inhabitants of the countryside were mostly interested in collection of NWFP because it was minor source of income, which they took in their jobs. There was economical transformation of economy of the Czech Republic after 1989 year. This transformation was occasion of disintegration of organisational structure of the purchase and supply of NWFP. Transformation had unfavourably influence to the countryside where possibility of employment had been worse. It could improve social conditions of the countryside population if they join in collection of NWFP. This collection could be organised by forming associations of collectors and their conjunction with customers in contemporary time, what would make optimum conditions for skilled carrying out and valorisation of the collection. The second possibility of organisation of collection is by making interest in companies working in forestry. These companies could accept NWFP as further source of their income, and that is why they would make new working places. Forming associations of collectors and joining companies working in forestry would have positive influence to skilled and economically carrying out exploitation of resources of NWFP and partial reduction of unemployment at the countryside. It is important to make better conditions for this exploitation of NWFP by partial modification of forest law in the Czech Republic.

**Keywords:** Non-wood forest products, forest fruits, medicinal plants, organisation, association, collection, countryside.

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## Introduction

Forest ecosystems are appreciated as an important resource of wood. Other than wood, the forest is a resource for further products, too, which are called as Non-Wood Forest Products (NWFP). There has been an elaborate study about collection of forest berries and mushrooms by inhabitants in the Czech Republic (Sisak, 1997). This study was made mainly by virtue of: sociological surveys in representative samples of inhabitants, a set of foresters of the State Enterprise Forests of the Czech Republic, field monitoring, and forest management plans. This study was made on 2,341 million hectares of forest land; practically all of the forest land was accessible for inhabitants. Observations were made on: mushrooms, blueberry (*Vaccinium myrtillus* L.), raspberry (*Rubus idaeus* L.), blackberry (*Rubus fruticosus* L.), elderberry (*Sambucus nigra* L.) and cranberry (*Vaccinium vitis-idaea* L.) for the study in question. The total land area of berries in the study was 417 700 ha.

The results of the study show that the recreational collection of berries and mushrooms amounted to 46,4 million kg with an approximate total value of 67,5 million US dollars in 1994, and 58,5 million kg with an approximate total value of 85,5 million US dollars based on market prices of these commodities in 1995. These figures represented about one quarter to one third of annual timber volume sold on the market for those years. The total collection of berries was about 25% of its biological yield.

If we want sustainable management of the NWFP then we could use about one quarter to one half of its biological yield yearly, without the negative influences of the regenerative capacity of these

resources. This potential yield amounts annually to 25,8-51,6 million kg with an approximate total value of about 39,3-78,7 million US dollars. These figures represent about one sixth to one third of the annual timber volume sold on the market and it could be a further source of income.

The forest is a very important resource of medicinal plants too. The number of species of medicinal plants is much higher and they cover the same or even larger area of the forests than berry species. However, this raw material basis is not quantified yet.

It is possible to collect forest fruits and medicinal plants from the end of April to October in climatic conditions of the Czech Republic. The best possibilities for collecting forest fruits and medicinal plants are in the month of July to the end of September.

### **The State of Organisation in the Collection and Subsequent Utilisation of Non-Wood Forest Products**

This subject is possible to divide into two time sections:

#### a) Situation before 1989

People in the countryside were largely interested in the collection of forest fruits and this activity was a minor source of incomes to their main job.

The consumers co-operative, called JEDNOTA, was engaged in the purchase of forest fruits and mushrooms before 1989. The main activities of this co-operative were the sale of foodstuff and consumable goods to inhabitants in the countryside. The co-operative had a system of shops over the area of the Republic, and therefore, it practically had shops in all towns and villages. They published purchase price lists and the places of sale every time before the season of every collection of forest fruits. The purchase place shops were typically located in the countryside where the first qualitative separation was carried out. Money from the sale of goods was used for purchase and warehousing and cooling capacities were used for storage of these fruits. The next day the fruits were taken away and supplied either to the shops of this co-operative in towns or to processing companies.

State Entertainment, Lecive Rostliny Zbraslav, was also engaged in the purchase of medicinal plants from its collection and cultivation. This company had shaped a system of purchase places for the whole republic but had a regional character. Skilled workers made qualitative separation of medicinal drugs and purchasing in these places. Then purchase of raw material was, according to quality, either processed into medicinal teas or supplied to pharmaceutical or food making companies.

Mostly pensioners and schoolchildren were interested in the collection of medicinal plants. These activities were often supported by the State.

As it was mentioned, the organisation of purchase and subsequent utilisation of the forest fruits and medicinal plants was extremely successful.

#### b) Situation after 1989

There were big political and economical changes in our republic after 1989. The transformation of the economy had influences on all branches including both processing and business companies. Nationally operated JEDNOTA disintegrated into smaller parts, which started to operate regionally. There was also a loss of shops in this net- by privatisation and restitution to original holders, during the transformation. New companies started to work in a branch of business, including international business companies which concentrated their business strategy on big towns, and for that reason these smaller regional co-operative once, which started to concentrate more on business activities, partially reduced forest fruits purchase. This reduction of forest fruits purchase was made by problems with their subsequent supplying because processing companies had similar problems during transformation.

Economical transformation did not have a very big influence on the organisation of medicinal plants purchase. Even privatisation of State Entertainment, Lecive Rostliny Zbraslav, signified reduction of the purchase places, nevertheless the new rise of new firms with interest in medicinal plants purchase

partially compensated this reduction of purchase places.

The approval of the new forestry law was an important factor in the collection and subsequent utilisation of NWFP. This forest law conserved the rights of inhabitants for free admission to all forests regardless of tenure (with the exception of reduction in protection areas and army forests), but the collection of NWFP was defined only for own personal use. This vague formulation concerning the collection and subsequent sale of NWFP had influence to the reduction of the sale of these products. There are some people who pay attention to the collection and subsequent sale of these products but it is only a sale of berries and mushrooms to tourists in regions near the borders with Germany and Austria.

Typical forest medicinal plants were taken away from the purchase lists and firms engaged in medicinal plants purchase concentrated only on cultivating and out forest growing medicinal plants purchase.

### **Possibilities of Organisation of Collection and Subsequent Utilisation of Non-Wood Forest Products**

Agriculture and forestry were the main source of income for people in the countryside. There were changes in agriculture after 1989, which made a reduction to half of the previous working places and for that reason unemployment had risen in the countryside. There was a problem with employing these people in towns because they would had to commute every day to the job, pay for traffic fees, and firms generally request specific qualification in their branch.

By these reasons, the exploitation of NWFP could be a source of income and work for unemployed people in the countryside. Organisation and skilled management could have a positive influence on the sustainable exploitation of these resources, which could provide a permanent source of income for inhabitants in the countryside.

It is not possible to make the same working system of the NWFP purchase and subsequent utilisation, as that took place during the time of existence of JEDNOTA, and for that reason organisation of these activities could be realised in two ways:

#### **a) Private persons**

This could be the best solution to make associations or co-operatives of collectors for organising exploitation of NWFP. The association could have regional character and it could associate collectors of the region, and in the future, regional associations could join into one national association. This association could take care of the skilled planning, organisation and collection of NWFP, and the association could also represent collectors in business connections with customers.

Regional co-operation of the association of collectors with regional net of sale firm and processing firm could be the best way for utilisation of forest fruits without expensive building up warehousing capacities. Associations of collectors would assure collection and quality of forest fruits by the requirements of the processing firms. There would be direct supply connections between collectors, represented by the associations, and processing firms in this regard. Associations and processing firms could use the storing and transporting capacities of the sale firms after agreement with them on what could be seasonal minor source of income for the sale firms. Purchase price would be appointed for the place of passing on production of collectors, what could be shop of sale firm, and processing firm would pay costs for storing and transporting. The direct connection collector-consumer will be advantageous for this model what would be presented in better realising of collected production for collectors, because purchase price would not be negatively influenced by middlemen.

There would be direct connection between collectors and consumers in the case of medicinal plants. Advantages would be the same as for forest fruits. People in the countryside mostly have sufficient free spaces in their buildings, which could be used for drying and temporary storage of medicinal plants. After a small modification, it would not be necessary to build new buildings and even to connect further firm to this organisation structure.

Creation of all the models mentioned would be a bit difficult from the organisation point of view, because these models have to be built from the beginning, and for that reason there would be some problems with first time agreements among the participants. In the beginning, partial support of the state would be useful for informing of the people about possibilities of commercial collection of NWFP and the establishing of associations, which could take care of the skill of carrying out the collection.

b) Companies working in forestry

Wood is the main activity and source of income for these companies. All activities carried out in the forest are aimed for timber production. Considering that these companies have shaped an organisational structure in their area, have disposal of some finances, and have transporting and storage capacities, it would not be big problem for them to include collection of NWFP in their activities.

These companies could employ seasonal workers for collection of forest fruits. Regarding the area on which these companies operate and the potential volume of production of fruits in these areas, it could be an interesting source of income for these companies.

Workers in silviculture operations could be used for collection of medicinal plants. These workers could devote a part of working time to silviculture activities and partly to the collection and drying of medicinal plants. Considering that they could reduce working time in silviculture activities, these companies would have to employ a specific number of workers dependent on the proportion between the time for silviculture operations and the time for collection of medicinal plants.

There would be a direct connection between these companies and consumers in both of these models. It could be easier to form these models because of the existing organisational structures, finance sources and skilled staff of these companies.

## **Conclusion**

All the designing variants would have a positive influence for economical and control the utilisation of resources for NWFP. Partial reduction of unemployment in the countryside would be no small contribution. But specific provisions are necessary so we could utilise NWFP in some of mentioned models.

The clear formulation of this sphere in forest law is the most important step for utilisation of NWFP. There is a requirement to define conditions for commercial collection and at the same time the skilled supervision on carrying out the collection. There could be a method of estimating the areas with occurrence of NWFP, and dividing these areas for commercial and recreational collection to eliminate conflicts between these two divisional groups of interest.

It will only be in the interest of the people and the companies for the utilisation of NWFP after this change in forest law, because the utilisation of these products is only a question of good organisational planning, collection and supply of these products to the consumers.

## **References**

Sisak, L. 1997. Importance of non-wood forest production in the Czech Republic (Vyznam produkce lesa krome dreva v Ceske republice), *Lesnictvi-Forestry*, 43, (2): 49-66.

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## COLLECTE ET UTILISATION DES PRODUITS FORESTIERS AUTRES QUE LE BOIS DANS LA RÉPUBLIQUE TCHÈQUE : ÉTAT ACTUEL ET POSSIBILITÉS

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### RÉSUMÉ

Les forêts de la République tchèque recèlent différentes espèces de fruits et de plantes médicinales qui peuvent être récoltées. En utilisant seulement le quart ou la moitié environ du rendement biologique des baies à des fins commerciales, pour un volume annuel d'environ 25,8 à 51,6 millions de kg et pour une valeur totale d'environ 39,3 à 78,7 millions de dollars É.-U., on pourrait obtenir des revenus représentant environ le sixième, voire le tiers, des revenus tirés du volume annuel de bois vendu sur le marché. Avant 1989, l'Etat soutenait l'achat et ensuite l'offre de produits forestiers autres que le bois destinés à l'industrie de transformation. Les habitants des campagnes étaient très intéressés par la collecte de ces produits parce qu'elle représentait une petite source de revenus et que cette activité était intégrée à leur travail. L'économie de la République tchèque s'est transformée après 1989 et à cette occasion la structure d'organisation de l'achat et de l'offre de ces produits s'est démantelée. La mutation économique a été défavorable pour le secteur rural, où il est devenu difficile de trouver du travail. En ajoutant la collecte de produits forestiers autres que le bois à leur activité, les ruraux pourraient améliorer leur niveau de vie. La récolte pourrait être organisée par la formation d'associations de cueilleurs qui seraient mises en rapport avec des acheteurs, immédiatement après la récolte ce qui créerait les conditions optimales pour récolter et utiliser les produits de façon professionnelle. Il existe une autre manière d'organiser la récolte : il s'agirait d'intéresser à cette activité les entreprises de foresterie. Ces entreprises pourraient voir dans la collecte des produits forestiers autres que le bois une autre source de revenus et créeraient donc de nouveaux emplois. La constitution d'associations de cueilleurs et la participation à cette activité d'entreprises d'exploitation forestière permettraient une exploitation professionnelle et économique des ressources provenant des produits autres que le bois et permettraient aussi d'abaisser en partie le taux de chômage dans les zones rurales. Il importe de rendre les conditions de cette exploitation plus favorables en apportant certaines modifications à la législation en matière de forêts.

**Mots clefs :** Produits forestiers autres que le bois, fruits des bois, plantes médicinales, organisation, association, collecte, campagne.

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## **НЫНЕШНЕЕ СОСТОЯНИЕ И ВОЗМОЖНОСТИ ЗАГОТОВКИ И ПОСЛЕДУЮЩЕГО ИСПОЛЬЗОВАНИЯ НЕДРЕВЕСНЫХ ЛЕСНЫХ ТОВАРОВ В ЧЕШСКОЙ РЕСПУБЛИКЕ**

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### **РЕЗЮМЕ**

В лесах Чешской Республики можно собирать различные виды лесных плодов и лекарственных растений. Только использование примерно одной четвертой–одной пятой биологического урожая лесных ягод в коммерческих целях (ежегодный объем около 25,8-51,6 млн. кг общей стоимостью около 39,3-78,7 млн. долл. США), может обеспечить выручку, составляющую примерно одну шестую-одну третью ежегодной стоимости лесоматериалов, продаваемых на рынках. До 1989 года государство поддерживало закупку и последующую поставку недревесных лесных товаров предприятиям перерабатывающей промышленности. Жители сельской местности были серьезно заинтересованы в заготовке недревесных лесных товаров, поскольку она являлась для них источником дополнительного дохода. После 1989 года экономика Чешской Республики была преобразована. В результате этого преобразования была разрушена организационная структура закупок и поставки недревесных лесных товаров. Эти преобразования неблагоприятным образом сказались на населении сельских районов, где и раньше возможности трудоустройства были меньшими. Социальные условия жизни сельского населения можно улучшить, если привлечь его к заготовкам недревесных лесных товаров. Эти заготовки можно было бы организовать посредством создания заготовительных ассоциаций и налаживания их связей с потребителями, что позволит создать оптимальные условия для квалифицированного проведения заготовительных работ и поднять доходность этого сектора. Вторая возможность организации заготовок состоит в том, чтобы заинтересовать в этом компании, работающие в лесном секторе. Эти компании могли бы рассматривать недревесные лесные товары в качестве дополнительного источника доходов, что приведет к созданию новых рабочих мест. Создание заготовительных ассоциаций и подключение к заготовкам компаний, работающих в лесном секторе, положительным образом повлияло бы на квалифицированную и экономически выгодную эксплуатацию ресурсов недревесных лесных товаров и позволило бы частично сократить безработицу в сельской местности. Важно создать лучшие условия для такой эксплуатации недревесных лесных товаров путем частичной модификации лесного законодательства Чешской Республики.

**Ключевые слова:** Недревесные лесные товары, лесные плоды, лекарственные растения, организация, ассоциация, заготовка, сельская местность.

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# **IMPROVED TAPPING OF ALMACIGA TREE FOR SUSTAINED RESIN YIELD**

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## **Introduction**

In the Philippines, cutting of almaciga (*Agathis philippinensis* Warb.) for timber and lumber production is banned. Hence the utilization of this species is limited to the resin, known in the world trade as almaciga resin or Manila copal. Almaciga resin is used in the manufacture of varnishes, lacquer, soap, paint, printing inks, linoleum, shoe polish, floor wax, plastic, water proofing materials, paper sizing and many other products. Locally, it is used as incense in religious ceremonies, as fuel, torches, caulking substances and smudge for mosquitoes. Although regarded as a minor forest product, it is one of the country's leading dollar earners. In 1997, the Philippine Forestry Statistics reported that 381,000 kg of almaciga resin valued at US\$303,000 were exported.

There are two kinds of almaciga resin: the ground or fossil resin, and the surface or tapped resin. Fossil resin is the amber-coloured exudation from the roots. It is obtained by digging into the ground where the almaciga once grew. In contrast, surface resin is extracted by tapping a living almaciga tree. It is soft when fresh, but hardens over time as it flows freely and later turns to amber-coloured like the fossil resin. Between the methods, tapping is the easier way to produce Manila copal.

However, traditional methods employed by Filipino tappers to harvest the resin, which include deep tapping, overtapping and frequent rechipping is endangering the industry.

## **Traditional tapping methods**

The more common methods of almaciga tapping in the Philippines are:

- Deep tapping. The cuts are deliberately extended to include sapwood, destroying the vascular cambium responsible for the tree's continuous radial growth and healing of wounds;
- Overtapping. Oversized cuts or too many cuts are made around the tree circumference. The law requires that the distance between cuts around the girth should be twice the length of the tapping cut. Violations result in impaired growth and eventual death of the tree; and
- Frequent rechipping. This introduces impurities into the exuded resin instead of increasing the flow rate. Chips of bark, wood and foreign materials lower the resin grade. Resin must be collected at least every 2 weeks to give ample time for the accumulation of large, easily-removed lumps of hardened resin.

In this study, FPRDI aims to establish guidelines for the proper tapping that will help prolong the life span of almaciga trees thereby maximizing resin production.

## **Materials and Methods**

Various R and D studies have been conducted by FPRDI, including: (a) determination of the effects of four diameter classes (20-30 cm, 40-50 cm, 60-70 cm and 80 cm and above) and sulfuric acid (H<sub>2</sub>SO<sub>4</sub>) at four concentrations (0%, 40% and 60% by volume) on resin production of almaciga trees; (b) survey of improper tapping practices of almaciga resin in the Philippines; and (c) identification of other factors affecting resin production. The investigations were designed primarily to improve the conventional methods of tapping almaciga trees so as to attain sustained yield productivity.

## Results and Discussion

Earlier studies have shown that resin production is affected by:

- **Vigor of the tree.** Vigor is seen in tree size and tree crown density. Since the leaves manufacture the resin, a tree with a heavy, well-proportioned crown produces more resin than one with a sparse crown. Also, a large tree with a bigger bark surface and a heavier crown produces more resin than a smaller tree;
- **Location.** Certain site characteristics presumably influence resin production. Resin production has been observed to be poor in Zamboanga, a province in Mindanao about 826 km south of Manila. In Abra, a province in Luzon, around 325 northwest of Manila, trees at lower elevations produce more resin than trees at higher elevations; and
- **Inherent capacity.** Resin production is also affected by heredity. Given nearly the same tree size and crown density, resin production of trees in the same location has been found to differ.

## Proper Tapping Methods

Owing to the detrimental effects of traditional tapping methods, FPRDI laid down the following guidelines for the proper tapping of almaciga trees. This tapping method was based on the results from the R & D studies FPRDI had conducted: (a) resin yield increased with increasing diameters up to 60 cm, but decreased at higher diameter classes; (b) resin exudation directly increased with increasing acid concentrations up to 50%, but either leveled off or decreased at higher concentrations; and (c) diameter and sulfuric acid acted independently on resin exudation of almaciga trees. The guidelines are:

- Tap only trees with a diameter at breast height of at least 40 cm;
- Remove loose bark, dirt and other foreign materials and lightly scrape the portion to be tapped. Start the first tapping at a point not more than 30 cm above the ground;
- Make a horizontal cut about 2 cm wide and 30 cm long and not beyond the bark, using a razor-sharp broad-bladed bolo or a large knife. Tapping more than twice around the tree circumference is permitted, but the distance between tapped portions should be about 60 cm or twice the length of the cut. While cutting, take utmost care to avoid damaging the cambium;
- Spray a mist of 50% sulfuric acid solution about 6 inches from the cut portion to stimulate resin flow, using one pass of a pint size capacity plastic squeeze sprayer. Since all acid-damaged tissues are removed in rechipping, the right amount of acid prolong the tree's tapping life; and
- After a week when resin exudation stops, a fresh cut may be made immediately above the previous one of the same length but lesser width (0.4 to 1 cm wide). Apply acid as before. Tap vertically upward.

## Conclusions

FPRDI had established guidelines for the proper tapping method of almaciga trees. The application of such guidelines would require a good working knowledge about the basic structure of the stem, nature of resin production, and biological factors in relation to tapping process in order to: (a) prolong the life span of almaciga tree; b) increase production of quality almaciga resin; (c) increase income of tappers; and (d) help in the conservation program of the government.

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# THE ROLE OF RESEARCH IN NTFP MANAGEMENT

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## Introduction

The challenge for forest managers is to combine conservation of forest functions (i.e. biodiversity, watershed protection, erosion control, carbon storage) with improved livelihoods of local people (Ros-Tonen, 1999a). The management of NTFP<sup>9</sup> production and harvesting cannot be seen separately from other forest uses. Contrary to timber harvesting or farming the extraction of NTFP is rarely an exclusive land use. In general it is part of a total livelihood strategy and combined with agricultural or other economic activities (Ros-Tonen et. al, 1995). In fact for local management the distinction between NTFP and timber is rather artificial, as they use all types (and services) from the forest (Schreckenber, 2000).

The role of NTFP production and harvesting in conservation is based on the assumption that the collection of fruits or tapping latex is less damaging than felling trees. NTFP were therefore considered as a low impact forest use compatible with forest conservation. On the other hand NTFP constitute an important component of many subsistence farming systems (van Dijk, 1999; Hartog & Wiersum, 2000). The FAO estimated that 80% of the population of developing countries use NTFP to meet their needs in health and nutrition (FAO, 1997).

NTFP are a rapidly growing market sector with a total value in world trade of US\$1,100 million. (Elevitch and Wilkinson, 2000). In some cases the value of NTFP trade is higher than that generated by commercial timber exploitation (CERUT, 1999). Although being potentially beneficial for local livelihood at the short term this commercial extraction of NTFP is not always sustainable. Ample evidence of over-harvesting of NTFP is given by numerous examples in literature. Even in the beginning of NTFP research over-harvesting of NTFP resources like rattan was reported (de Beer and McDermott, 1989). Ros-Tonen (1999b) concludes that the larger the market for a NTFP, the higher becomes its value and the greater the danger of overexploitation. Only products which can be harvested without killing the individual plant or animal, which are abundant, or which regenerate easily offer good prospects for sustainable management. Examples of NTFP with a potential for sustainable production and harvesting are Brazil nut (*Bertholletia excelsa*) in Brazil and Bolivia (Assies, 1997) and palm heart from multi-stemmed species like *Euterpe oleracea* in Guyana (van Andel et. al, 1998).

## Management options

Management needs to consider both the conservation of forest functions on the long term as the quality of local livelihood. To explore the suitability of NTFP production and harvesting with other forest uses different management options are to be considered.

### ❖ *Develop sustainable harvesting methods*

*'Sustainable forest management is the process of managing permanent forest land to achieve one or more clearly specified objectives of management with regards to the production of a continuous flow of desired forest products and services without undue reduction of its inherent values and future productivity and without undue undesirable effects on the physical and social environment'* (ITTO definition in Lammerts van Bueren and Blom, 1997).

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<sup>9</sup> NTFP (Non Timber Forest Product) are defined as all tangible forest products other than industrial wood which can be collected from forests for subsistence as well as for trade (after Ros-Tonen et al, 1995).

In order to develop sustainable harvesting methods a number of key-ecological questions has to be answered (e.g. phenology, ecology, reproduction biology) in order to determine best harvesting practices, species and best suiting areas. The determination of a sustainable harvesting level depends on information on volume and reproduction. The lack of NTFP resource assessment methodologies in the tropics hampers the determination of such sustainable harvesting levels. NTFP resource assessment in tropical regions is relatively new and received little scientific attention, consequently only local methodologies have been developed by individual researchers. Some of these methods incorporate existing local knowledge with inventory methods from wildlife management, horticulture and other disciplines. An extensive literature survey by Jenny Wong (2000) showed that only a limited extent of these methods is scientifically sound. On the other hand the existing scientific inventory methods are not easily adjustable to local circumstances and are not easily understood and interpreted by local management. Therefore research should relinquish the need for inventory methods, which include traditional knowledge as well as some extent of scientifically rigour.

#### ❖ *Develop human modified vegetation types*

The distinction between natural and human modified forest systems is described as a gliding scale, characterised by an increase in human labour per unit of forest land and intensified human intervention on the reproductive biology of the desired species to gain a higher density and better access to the product (Wiersum, 1999).

Numerous interventions can be applied in various intensities and at different level. At the species level one has to consider yield raising methods and techniques such as semi-natural selection or domestication of the specific species. At the system level not a single species but also the surrounding ecosystem is adapted to the production and harvesting of a specific species. Farming or plantations are considered the most intensive management systems.

Some forestry systems try to combine the features of natural forests and domesticated products. One such system is 'Analogue Forestry'. Analogue Forestry is a system of complex agro-forestry that encourages farmers to mimic the structure and ecological functions of the local natural forest ecosystem using species that provide them with a range of products for personal consumption or sale in the marketplace. Farmers benefit from the diversity of products that they harvest while also restoring the natural environment and supporting key ecological processes like soil retention and water purification (Senanayake & Jack, 1998). Such systems seem promising and are in needs of more scientific attention to fully investigate their potential contribution to sustainable forest management, conservation of natural resources and improvement of local livelihood.

#### ❖ *Develop new market opportunities*

The chance of a specific product to succeed in new commercial markets has to be studied in market viability studies. Studying the commercial potential of a specific (set of) NTFP has to take into account some considerations. The focus on developing market outlets for NTFPs needs to be kept in balance with consideration of the huge and usually very important continuing use of NTFPs to meet subsistence needs (Arnold & Ruiz Pérez, 1998). Some other considerations are the sustainability of the production, closely related to the continuity of production flow, the impact on socio-economic structures of the community, and the position of the NTFP in relation to similar (NTFP) products. For the latter a classification of NTFP based on supply and demand characteristics, the driving market mechanisms, is to be considered (see box 1).

Forest product certification seeks to link trade in forest products to the sustainable management of forest resources, and is therefore an important marketing tool for management to consider. Certified products enter different markets with other opportunities compared to the traditional, non-certified, trade markets. The three main certification schemes, Forest Stewardship Council (FSC, Sustainable Forest Management), International Federation of Organic Agricultural Movements (IFOAM, biological control) and Fairtrade Labelling Organisation (FLO, Fair Trade), are still highly inconsistent and urgently need closer co-operation. Some products, like shade coffee and chicle in Mexico and palm heart in Brazil, have already been certified by different certification schemes (Mallet, 2000).

**Box 1: provisional categorisation of NTFP according to management characteristics (Wiersum, 1999)**

<b>Supply characteristics</b>	
1.	<b>Production characteristics</b> - Degree of ecological sustainability of extraction - Ease of vegetative or regenerative production - Ease of cultivation under different environmental conditions - Ease of stimulating production by technological means
2.	<b>Organisation of production</b> - Access to NTFP resources - Gender division of production responsibilities
<b>Demand characteristics</b>	
1.	Opportunistic collected products for subsistence consumption not related to main household needs (e.g. snack fruits)
2.	Occasionally collected products purposely collected in times of emergency (e.g. medicinal products, emergency foods during droughts)
3.	<b>Products for regular household consumption</b> - Easy to substitute with products of other species (e.g. various food products, fodder, fuelwood) - Difficult to substitute with products from other species (e.g. preferred forest foods)
4.	<b>Products for sale at various market types (local, regional/national, international)</b> - High degree of competition with substitutes - Low degree of competition with substitutes (e.g. certain medicinal products, gums, resins)
5.	Products demanded in manufactured forms, and which can be locally produced giving them added value (e.g. palm sugar, liquors)

**Research needs**

The management options mentioned above are to be based on and supported by sound scientific data. Ros-Tonen (1999a) divides NTFP research into two categories based on the primary objective, i.e. forest oriented and people-oriented research. The forest oriented approach focuses on the development of an ecologically sustainable extraction system, while the people oriented approach focuses both on the recovery of local knowledge and its application in participatory management, and to improve people's livelihood. Combining the threefold division with the research needs derived from the management options mentioned above results into the following schedule:

<b>Forest-oriented approach</b> <i>Forest conservation</i>	<b>People oriented approach</b>	
	<i>Participatory management</i>	<i>Improved livelihoods</i>
<ul style="list-style-type: none"> <li>Supply scientific basis, with scientific data on key ecological functions like phenology and reproductive biology, to develop sustainable harvesting methods and levels;</li> <li>Develop tools to monitor the sustainability of the extraction at species and ecosystem level.</li> <li>Point out the role of NTFP extraction as a suitable and compatible land use option in land use planning and forest management planning.</li> </ul>	<ul style="list-style-type: none"> <li>Develop participatory management models taking into account traditional/local knowledge and ensuring a broad support for management;</li> <li>Hence, science should take into account that all management tools are to be applied and understood by local management.</li> </ul>	<ul style="list-style-type: none"> <li>Develop market viability studies and closely related market monitoring tools for specific NTFP products to be applied by local management;</li> <li>Access the role of NTFP certification as a marketing tool in (international) trade and provide scientific support for certification like objective indicators (Viana et al, 1995);</li> <li>Study the potentials of domestication of commercial attractive forest products and their integration into silvo-/ agro-forestry systems;</li> <li>Develop yield raising methods and techniques;</li> <li>Provide insight into land tenure and property and access rights;</li> <li>Provide insight into the socio-economic dynamics of NTFP extraction both for subsistence and commercial extraction.</li> </ul>

The dashed lines indicate that the data are not limited to a specific objective but are strongly interrelated and mutually reinforcing. This schedule of research needs makes clear that there is a challenge ahead for continued collaborative NTFP research for the benefit of tropical; rain forest conservation and the people who depend on them for their livelihood. It is difficult to make any kind of prioritisation as all aspects are important to come to a NTFP production harvesting system contributing to the conservation of forest and the quality of local livelihood.

## Literature

- Andel, T.R. van, Huyskerns, P and Broker, K. (1998). *Palm heart harvesting in Guyana's North West District: exploitation and regeneration of Euterpe oleraceae swamps*. The Tropenbos-Guyana Report 98-1, Tropenbos Guyana Programme, Georgetown, Guyana
- Arnold, J.E.M. and Ruiz Pérez, M. (1998). The role of non timber forest products in conservation and development. In: *Incomes from the forest. Methods for the development and conservation of forest products for local communities*. By Wollenberg and Ingles (Eds.). CIFOR, Bogor, Indonesia.
- Assies, W. (1997). *Going nuts for the rainforest Non-timber forest products, forest conservation and sustainability in Amazonia*. Thela Latin American Series, Thela Publishers, Amsterdam, the Netherlands.
- Beer, J.J. de and McDermott, M.J. (1989). *The economic value of non-timber forest products in Southeast Asia*. Netherlands Committee for IUCN, Amsterdam, the Netherlands.
- CERUT (1999). *The wealth of forest in Cameroon – results of field testing a methodology for the valuation of non-timber forest products in Northwest and Southwest Cameroon*. Aidenvironment, Amsterdam, the Netherlands.
- Dijk, J.F.W. van (1999). *Non-timber forest products in the Bipindi-Akom II region, Cameroon. A socio-economic and ecological assessment*. Tropenbos Cameroon Series 1. Tropenbos-Cameroon, Kribi, Cameroon.
- Elevitch, C. and Wilkinson, K. (2000). Non timber forest products enterprises. *The Overstory* #55. Permanent Agriculture Resources, Holualoa, USA
- FAO (1997). *State of the World's Forests 1997*. FAO, Rome, Italy.
- Hartog, W.H. den & Wiersum, K.F. (2000). Timur (*Zanthoxylum armatum*) production in Nepal. Dynamics in Nontimber forest resource management. *Mountain Research and Development* 20 (2): 136-145.
- Lammerts van Buren, E.M. and Blom, E.M. (1997). *Hierarchical framework for the formulation of sustainable forest management standards*. The Tropenbos Foundation, Wageningen, the Netherlands.
- Mallet, P. (2000). *Certification of non-timber forest products. The state of the playing field*. Falls Brook Centre, Canada. Internet: [www.web.net/fbcja/programs/certmark/ntfp/ntfp.htm](http://www.web.net/fbcja/programs/certmark/ntfp/ntfp.htm) accessed 26-7-2000.
- Ros-Tonen, M.A.F., Lammerts van Bueren, E.M. and Dijkman, W. (1995). *Commercial and sustainable extraction of non-timber forest products. Towards a policy and management oriented research strategy*. The Tropenbos Foundation, Wageningen, the Netherlands.
- Ros-Tonen, M.A.F. (1999a). Refining concepts, objectives and research questions for NTFP research. In: Tropenbos (1999). *NTFP research in the Tropenbos programme: results and perspectives*. Tropenbos Foundation, Wageningen, the Netherlands.
- Ros-Tonen, M.A.F. (1999b). Introduction: NTFP research in the Tropenbos programme. In: Tropenbos (1999). *NTFP research in the Tropenbos programme: results and perspectives*. Tropenbos Foundation, Wageningen, the Netherlands.
- Schreckenber, K. (2000). *Participatory non-timber forest product inventory in rural development forestry*. Paper prepared for the ETFRN workshop on 'Developing needs-based inventory methods for non-timber forest products', 4-5 May 2000, FAO, Rome.
- Senanayake, R. and Jack, J. (1998). *Analogue forestry: An introduction*. Monash publications in geography and environmental science 49. Monash University, Melbourne, Australia.
- Viana, V.M., Ervin, J., Donovan, R.Z., Elliot, C. and Gholz, H. (1995). *Certification of forest products. Issues and perspectives*. Island Press, Washington DC, USA.
- Wiersum, K.F. (1999). Understanding diversity in NTFP management: a neglected issue in NTFP research. In: Tropenbos (1999). *NTFP research in the Tropenbos programme: results and perspectives*. Tropenbos Foundation, Wageningen, the Netherlands.
- Wong, J. (2000). Developing needs-based inventory methods for non-timber forest products. Application and development of current research to identify practical solutions for developing countries. Paper prepared for the ETFRN workshop on 'Developing needs-based inventory methods for non-timber forest products', 4-5 May 2000, FAO, Rome.

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## SUSTAINABLE USE OF MEDICINAL PLANTS - A MULTI-SECTORAL CHALLENGE AND OPPORTUNITY

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Wild plants have been an important component of healthcare throughout human history. Medicinal plants continue to make important contributions to healthcare and livelihoods, and were recently identified by FAO as being among the most valuable non-wood forest products (FAO, 1999). Unfortunately, harvests to meet the demand for a growing number of medicinal species are in many cases exceeding sustainable levels. Wild medicinal plant populations and the benefits derived therefrom are coming under threat as a result. More effective co-operation among the variety of institutions concerned with the use and trade of medicinal plants, including those from the healthcare, conservation, development and commercial sectors, is required to ensure the conservation of biodiversity and continued availability of medicinal resources.

### *Medicinal Plants and Health*

Medicinal plants underpin healthcare practices across the globe. Much of the world's population depends on traditional medicine to meet daily health requirements, especially within developing countries. Traditional medicine in turn relies heavily on medicinal plants. Reliance on natural medicinal resources can be attributed to cultural preferences as well as to the high cost and inaccessibility of western medicine. Use of plant-based remedies is also widespread in many industrialised countries. Herbal remedies are made directly from plant materials, and numerous pharmaceutical products are based on or derived from plant compounds. Similarly, cosmetics and other household products may contain plants of medicinal or therapeutic value. The use of medicinal plants for healthcare is believed to be increasing throughout much of the world, e.g. in Africa (Cunningham, 1993; Marshall, 1998), China (He and Sheng, 1997), Europe (Lange, 1998) and North America (Brevoort, 1998).

### *Commercial Trade in Medicinal Plants*

The large and growing demand for plant-based medicines and changing population patterns have prompted a growing domestic and international trade in medicinal plants. The following information from Lange (1997, 1998) gives an indication of the scale of the trade.

According to Customs data, approximately 440 000 t of medicinal and aromatic plants were traded internationally in 1996, with a reported value of USD1.3 billion. Hong Kong, Japan and Germany were the largest importers during 1994 and 1995, the United States being the third largest importer overall during the period 1992 to 1996. Approximately 60% of imports into Germany in 1996 originated from non-European countries, with exports from Asia dominating the trade, followed by exports from Africa. China was also by far the largest exporter of medicinal and aromatic plants to world markets during the mid-1990s, with average exports topping 140 000 t from 1992 to 1996. The second largest exporter was India, with export volumes averaging approximately 36 000 t during this period.

A wide diversity of medicinal plant species are used and traded for medicinal purposes. A recent TRAFFIC 1 study of the European medicinal plant trade (Lange, 1998) estimates that over 2000 medicinal and aromatic plant species are used commercially in Europe, of which 1200 to 1300 are native. Approximately 90% of the European species are collected from the wild, with eastern Europe and the Mediterranean regions being the main suppliers (Lange, 1998). In India it has been estimated that approximately 7500 species are used for medicinal and veterinary purposes (Uniyal *et al.*, 2000). Over 10,000 species are used medicinally in China (He and Cheng, 1991), with 1,000 species commonly used in medicinal preparations, of which 80% are wild-collected (He and Sheng, 1997).

Harvest of medicinal plants to supply domestic and foreign markets provides an important source of

cash income in many countries. In Nepal, for example, Olsen (1998, cited in Olsen, 1999) has estimated that 470 000 households are engaged in commercial collection of medicinal plants. Several publications in the FAO Non-Wood Forest Product Series have drawn attention to the current and potential role of medicinal plants in economic development (e.g. see FAO, 1995; FAO, 1997).

### *Declines in medicinal plant populations*

There is growing evidence that the populations of many medicinal plant species are declining in the wild. These declines are the result of several factors, key among them being habitat degradation and expanding harvests. TRAFFIC's study of the European medicinal plant trade identified approximately 150 European species reported to be threatened in at least one European country (Lange, 1998); a TRAFFIC study in East/Southern Africa identified approximately 100 species of conservation concern in one or more countries (Marshall, 1998). Reviews of the status of medicinal plant species according to the 'Red List' (threat) criteria of IUCN-The World Conservation Union in three regions of India identified approximately 70 species considered at risk (Anon., 1998). Fourteen species have been included in the Appendices of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) owing to concern that they might be threatened unless international trade is subject to specific controls.

### *Sustainable Use of Medicinal Plants: A Multi-Sectoral Challenge and Opportunity*

A variety of individuals and institutions have an interest in securing the future of medicinal plant species both because of the direct benefits they provide and in the wider context of biodiversity conservation. These range from local collectors, healers and communities to national governments, multi-national corporations, non-governmental organisations and international treaty bodies. Areas of concern include the role of medicinal plants in healthcare (both local and national) and development, biodiversity conservation, the use of traditional knowledge, intellectual property rights and benefit sharing, marketing and trade.

Individuals acting within different sectors are frequently unaware of the shared and/or conflicting interests and motivations of other sectors. In some cases, this can lead to different sectors unnecessarily working at cross-purposes. For example, government agencies charged with species conservation may be unaware of the importance accorded medicinal plants by health agencies. Similarly, health agencies may be unaware of the status of certain species in the wild. The former may seek to restrict use and trade of specific species, while the latter seeks to expand it.

In many cases, the long-term interests sought by different sectors might be better served through increased information sharing, dialogue and cooperation. For example, efforts to promote commercial trade of medicinal plants as a basis for economic development would benefit from greater knowledge of species biology and market dynamics. Efforts to ensure the conservation of medicinal plant species and their availability for healthcare would similarly benefit from such knowledge. Policies intended to support these and/or other objectives similarly seem more likely to succeed if the full range of stakeholder perspectives and interests are understood and taken into account.

The need for more effective cross-sector collaboration to address medicinal plant conservation issues was first brought to world attention by the *International Consultation on the Conservation of Medicinal Plants*, convened by the World Wide Fund for Nature (WWF), IUCN and the World Health Organisation in Chiang Mai, Thailand, in 1988. This message was reiterated a decade later during the international conference *Medicinal Plants for Survival*, hosted by the Foundation for Revitalization of Local Health Traditions in Bangalore, India in 1998. More recently, 20 participants at the symposium *Medicinal Utilisation of Wild Species* signed a 'Joint Declaration for the Health of People and Nature', which emphasises the need to address conservation concerns in a multi-disciplinary and collaborative manner. Signatories include representatives of the phytopharmaceutical industry, practitioners' associations and conservation organisations. The depository for the Joint Declaration is WWF Germany, who organised the symposium with TRAFFIC Europe - Germany, and, who, with TRAFFIC, is working to encourage and monitor the Declaration's transformation from words into actions.

These and other initiatives indicate the potential for more and more effective cooperation among individuals and institutions concerned with the use, trade and conservation of medicinal plants. Additional effort needs to be invested in putting these good intentions into practice in order to secure the future of medicinal plant populations and the benefits they provide.

#### References:

Anon. (1998). Report of BCPP, Conservation Assessment and management Plant (CAMP) Workshop on selected medicinal plants of northern, northeastern and central India.

Brevoort, P. (1998). The booming U.S. botanical market: A new overview. *HerbalGram* 44: 33-45.

Cunningham, A.B. (1993). *African Medicinal Plants: Setting Priorities at the Interface Between Conservation and Primary Healthcare*. UNESCO, Paris, France.

Cunningham, A.B. (1993). *African Medicinal Plants: Setting Priorities at the Interface Between Conservation and Primary Healthcare*. UNESCO, Paris, France.

FAO. (1995). *Non-wood Forest Products for Rural Income and Sustainable Forestry*. FAO, Rome, Italy.

FAO. (1997). *Medicinal Plants for Forest Conservation and Healthcare*. FAO, Rome, Italy.

FAO. (1999). *State of the World's Forests 1999*. FAO, Rome, Italy.

He, S.A. and Sheng, N. (1997). Utilization and conservation of medicinal plants in China with special reference to *Atractylodes lancea*. In: FAO. (1997). *Medicinal Plants for Forest Conservation and Healthcare*. FAO, Rome, Italy.

He, S.A. and Cheng, Z.M. (1991). The role of Chinese botanical gardens in conservation of medicinal plants. In: Akerele, OI, Heywood, V. and Synge, H. (eds.) (1991). *The Conservation of Medicinal Plants*. WHO, IUCN-The World Conservation Union and WWF, Geneva and Gland, Switzerland.

He, S.A. and Sheng, H. (1997). Utilization and conservation of medicinal plants in China with special reference to *Atractylodes lancea*. In: FAO. (1997). *Medicinal Plants for Forest Conservation and Healthcare*. FAO, Rome, Italy.

Lange, D., (1997). Trade in plant material for medicinal and other purposes: A German case study. *TRAFFIC Bulletin* 17(1): 20-32.

Lange, D. (1998). *Europe's Medicinal and Aromatic Plants: Their Use, Trade and Conservation*. TRAFFIC International, Cambridge, United Kingdom.

Marshall, N.T. (1998). *Searching for a Cure: Conservation of Medicinal Wildlife Resources in East and Southern Africa*. TRAFFIC International, Cambridge, United Kingdom.

Olsen, C.S. (1998). The trade in medicinal plants from Nepal. Theme paper presented at the International Conference on Medicinal Plants, Bangalore, India, 16-19 February 1998.

Olsen, C.S. (1999). CITES Appendix II re-visited: Is the listing of *Nardostachys grandiflora* and *Picrorhiza kurrooa* appropriate? *Medicinal Plant Conservation* 5: 8-10.

Uniyal, R.C., Uniyal, M.R. and Jain, P. (2000). *Cultivation of Medicinal Plants in India: A Reference Book*. TRAFFIC India, Delhi, India.

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<sup>1</sup> TRAFFIC is the joint wildlife trade monitoring programme of WWF – World Wide Fund for Nature and IUCN-The World

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Conservation Union. TRAFFIC has grown from a single office when it was first formed in 1976 to a worldwide network with staff based in 22 countries and a coordinating office in Cambridge, UK. TRAFFIC's aim is to ensure that trade in wild plants and animals is not a threat to the conservation of nature. Additional information regarding TRAFFIC's work can be found on TRAFFIC's website ([www.traffic.org](http://www.traffic.org)) or by sending a request to TRAFFIC (219c Huntingdon Road, Cambridge CB3 0DL, United Kingdom; email: [traffic@trafficint.org](mailto:traffic@trafficint.org)).

## **FAO'S NON-WOOD FOREST PRODUCTS PROGRAMME**

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FAO's Non-Wood Forest Products (NWFP) Programme aims to be a "Centre of excellence in information sharing" to improve the utilisation of NWFP as a contribution to sustainable forest management, to the conservation of their biological diversity, and to better food security. Programme activities are implemented through four main areas of intervention: (i) gathering, analysis and dissemination of key technical information on NWFP; (ii) full appraisal of the socio-economic contribution of NWFP to sustainable development; (iii) improved networking among individuals and organisations dealing with NWFP; and (iv) technical assistance on NWFP issues to FAO member countries.

Non-Wood Forest Products and similar terms, like "minor", "secondary", and "non-timber" forest products, have emerged as umbrella expressions for the vast array of both animal and plant products other than wood (or timber) derived from forests or forest tree species. An estimated 80 percent of the population of the developing world uses NWFP to meet some of their health and nutritional needs. Several million households world-wide depend heavily on these products for subsistence consumption and/or income. NWFP are also used in many village level artisanal and craft activities. Some NWFP undergo large-scale industrial processing for products such as additives for foods and beverages (gum arabic), flavourings and perfumes (essential oils), medicines, and paints or polishes (resins). Presently, at least 150 NWFP are significant in terms of international trade. Most of these are exported in raw or semi-processed form. While most are traded in rather small quantities, some products do reach substantial levels, such as gum arabic, rattan, cork, wild honey, forest nuts and mushrooms.

Gathering, analysis and dissemination of key technical information on NWFP is provided through preparing reviews on specific categories of NWFP and/or on important topics for their development and which are published in the Non-Wood Forest Products Series or in other FAO publications. Examples of titles published on products include: Flavours and fragrances, Pine resins, Edible Nuts, Natural colourants and dyestuffs, Tropical palms; and on issues: NWFP for rural income and sustainable forestry, Domestication and commercialization of NWFP, Medicinal plants for forest conservation and health care, NWFP of Central Africa: Current research issues and prospects for conservation and development.

A comprehensive database including production and trade data at the country level on major NWFP, complemented with other descriptive information on the NWFP resource base, products and their users is in elaboration for countries in Africa, Latin America, Asia and the Pacific. This activity also includes clarification and research to improve currently used definitions, concepts and related terminology. The aim is to provide validated information leading towards a more accurate appraisal of their true socio-economic contribution to sustainable development and effective guidance for policy formulation governing the NWFP sector. FAO member countries are in need of such information in order to promote a sustainable and equitable utilization of NWFP for poverty alleviation.

Improved networking among organisations and individuals working in the field of NWFP is facilitated by the programme through its annual news bulletin, *Non-Wood News*; its webpage as a gateway of information and contacts on NWFP; and by organizing international expert meetings to strengthen collaboration and partnerships on NWFP issues at the national, regional and global levels.

The NWFP programme also provides technical assistance to FAO member countries, such as: technical advice to (FAO) field projects on NWFP related issues; Project identification, evaluation and monitoring; and Identification of donors for project funding.

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# TRADE IN WILD MEDICINAL PLANTS AND BULBOUS PLANTS OF TURKEY AND THE INVOLVEMENT OF LOCAL PEOPLE

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## Summary

Forests are the most important habitat for living creatures on earth as they are home to a third of all living species. They are useful for regulating climate, holding and storing water, slowing down the increasing carbon dioxide in the atmosphere and their timber is very important for economic development. In addition to these, they contain both medicinal and horticultural plants. I would like to discuss two examples of non-wood forest products - Medicinal and Bulbous Plants - which are harvested by local people from the forests in order to generate income in Turkey.

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## A Study on the Conservation of Medicinal Plants in Turkey:

There was a study carried out on medicinal plant trade in Turkey throughout 1996 and 97. It was a joint project between The Society for the Protection of Nature (DHKD), Istanbul University (Department of Pharmaceutical Botany) and Ankara University (Department of Pharmaceutical Botany). These three partners joined forces to identify which wild plants are used for medicinal purposes and which of these plants are threatened and how they can be protected.

In brief, generally the medicinal plants are collected by local villagers, mainly from forests and mountain habitats across Turkey. Basic drying and sorting takes place within the village before the materials are collected by village middlemen, who sell to town middlemen who in turn sell to the wholesale trader. They include both export and internal traders.

The income generated from the wild collection of medicinal plants is considerably important to village populations, particularly since many individuals involved in collection do not have any full time employment. Remarkably, the income generated from non-timber forest products, including medicinal plants, is equal to or more in value than timber products.

Turkey has the largest flora of any European or Mediterranean country and consequently the largest number of medicinal plants. The survey uncovered some 346 taxa of wild native plants in commercial trade. The trade is divided into two categories:

a) Internal trade: The two principle uses of medicinal plants used within Turkey are as i) herbal teas (particularly genera within the family Labiatae such as *Salvia*, *Sideritis* and *Stachys* and ii) a raw material in the production of Helva, utilising the roots of perennial species of *Ankyropetalum* and *Gypsophila* (both Caryophyllaceae).

b) Foreign trade: Turkey exports approximately 28,000 tonnes of medicinal and aromatic plants per annum, generating nearly 50 million dollars of foreign currency from the trade per year. Turkey accordingly earns 20 times more income from trade in medicinal and aromatic plants than bulbous plants marketed for horticultural purposes. Using data from Lange & Schippmann (1997) this indicates that Turkey is the third largest exporter of medicinal plants of wild origin of any country on earth after China and India.

The ten most-threatened plant species have been determined from the listing of the top 50 most-

endangered taxa using the IUCN criteria.

It is impossible to talk seriously about conservation and sustainable use of species and habitats without also considering local and national economies, trade and communities.

A number of local and regional examples introduced to encourage the sustainable use and cultivation of medicinal plants include the following:

Since 1990, education courses promoting the artificial propagation and cultivation of medicinal plants have been undertaken by the Ministry of Agriculture and Rural Affairs, in conjunction with the Aegean Agricultural Research Institute. Targetted species include *Origanum onites*, *Capparis spinosa* and *Melissa officinalis*;

The wild collection of Oregano is strictly regulated by the regional Forestry Directorate in Sütçüler of the region of Isparta. This directorate identifies places for annual collection, sets prices and collection dates, and prepares relevant contracts and other paperwork.

- i. As a result of the joint DHKD project, various suggestions and activities have been made, including:
- ii. further research;
- iii. regulatory policies, legislation and monitoring;
- iv. identification and designation of protected areas;
- v. artificial propagation and cultivation; and
- vi. education and public awareness.

The idea of growing medicinal plants for conservation and development should be adopted all over the world. To sustain the use of wild stock, cultivation of the plants helps remove pressure from wild habitats. It also has health benefits, as it enables a higher degree of standardization. Furthermore, cultivation makes it easier to avoid mistakes in identification and combats adulteration.

Cultivation of medicinal plants will provide money as well as health care in developing countries such as Turkey. In addition to this, it lends the opportunity to develop local processing industries.

### **The Indigeneous Propagation Project of Threatened Turkish Bulbs**

Turkish bulbs have been collected from the wild since the late 1800's to feed the demand coming from the international flower industry. This collection of wild bulbs for commerce exceeded 60 million per year in 1980's. This was far from a sustainable level. According to various observations (e.g. by collectors and scientists in situ) the natural population size of wild bulbs has decreased over the last 40 years. Nature conservationist and many scientists have become concerned about the level of collection. DHKD (The Society for the Protection of Nature) and FFI (Fauna & Flora International) have joined forces to relieve the pressure from the over-collection of wild populations of flower bulbs through the development of a village-based propagation scheme at the pilot site, and changing the bulb trade. The latter is being carried out by replacing bulbs collected from unsustainable wild populations to sustainable or cultivated sources by lobbying for the implementation of related national and international laws.

Throughout the course of the project, a project site was established where bulb propagation is undertaken at the village level. Since the start of the project, around 150 families have been involved with the bulb propagation in the Taurus Mountains. The methodology is as follows:

- i. Planting material has been loaned by export companies, namely by MARLA A.i. in Yalova;
- ii. Bulbs are harvested on a 3-4 year rotation with daughter bulbs being replaced and plants being allowed to seed prior to harvest;
- iii. Harvested bulbs are sold to the exporters;
- iv. Their sale to retailers in the UK is arranged and monitored by FFI.

Since the first harvest took place in 1996, a harvest festival is organised every year in the village to

draw public attention to bulb propagation.

Nature conservation is becoming more and more important every day due to the rapid rate of population increase, unsustainable collection from the wild and habitat destruction. Everyone-governments, non-governmental organisations, businesses and individuals-should be concerned about the future of wild species and their natural habitats as well as their future. As the most powerful creature on earth, we should be aware of the extinction of wild species and the rapid decline of natural resources in the near future. The improvement of our health and economic conditions directly depends on the sustainable use of natural resources and nature conservation.

### References:

- Özhatay, N. et al. (1997). *The Wild Medicinal Plant Trade in Turkey*. The Society for the Protection of Nature (DHKD), Istanbul.
- Atay, S. (1996). *Guide for Introduction and Propagation of Turkish Bulbous Plants on Export List*. The Society for the Protection of Nature (DHKD), Istanbul. ISBN 975-96081-1-1.

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## COMMERCE DES PLANTES MÉDICINALES ET DES PLANTES BULBEUSES SAUVAGES DE TURQUIE ET PARTICIPATION DE LA POPULATION LOCALE

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### RÉSUMÉ

La forêt est l'habitat le plus important des créatures vivantes sur terre puisqu'elle abrite un tiers des espèces vivantes. Les forêts jouent un rôle dans la régulation du climat, pour retenir l'eau et ralentir l'augmentation du dioxyde de carbone dans l'atmosphère, et le bois revêt une grande importance pour le développement économique. De plus, les forêts recèlent des plantes d'intérêt médical et horticole. Le propos du document est d'examiner deux exemples de produits forestiers autres que le bois - les plantes médicinales et les plantes bulbeuses - qui sont récoltés par la population locale dans les forêts afin d'en tirer un revenu.

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## ТОРГОВЛЯ ДИКИМИ ЛЕКАРСТВЕННЫМИ И ЛУКОВИЧНЫМИ РАСТЕНИЯМИ В ТУРЦИИ И УЧАСТИЕ МЕСТНОГО НАСЕЛЕНИЯ

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### РЕЗЮМЕ

Леса представляют собой важнейшую жизненную среду для живых организмов на Земле, поскольку в них обитает третья часть таких организмов. Они играют полезную роль, регулируя климат, удерживая и сохраняя воды, сокращая концентрацию в атмосфере двуокиси углерода, а лесоматериалы крайне важны для экономического развития. Кроме того, в них произрастают как лекарственные, так и плодовые растения. В докладе рассматриваются два вида недревесных лесных товаров – лекарственные и луковичные растения, – которые в Турции заготавливаются местными жителями в лесах в целях получения доходов.

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# **HARVESTING OF NON-WOOD FOREST PRODUCTS IN THE TROPICS - NIGERIA AS A CASE STUDY**

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## **Abstract**

Nigeria covers an area of 983 213 km<sup>2</sup> of which 360 000 km<sup>2</sup> are classified as forest (FAO, 1979), out of these, there is a high forest reserves of about 18 688 km<sup>2</sup> owned by the government, though most of these reserves are under exploitation or have been leased to concessionaires, who hold exclusive felling rights on them.

There is also a large area about 66 560 km<sup>2</sup> of Savannah Forest Reserves in which useable but scattered quantities of timbers occur. In addition to these, there are vast areas of forest land outside the reserves in which large quantities of timber are available and which are not under strict control of the government as the reserves.

About 50% of total volume of timber produced in Nigeria and most developing countries are abstained from the less controlled area, Nigeria forest remarkably contains a large varieties of the species in these forest, over 100 are useable even though less than 30 (the so-called commercial species) have been introduced to world market.

Felling of trees from the reserves is strictly controlled while outside the reserves they are not controlled at all. All these above stated fact plainly shows that even in government reserves where there is harvesting control it is only targeted at wood forest product are considered insignificant and its harvesting is no consideration in the government plan of action on the forest.

This negligence coupled with the state of economy in most of the developing countries made it easy for the people to freely invade the forest to harvest non-wood forest products such as leaves' barks, roots without any hindrance, even if not of late that the government started restricting hunting wild animals in government protected reserves.

The manner and the methods of harvesting these non-woods forest products by the people are most of the time using crude and affect immensely the growth and the yield of the wood forest products itself, one of some natural forest, they are cases where such harvesting method and duration have caused the deforestation of such forest reserves.

Therefore, the people must be educated on best method and manners of harvesting non-wood forest product in a way that will not have a negative effect of the state of the forest and its wood forest products either in government forest reserves and natural forest estates.

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## **Forest Resource in Nigeria**

From time immemorial, forest and forest products have been playing a very significant role in any nations economy, mostly developing countries of the world, Nigeria included, despite the fact that forest and its resources are poorly priced in Nigeria market, the importance of the products can not be over emphasized.

Forest products can be broadly divided into wood and non-wood product in Nigeria it is commonly refer to as major and minor forest products. Major (wood) forest products includes products Timber, pole,

plywood, veneers and charcoal etc while minor (non-wood) forest product include products such as dye, tanning, gums, canes, herbs etc.

Forest products whether major or minor is the backbone of most industries directly or indirectly in Nigeria, apart from industrial uses, the basic necessity of living are food, cloth and shelter, this necessity directly or indirectly originates from the forest.

In Nigeria, there is a greater concentration on the word forest product, this can be easily identify in it be titled as major forest product. The government of the country also based its forestry plan and management principles mainly on this major forest product.

In most government reserves establishment to produce timber for local and international needs little attention are paid to other minor forest products, even in some cases the public are less control in entering government forest reserves to harvest minor forest such as tree leaves, barks and root.

Due to disparity in the economy of the state and that of the citizenry, each have different perspective on type of forest resources being harvested, the government and very few rich people in the society involve themselves in timber harvest leaving other non-timber products to the ordinary citizen of the country.

### **Forest History in Nigeria**

Nigeria covers an area of 983,213km<sup>2</sup> of which 360,000km<sup>2</sup> are classified as forest (FAO, 1979). This said of forest is continually diminishing due to conversion into Agricultural uses, urbanization and establishment of industries.

In other to prevent total depletion of the forest resources In the future, 10% Nigeria total land surface has been set aside as forest reserve (FDF, 1985). The Savanna reserved forest covers an area of 75,279km<sup>2</sup> due to its importance for wildlife and forage resources.

Since the inception of forestry in Nigeria in 1960s, estimates available show that up to and including the 1980 planting season, over 135,000ha of plantations had been established in the high forest and savanna zones of Nigeria (Allen and Shimce, 1981). The second National Development Plan 1970 - 1974 gave strong support to intensive afforestation programmes using fast growing species.

The inception of Ondo State Afforestation Project in 1980 gave rise to the execution of the first phase project in 1986 and the accomplishment of the second phase in 1989. This was enhanced with loans from World Bank and African Development Bank. Similar projects are located in Anambra and Ogun States.

According to the World Bank 1978, the aims of the projects are to:

- Train Nigeria Forestry Staff the planning and execution of plantation programmes involving mechanical methods of forest clearing;
- Provide employment for about 900 permanent workers with seasonal peaks of 1800 employees;
- Encourage permanent forestry workers to settle in the area by providing staff housing, of office, workshop, water and electricity in the forest villages;
- Increase food production by allowing about 700 farmers to farm in parts of the cleared area annually; and
- Construct a total of 607km of roads and 929km of tracks in addition to the maintenance of these roads annually.

Forest resources in Nigeria include Timber, Fuelwood, wildlife, inland fisheries and forage which are physical and have market-determined values. Other output of forestry are recreation, amenity and environmental protection which all have non-market determined value.

However, growing disparity between production and supply of timber and other wood products

therefore call for more plantations. In fact, the present record of planting by the states is not encouraging. Therefore, planting by individuals, groups and private companies should be promoted.

Forest management in Nigeria faces great challenge in future. There is thus an urgent need to rebuild and restore the depleting resources in Nigeria.

Natural reserves which are considered as a no man's land, freely people enter the forest, women and youths in particular to harvest tree leaves, barks, tree roots and so on. For medicinal use, in Nigeria as it is most developing countries of Africa, people are relying more on traditional medicine which mostly involve the use of herbs, this further encourage the poor masses to I enter the forest, harvest non-wood forest product which are readily made I available into money to assist their families in providing them with their ~ subsistence needs.

### **Harvesting of Non-Wood Forest Products**

Study have revealed that more that 85 percent of those involved in harvesting of I non-wood forest products m developing countries of Africa, Nigeria in l particular are mostly women and youths with very little education if at all. In all cases, they harvest these non-wood products with cutlasses, go-to-hell and other sort of tool comfortable for them.

The system and consistency of harvesting have been revealed by studies to be seriously affecting forest estates either Natural forest reserve or Government forest plantation, study revealed that after from shifting

Agriculture that is depleting Natural forest reserves uncontrolled and consistent non-wood harvesting is closely following even in Government plantations uncontrolled harvesting of non-wood forest products like leaves,

barks and root have seriously affected growth and quality of timbers in such plantations.

### **Conclusion**

After carefully studying the problem facing harvesting of non-wood products in Natural and Government forest reserves, a solution is disparately needed to solve this problem, this is tables as follows:

- (1) Organising a lecture programme to educates youth and women on how to sustainable utilize and harvest non-wood forest product without necessarily disturbing the wood forest product and the environment;
- (2) Establishing plantations to cater for some of these non-wood product need of the populace e.g. firewood plantation, leaves plantation where tree species will be grown for leaves production.

Though the second suggested solution of establishing non-wood forest product plantations seems best, but it practicability, management and control seems beyond what can be easily achieved in developing countries of Africa.

### **About Tropical Forest Network**

The Tropical Forest Network (TFN) is a forestry research and advocacy non-governmental, organisation following on sustainable management and utilisation of the tropical forest in the sub-region.

We are using this medium to one of our newly design project titled "Youth Forestry and the Environment". This project if finally sponsor can be used to nine educate youths and women on how to sustainable utilize and harvest non-wood products, which will be as follow up to this Turkish conference.

TFN is using this medium to solicit for moral, material and financial support from individual, corporate and international organisation, no amount or office equipment is too small.

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