

**Consultant report on developing a
national strategy for NWFP
development in Bhutan**

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Abbreviations and acronyms

ABS	Access Benefit Sharing
AMS	Agriculture Marketing Services
ANSAB	Asian Network for Sustainable Agriculture and Bioresources
BAFRA	Bhutan Agriculture Food and Regulatory Authority
BNFSSP	Bhutan National Food Security Strategy Paper
CBNRM	Community Based Natural Resource Management
CFs	Community Forests
CFMG	Community Forest Management Group
CORRB	Council for Research and
DFO	Divisional Forest Officer
DOF	Department of Forest
DSC	Druk Seed Corporation
EODP	Essential Oils Development Program
EPC	Entrepreneurship Promotion Center
FAO	Food and Agriculture Organization
FCB	Food Corporation of Bhutan
FDCL	Forest Development Corporation Limited
FMU	Forest Management Units
FNPP	Food and Agriculture Organization and Netherlands Partnership Program
FPUD	Forest Protection and Utilization Division
FRDD	Forest Resource Development Corporation
FYP	Five Year Plan
HRD	Human Resource Development
IDRC	International Development Research Center
IFAD	International Food and Agriculture Development
INDOCERT	Indian Organic Certification Agency
ITMS	Institute of Traditional Medicine and Services
MAP	Medicinal and Aromatic Plants
MEA	Ministry of Economic Affairs
MTI	Ministry of Trade and Industry
NFRP	National Forestry Research Program
NBC	National Mushroom Center
NCD	Nature Conservation Division
NGO	Non Governmental Organization
NRDCL	Natural Resource Development Corporation Limited
NMC	National Mushroom Center
NWFP	Non-wood forest products
PM	Park Manager
RECOFTC	Regional Community Forestry Training Center for Asia and Pacific
RGOB	Royal Government of Bhutan

RNR	Renewal Natural Resources
SFD	Social Forestry Division
SPS	Sanitary and Phytosanitary Measures
SNV	Netherlands Development Organization
TRIPS	Trade Related Intellectual Property Rights
WWF	World Wildlife Fund

I. Introduction

Non-wood forest products (NWFPs) play an important role in the daily lives and overall well being of the Bhutanese people especially among the rural farming community; for instance they are a major source of off farm income¹, food, medicine, fodder, fiber, and also used for local construction materials. Many of them are importantly traded commodities at local, national and international levels, providing employment and income at each level. Despite such potentials, majority of the farming communities remain to be poor, raising concern whether NWFPs constitute a poverty trap, a safety net, or a potential but underutilized resource for rural development and poverty alleviation.

Thus, emphasizing the overall national policy objectives on NWFP development as a major activity for poverty reduction and economic growth; the study has been commissioned to prepare inputs towards developing a national strategic plan for NWFP development and utilization in Bhutan for 2008-2020. The study has been carried out in close consultations with the Forest Resource Development Division (FRDD) within the Department of Forest, NWFP Working Group members and other important stakeholders within the Ministry of Agriculture and outside. The consultancy service has been outsourced from a national consultant with financial support from World Wildlife Fund (WWF), Food and Agriculture Organization and Netherlands Partnership Program (FNPP) and the Netherlands Development Organization (SNV). Details on the Terms of Reference and the consultant are given in Appendix 1).

1.1 What are Non-wood Forest Products (NWFPs)?

The International Expert Consultation on NWFP, held in Indonesia in 1995, defined NWFP as "goods of biological origin other than wood, as well as services, derived from forests and allied land uses (FAO, 1995a).

Another definition used by FAO (1995b) defines NWFP as "all the biological material (other than timber and firewood) that may be extracted from natural ecosystems, managed plantations and semi-wild trees growing on farm-lands and be utilized within the household, be marketed, or have social, cultural or religious significance". Both plant and animal products are included. This definition describes the forest and similar land uses in a more comprehensive way and sets limits as to what can be considered a NWFP. In an attempt to harmonize terminology related to NWFP and a global definition of NWFP, FAO

¹ Farmers from Mongar, Lhuentse, Trashigang and Trashiyantse earned an income worth Nu. 51,247,045 from the sale of lemon grass extract according to reports from Essential Oils Industry of Bhutan: A Perspective by EODP, 2004.

proposed a new definition of NWFP. According to this proposal, "NWFP consist of goods of biological origin other than woods derived from forests, other wooded land and trees outside the forest" (FAO, 1999b).

The Forest Nature and Conservation Rules 2006 defines NWFPs as that constituting resin, varnish, *katha*, *kutch*, plants, flowers, seeds, bamboo, bulbs, roots, fruits, leaves, barks, grasses, creepers, reeds, orchids, cane, fungi, moss, medicinal plants, herbs, leaf-mould, or other vegetative growth, whether alive or dead; wild animals (including fish) and parts or products of wild animals, including the skin, hide, feather, fur, horn, antler, tusk, bone, bile, musk, honey, wax and lac, insect; and boulders, stone, sand, gravel, rocks, peat and soil (RGOB 2006).

For our purpose, NWFPs is defined as goods of biological origin other than wood, derived from natural forests. In addition, it would also constitute fish found in natural waters within the geographical boundaries of the country.

1.2 Non-wood Forest Products in Bhutan

Non-wood forest products form an integral part of the livelihood strategy of the rural community in Bhutan with almost 69.1 percent² of the Bhutanese population residing in rural areas depend primarily on subsistence agriculture and natural resources. Bhutan is rich in biodiversity including a large percentage of non-wood forest products. The country has proven a haven for a wide array of non-wood forest products ranging from bamboos, cane shoots, lemon grass, essential oils, mushrooms, ferns, resin, medicinal and aromatic plants, natural dyes, bees and insects, honey, tubers, traditional fish products, and a host of others. At the household level they are used mainly for subsistence purposes such as food, medicine, household ware, fodder, roofing and fencing materials, leaf litter for farm manure and fuel wood. Other functions of NWFP include ingredients for dyes, raw materials for handicraft, twigs and branches for broom making, and rural household importance to cure human and animal ailments through use of natural herbal remedies.

According to Renewal Natural Resource (RNR) Statistics 2000, about 42 percent of households in the country use bamboo resources for a variety of purposes, while about 21 percent of households are engaged in harvesting mushrooms from the wild, and 38.6 percent of households in fern top harvest during summer months.

² Results of the Population and Housing Census of Bhutan 2005 undertaken by the Office of the Census Commissioner, RGOB.

NWFPs in Bhutan can play a key role in maintaining national food security and poverty alleviation. It is therefore important to understand and appreciate the crucial role NWFPs play in supporting rural livelihoods of the forest-dependent communities in the country. Further, increasing economic value of NWFPs and expanding markets have created added opportunities in terms on generating non-farm income, as well as challenges to local level NWFP management in terms of sustainable management. Such new challenges and opportunities need to be taken into account to foster sustainable, equitable and efficient management and utilization of NWFP.

Therefore, decision makers in the government, multilateral and bilateral development partners working in the forestry sector need to reinforce support towards sustainable management of NWFP since it has become an inseparable part of pro-poor forest management and utilization.

1.3 Rationale

The importance for developing a NWFP strategy is of paramount importance especially with its significant role in the economic and cultural lives of virtually all rural households in Bhutan. NWFPs have also been reflected as an essential and high priority activity for the Tenth Plan (2008-2013) and expected to improve livelihoods and increase rural incomes, particularly for the poor and landless, thereby reducing rural poverty and emerging as a successful example of the greening of national accounts as envisioned in the Vision 2020 document.

Considering the above situation, a national strategy for NWFP development is vital as stakeholders call for adequate capacity to integrate issues related to the legal framework, policies, institutions, resource management, processing and markets. A national strategy is therefore most essential to guide NWFP development towards reducing poverty and increasing rural incomes and to build on on-going efforts and activities that are being carried out by different agencies.

1.4 Vision

The vision related to sustainable resource management, improving livelihoods, and poverty alleviation is suggested considering the following three areas in mind:

- 1) sustainable use of the rich NWFP resources,

- 2) increased equity in distribution of benefits from the commercial utilization of these resources, and
- 3) contribution of this sector to overall social and economic development.

The vision statement reads as follows;

Enhanced rural livelihoods and economies through optimal utilization of NWFP resources at local, community and national level through sustainable management and commercialization of NWFPs.

1.5 Objectives

The overall objectives is geared towards the development and safeguard of NWFPs in the country by empowering grass root communities to optimize the flow of local and national benefits from the management and sustainable utilization of NWFP resources.

Specific objectives for NWFP development include the following;

1. Sustainable NWFP development for improved livelihoods and income generation.
2. Strengthening linkages and coordination between/among major NWFP stakeholders, including the improvement of collaboration between institutions.
3. To develop and promote prioritized NWFP species with importance set to rural livelihood and income security.

II. Legal Framework Governing NWFP in Bhutan

Overall national forest policies in the country seek to ensure that resources contribute both to social justice and equity and are sustainably used and managed. While at the same time such policies also attempt to strike a meaningful balance between the goal of environmental conservation and financial considerations. Several policies and legal provisions broadly cover the forestry sector in general but very few specific policies and legal frameworks relating to the NWFP sub-sector are present in the legislature. For instance, although the draft Constitution of Bhutan under Article 5 Section III has explicit provisions to maintain a minimum of sixty percent forest cover at all times to come and rest of the entire article is dedicated on conservation and sustainable utilization of the country's natural resources with no mention on NWFPs.

The Ministry of Agriculture is the main agency involved with the formulation of rules and regulations, policies and administration of the forestry sector. Among others, the Department of Forests (DoF) and the Social Forestry Division (SFD) sets policies and guidelines for forestry management and the identification of forestry management units (FMUs). Some of the prominent forest policies governing forest resource management and utilization that interact to regulate and set the context in which NWFPs are collected, cultivated, processed and sold are presented in chronological order;

2.1 Policy framework related to the management of NWFP resources

2.1.1 The Forest Act 1969

The Forest Act 1969 nationalized all forest land and substantially changed natural resource property rights and provided substantial power to forest officials to protect, manage and control access to the forests. It defined “forest” as “any land under forests in which no person has acquired a permanent, hereditary and transferable right of use and occupancy” and gave the status of reserved forest to all forest land. At the same time, it appropriated many areas used as village and community forests as government property.

2.1.2 National Forestry Policy 1974

The National Forest Policy 1974 pays particularly attention to conservation and made it mandatory to maintain 60 percent of the land area under forest cover. This policy outlines the protection of the land, its forest soil water resources and biodiversity against degradation such as loss of soil fertility, soil erosion, landslides, floods and other ecological devastation and the improvement of all degraded forest land areas, through proper management systems and practices. The policy also emphasizes the elimination of shifting cultivation to prevent forest degradation and to maintain soil fertility. Watershed management and the restoration of denuded and barren hills are accorded high priority. It contains objectives related to forest conservation, afforestation, resource survey, forest utilization program, wildlife and recreation, forest administration and training, investment, forest revenue, research and publicity and forest law. NWFPs do not figure prominently in any of these activities.

2.1.3 Forest and Nature Conservation Act 1995

In 1995, the National Assembly repealed the Forest Act 1969, and expanded its content to enact a new act, the “Forest and Nature Conservation Act 1995” addressing changed social and economic needs of society. An important objective of the new act is to ensure an adequate supply of basic forest products

to meet the needs of the population with due recognition of the multiple responsibilities for forest resources and their sustainable management and use.

The basic principle of using the law to protect forests from local people has been maintained. The revised definition of 'forest' under the new act reads: "Forest means any land and water body, whether or not under vegetative cover, in which no person has acquired a permanent and transferable right of use and occupancy, whether such land is located inside or outside the forest boundary pillars, and includes land registered in a person's name as *tsamdrog* (grazing land) or *sokshing* (legal authority for leaf litter gathering). The new act recognizes community forests regarding their creation and management. The new act also provides for the protection of flora and fauna and categorizes their status.

The Forest and Nature Conservation Act of 1995 defines the objectives of forest planning and asks for an approved forest management plan for each reserved forest in Bhutan and especially for logging areas. Forest management planning has undergone major transformation in structure, technique and content in order to implement direction of the Forest and Nature Conservation Act of 1995.

Section 2 of the act captures NWFPs under definition of the forest produce (trees or part of trees, wild plants or produce including bamboos, and canes, and medicinal plants fungi and herbs). Accordingly, the commercial harvesting of edible forest produce is to be permitted based upon resource availability and an approved management plan. The management plan according to Section 5 of the Forest and Nature Conservation Act of 1995 should provide information such as, description of areas, its resources, uses, role of biological diversity of Bhutan, management regime required for protection and sustainable utilization of the resources, assess environmental and socio-economic impact of the proposed regime.

There is no separate policy or legal instruments specifically designed for NWFPs management, utilization, marketing and trade.

2.1.4 The Biodiversity Act of Bhutan 2003

The Biodiversity Act of Bhutan, 2003 mentions safeguards on genetic resources of the country especially in terms of bio-prospecting and export of genetic resources. One of its main objectives is to "to ensure national sovereignty over genetic resources in accordance with relevant national and international laws." It focuses on the protection of traditional knowledge, access benefit sharing (ABS) and bio-prospecting. For instance, Section 7 stipulates, application requirements for access permit which conditions an applicant to meet 19 conditions, while

Section 9 stipulates conditions required for the grant of access and Section 10 spells out the conditions required for benefit sharing.

2.1.5 Forest and Nature Conservation Rules of Bhutan 2006

Under the Forest Nature Conservation Rules of Bhutan 2006, community forest is encouraged through the establishment of a Community Forest Management Groups (CFMG). The size of the Community Forest (CF) depends on the availability of the area in and around villages of the CFMG and the forest area allocation not exceeding more than 2.5 ha per household. However, as mentioned under Part II Section 27(d), for the purposes of management of NWFP, the area allocation may be more than 2.5 ha per household depending upon availability of the land. A group of at least ten households willing to establish, control and manage a forest area as a community forest in accordance with these rules can form a CFMG. The CFMG is authorized under the rules to control the management of the CF in accordance with the management plan prepared by the CFMG and approved by head of the forest department on the recommendation of the Divisional Forest Officer (DFOs) and Dzongkha Forest Officer (DzFO).

Under Chapter V Article 54 (1), trade and transit of NWFPs are allowed provided valid permits are secured from the DFO or the Park Manager (PM) if it is within park protected areas. Royalty rates for NWFPs are waived off for domestic purposes (other than items covered in Schedule I of the Act), however, for commercial purposes a nominal royalty is levied (Article 112 Section 1 and 2). The collection of medicinal and aromatic plant species is limited to requisition from the Institute of Traditional Medicine and Services (ITMS); only upon which the registered collectors are sanctioned approval. Harvest of NWFPs has to be accompanied with written permits and approvals from either the DFO/PM. Import and export of NWFPs are regulated with centralized control; requiring approval from the head of the Forest Department.

As mentioned above, Chapter V Article 54(1) mention the domestic use of NWFPs are allowed upon seeking permission from the DFO. In case of commercial purposes (imports and exports); permit approvals must be routed from the DFO with final approval from the Department of Forest or the Ministry of Agriculture. Such a requirement applies to non-Community Forests areas, while members belonging to a CF, operate guided by the management plan and its bylaws.

Other rules include framing of private forest rules and CF rules. The main purpose of the private forest rules is to encourage local people to grow firewood and construction timber for their own use and also as a source of cash income.

The private forest is defined as “trees and wild plants planted or sprouted naturally on the registered private land categories within the 25-acre ceiling and including other marginal lands; provided that the cadastral survey has confirmed registered ownership with respect to that particular land.

2.2 Policy framework related to marketing and trade of NWFPs.

Developing small and medium enterprises using NWFPs as the raw material has always been one of the priorities of the government. Government authorities provide policy support through technical assistance, farmers training and issuance of permits for raw materials to be used as ingredients in manufacturing. For instance, the Forest Nature Conservation Rules 2006, Chapter V Article 54 provides provisions on trade and transit through securing official permits upon paying royalties as outlined in the rules. While Chapter XI, Article 105 provides for royalty exemptions provisions in the case of personal utilization of NWFPs in the rural areas. However, supply of NWFPs for other purposes deems necessary approval from the head of the forest department.

Import of NWFPs is guided by the Forest Nature Conservation Rules 2006 whereby an importer must obtain official approval in the form of a written import permit from the Department of Forest through either the DFO or the Park Manager (PM). Similarly, in the case of exports, only the Ministry of Agriculture decides the export of any items of NWFP from government reserved forests. For instance, in 1998, the government banned the export of all medicinal plants and it was only ten years later (until 2008), when export of chirayita, pipla, and rubia cordifolia was allowed. NWFPs which are from private land/private forest/nursery are also allowed to be exported but must be accompanied with proper transit permits and upon satisfying export regulation requirements of both Ministry of Agriculture and Ministry of Economic Affairs. For example, no exports are permitted without the export certification issued by Bhutan Agriculture and Food Regulatory Authority (BAFRA) certification and export license issued by the Department of Trade, Ministry of Economic Affairs.

2.3 Other policy support related to institutions in NWFP management

The Social Forestry Division (SFD) has been recently given the national mandate to coordinate all activities to oversee the proper management and meaningful utilization of NWFPs in the country. Keeping in line with forest resource development policies, the division has undertaken initiatives setting up around 58 approved community forests, out of which six are devoted to NWFPs. These include namely, *Borinda grossa*, lemon grass (*Cymbopogon flexuosus*), pipla, chirayita, and bamboo and cane. Other NWFP related community forests that are

in the pipeline include star anise (*Illicium griffithii*), *Cordyceps sinensis* and matsutake mushrooms (*Tricholoma matsutake*).

Policy mandates and directives are channeled through respective departments and agencies to implementing agencies in the field. For instance, CORRB executes its policy directives through the RNR-RCs, while the Department of Forest accordingly provides policy directives to SFD, FRDD, Parks, Territorial Divisions and dzongkhags. The same is done by the Department of Agriculture in providing policy directives to the National Mushroom Center.

Agencies like the Agriculture Marketing Services within the Ministry of Agriculture and the Marketing Section within the Institute of Traditional Medicine and Services are mandated to facilitate marketing of NWFP produce through developing market information systems, market research in terms of demand and prices, product development and trade facilitation. In addition, BAFRA ensure quality and safety standards through the safeguarding the image of the product originating from Bhutan. The Department of Trade under the Ministry of Economic Affairs presents trade policy guidelines and promotes bilateral and regional trade through bilateral and multilateral trade agreements. Policy and planning division within the Ministry of Agriculture facilitates developing enabling policy environments through the initiatives of NWFP working group.

III. Institutions related to NWFPs

3.1 Government Institutions

Recognizing the utilization potential of NWFPs for food and income security and sustainable forest management, a wide range of institutions have taken responsibility for sustainable management of NWFPs in the country. A large number of entities are involved (including different organizations and agencies from the government, non-government and private sector) in the management and development of NWFPs, because it covers a wide array of activities.

Some of the agencies are listed as follows;

- Department of Forest that includes,
 - Forest Protection and Resource Utilization Division (FPUD)
 - Co-ordinate all territorial division activities on behalf of the Forest Directorate including NWFP management.
 - Assisting the Head of the Department in all matters related to the Divisions and Parks.
 - Forest Resource and Development Division (FRDD)

- National mandate for NWFP development and coordination among organizations for strengthening NWFP development.
- Spearheads the NWFP Working Group.
- Develop appropriate methodologies for conducting resource inventories of important NWFPs in the country.
- Develop non-wood forest product inventory methodology, management guidelines and plans on a prioritized list for NWFPs for sustainable and meaningful utilization.
- Review and improve forest management codes/guidelines including NWFPs.
- Develop action frameworks to enhance cooperation and coordination among various stakeholders in the NWFP sector.

NOTE: The national mandate for the NWFP development and all related activities will be handed over to the Social Forestry Division in the first half of 2008.

- Social Forestry Division (SFD)
 - Promote NWFP developmental activities in the country in collaboration of the Dzongkhag Forestry Officers (DzFO), Divisional Forest Officers (DFO), and Park Managers.
 - Provide training on NWFP development activities for Community Forest user groups.
 - Develop management guidelines on prioritized NWFPs.
 - Provide functional support to Dzongkhag Forestry Sectors in building systems for managing social forestry programs;
 - Provide technical support and implementation of (i) private forestry; and (ii) community forestry program;
- Nature Conservation Division (NCD)
 - Species conservation and research monitoring
 - Biodiversity inventory and management
 - Management of botanical parks
- NWFP Working Group comprising members from the following organization;
 - Forest Resource Development Division
 - Institute of Traditional Medicines and Services
 - National Resource and Development Corporation Ltd.
 - RNR-RCs (Bajo, Yusipang)
 - Social Forestry Division
 - DzFO representatives
 - DFO representative
 - Park representative
 - Agriculture Marketing Service Representative
- Council for RNR Research in Bhutan (CORRB)

To pursue RNR integration concepts in research programming and technology generation and package technological options for implementation by the RNR sector programmes. In addition, CoRRB has the lead responsibility on the following field programmes.

Farmer organization and cooperatives - in terms of conceptual and strategic support.

Coordination of Community Based Natural Resource Management (CBNRM). This involves;

- Non technical training
- School agriculture program
- Agro meteorology services
- Soil services (investigation & analysis)

- RNR-RC Yusipang
 - Coordinate, monitor and implement NWFP related research nation wide including high altitude medicinal and aromatic plants.
 - Undertake research for improving scientific methods of sustainable utilization of NWFPs to enhance rural income.
 - Develop appropriate research methodologies and strategies for conservation and meaningful utilization of NWFPs in the country.

- RNR-RC Bajo
 - Conduct action oriented research in community based resource management.
 - CBNR efforts through formation of bamboo and cane management groups.

- RNR-RC Wengkhar
 - Research and support in preparation of management plans for NWFPs such as lemon grass, chirayita, pipla, bamboo and cane (as part of the CBNRM project).
 - Research on in-situ management of pipla spp. and chirayita.
 - Research on low altitude medicinal and aromatic plants
 - Herbal home remedies and product development?

- RNR-RC Jakar
 - Conduct research to generate information on availability of NWFPs.
 - Develop related technology for sustainable harvesting and management practices of selected NWFPs including mushrooms and medicinal and aromatic plants in collaboration with ITMS.
 - Promote NWFP plantations with economic significance. Example, bamboos and cane and medicinal plants.

- National Biodiversity Center
 - Provide framework for organizing Bhutan's biodiversity related activities.
 - Offer mechanism for national decision making on biodiversity concerns, cutting across sectors, divisions and institutions.
 - Provide mechanism to guarantee a better national balance between conservation and utilization of biological resources in general, and between in-situ and ex-situ conservation in particular.
 - Presents institutional and policy mechanisms to assure continuity of biodiversity related activities over time.

- National Mushroom Center
 - Sustainable use of natural resources and management of mushrooms.
 - Increase of income, living standards and nutritional status especially of the rural population through mushroom cultivation.
 - Provide training in mushroom cultivation and in harvesting techniques of wild mushrooms in order to sustain wild mushroom resources.

- Agriculture Marketing Services
 - Develop and disseminate market information.
 - Develop marketing infrastructure and communication network
 - Explore, develop and promote intra-regional and niche export markets for RNR products (fresh and processed).
 - Promote value addition and agribusiness enterprises.
 - Develop market institutions and linkages between buyers and suppliers.

- Natural Resources Development Corporation Limited (formerly FDCL)
 - Identification of commercial bamboo species
 - Plantation of bamboo estates
 - Identification of local bamboo products for marketing
 - Non-wood value addition through local and improved craftsmanship.

- Institute of Traditional Medicine and Services
 - Promote the traditional system of medicine in the country;
 - Preserve the unique culture and tradition related to medical practice
 - Provide alternative medicine as complementary to the allopathic system
 - Produce medicines required by the traditional medical system;
 - Conduct research and quality control of drugs;
 - Provide traditional medical services in Bhutan

- Ministry of Economic Affairs (formerly Ministry of Trade and Industry)
 - Training on developing knowledge and craftsmanship employing natural resources like bamboo and cane, orchids, mushroom cultivation.
 - Essential oils development programs (EODP) and formation of related farmer groups and cooperatives.

- Entrepreneurship Promotion Center
 - Serves as a focal point for all entrepreneurship and small business promotion activities in the small and medium enterprise (SME) sector.
 - Designs and conducts short courses to assist potential entrepreneurs to start small businesses.

- Intellectual Property Division
 - Facilitates registration of intellectual property rights including company trademarks, brand name and labels.

- Forestry Training Institute in Langmagonpa, Bumthang
 - Development of NWFP curriculum

3.2 Private Sector

Currently, there are only a few well established private sector institutions involved in NWFP management and utilization except for a few licensed incense entrepreneurs, Bio-Bhutan, mushroom export houses and a few Daphne traditional paper making enterprises.

Other private players include recent government initiatives towards formation of farmers groups like the lemon grass association in the east and bamboo and cane growers in central Bhutan operating through the community forestry initiatives. The number of backyard incense manufacturers is also on the rise; however, it is perceived that the procurement of raw materials within the country is difficult and expensive, yielding to imports from India as an alternative. Complaints on the lack of adequate institutional support from the government and the cumbersome local procurement that requires written approvals and permits, unreliable quantity supplies are some of the contributing factors resulting to imports. For example, the incense industry uses more than forty different herbs and aromatic plants as ingredients for manufacturing incense sticks. Although 90 percent of these species grow and are available in the country, the industry obtains 80 percent of these species from India because of the cumbersome, time consuming processes for obtaining approval permits and required quantity on time (Chimi P & K Tideman, 2006).

There are forthcoming plans to privatize feasible enterprises within NRDCL and ITMS to be taken up by the private sector.

3.3 Non-government organizations and development partners

Tarayana foundation a home grown non-governmental organization recently started utilizing nettle hemp plants (*Girardinia diversifolia*); producing authentic hand woven fabric fetching attractive prices for the producers at the national exhibition held in the capital. Candle making is another activity using local materials like natural dyes to color the candles.

Bio-Bhutan is another pioneering enterprise that produces and markets natural and organic certified products from Bhutan for Bhutanese and international markets. In 2006, the enterprise obtained organic certificates for lemon grass oil and pipla from Indian Organic Certification Agency (INDOCERT) an Indian certification agency based in Kerala. Bio Bhutan is guided by an advisory board comprising of representatives from Helvetas/SDC Bhutan and the Swiss Bhutan

Society including the Swiss Bhutan Friendship Association and the private sector in Bhutan³.

Bilateral and multilateral development partners continue to provide both financial and technical support through projects and technical assistance. For example, Food and Agriculture Organization and Netherlands Partnership Program (FNPP) is involved in commodity chain analysis of high value mushrooms and NWFPs in Bhutan, while Helvetas/SDC provides technical assistance in participatory forest management and International Development Research Center (IDRC) and SNV has been actively involved in funding CBNRM activities. United Nations Development Program (UNDP) has also been a strong development partner through the Rural Enterprise Development Project (REDP) managed by both Ministry of Agriculture and Ministry of Economic Affairs. Similarly, European Union's support on Medicinal and Aromatic Plant project (MAP), World Wildlife Fund (WWF), Netherlands Development Organization (SNV), Helvetas/SDC and International Food and Agriculture Development (IFAD) are all involved in one way or the other in promoting and developing NWFPs in Bhutan through programs and projects.

Asian Network for Sustainable Agriculture and Bioresources (ANSAB) and Regional Community Forestry Training Center for Asia and Pacific (RECOFTC) are some of the institutions where Bhutanese officials attend short training programs through workshops and study visits.

3.4 Major Institutional Challenges

One of the major institutional challenges is lack of effective cooperation and coordination among and between different organizations in terms of duties and mandates related to NWFP management.

The management of NWFPs is informal as compared to the handling of timber and timber products. Where NWFPs are managed under such arrangements as joint or communal forest management, there are in most cases no clear institutional or legal frameworks to support their development, marketing and trade. Ownership, access and user rights over NWFPs are unclear which could lead to conflicts over specific areas and products and violation of the rights of local communities as the awareness and value of the products increase.

³ www.biobhutan.com

IV. Context - NWFP Resources in Bhutan

The socio-economic importance of NWFPs among the rural farming communities in Bhutan cannot be more emphasized. The country is rich in agro-biodiversity with a long list of species, either used locally or traded in the local or overseas markets. The country hosts an abundant habitat for various eco-systems, fauna, flora, and genetic resources of animals and plants. Among many, NWFPs are an important income source for the rural people in the country and cover a wide variety of products like cordyceps, mushrooms, and medicinal plants. Bhutan has currently identified 600 species of medicinal plants⁴, 97 mushroom species, 97 kinds of fruits and nuts, 50 bamboo species, 14 cane species, 25 oil and resin species, 20 different kinds of spices, 38 fibers plants, 70 ornamental plants, 181 fodder related varieties, 36 types of dye plants, 12 kinds of tubers and 77 forest vegetables (FRDD, 2006).

4.1 Priority Species

Prioritization is based on the following criterion that has been agreed upon at a stakeholder meeting conducted with senior government officials and representatives from the private sector (held on November 16, 2007).

1. Economic criteria: export market value and local demand, income generation, bio-prospecting,
2. Social criteria: job creation, poverty alleviation especially for people living in rural areas, income and food security;
3. Environment criteria: positive impact on bio-diversity conservation and protection of natural forest, risks of over exploitation, geographical abundance;
4. Difficult or easy in terms of technology and techniques for propagation, cultivation, processing, marketing and investment.

Based on the above criteria, the prioritized NWFP groups have been identified as follows:

(1) Mushrooms

Tricholoma matsutake (Sangay shamu)

Cantharellus cibarius (Sisi shamu)

Rozites caperata (Dungshi shamu)

⁴ Of which 267 or 85 percent of the species are collected for ingredients in traditional medicine.

Lyophyllum shimeji (Ngala shamu)
Auricularia sp. (Jili namcho)
Pleurotus spp. (Oyster mushroom)
Lentinus edodes (Shiitake)

(2) Bamboos and Canes

Neomicrocalamus andropogonifolius (Yula)
Borinda grossa
Dendrocalamus sp.
Bambusa sp.?
Calamus acanthospathus
Calamus latifolius
Plectocomia himalayana
Yushania spp (Daew yanka)

(3) Medicinal and aromatic plant species

Aconitum heterophyllum/lacinatum (Tsendhug)
Acorus calamus (Chudala)
Carum carvi (Carraway)
Cordyceps sinensis (Yartsa guenbup)
Cymbopogon spp. (Lemon grass)
Illicium griffithi
Picrorhiza scrophulariifolia (Hong-len)
Saussurea lappa (Ruta)
Swertia chirayita
Aquilaria malaccensis (Agar wood)

Incense sub-sector (in order of importance)

Juniperus squamata/pseudo sabina (shup)
Ephedra geradiana (Tsey)
Rhododendron anthopogum (Balu)
Rhododendron ciliatum (hairy leaf)
Rhododendron setosum (Sulu)
Selenium vaginatum (Tang-kuen)
Nardostachys grandiflora (Jatamansi, pangpoi)
Innula racemosa (Manu)
Saussurea lappa (Ruta)
Cinnamomum tamala (Shintsa, Teespata, Dalchini)
Tanacetum nubigenum (Sanse kaju)
Terminalia chebula (Aru)
Terminalia bellirica (Baru)
Curcuma longa

(4) Natural Dyes

Rubia cordifolia
Strobilanthus cusii (Tsangja) (Indigo blue)
Rhus spp. (sey-wood varnish)
Phyllanthus emblica (Umla)

(5) Vegetables and food crops

Asparagus racemosus (Wild asparagus)
Dioscorea belophylla (Tubers)
Dioscorea hamiltoni (Tubers)
Diplazium esculentum (Nakey)
Elatostema spp. (Damroo)
Adhatoda vasica (Tro Bashaka) – flower as vegetables

(6) Spices

Ellettaria cardamom (Sugmyel)
Piper longum (Pipla long)
Piper nigrum (Pipla short)
Piper pedicellatum or *peepuloides* (Pipla)
Zanthoxylum armatum (Sichuan pepper)
Zanthoxylum piperidum
Murraya Koenigii (Curry plant)

(7) Other plants

Traditional paper species
Daphne spp.
Edgeworthia spp.
Lycopodium (Zala-gadang)
Elaeocarpus varuna (Gaasha Thungsee in Sharchop)
Sarcococca hookeriana
Gerardiana diversifolia (Nettle plant)

(8) Non-plants

Fish (Dosem)
Hornets (Jing-em)

4.2 Distribution of Priority Species

For distribution of priority species please refer to Appendix 3.

4.3 Management of NWFP Resources

In Bhutan there are different management methods in place for NWFP resources in the wild at the moment. A system of permits that requires obtaining written

approval from authorities to deal with NWFP related natural resources and through the establishment of CFs⁵ focused on the management of NWFPs. At present there have been six CFs officially approved that focus on NWFP management including for *Swertia chirayita* in Singkhar lauri (Samdrukjongkhar district), *Borinda grossa* (an endemic bamboo species to Bhutan) in Wamanang Trashiyangtse district, Cane (*Calamus acanthospathus*, *C. latifolius*) and Yula (*Neomicrocalamus andropogonifolius*) in Bjoka (Zhemgang district) and for a number of bamboo and cane species in Langthel (Trongsa district). A number of other CFs for NWFP management is in the pipeline including for pipla (*Piper peepuloides*), lemon grass (*Cymbopogun flexuosus*), Daphne spp. Cane (*Plectocomia himalyana*) and star anise (*Illicium griffithii*).

FRDD is working on the development of guidelines for resource assessment and management of NWFPs. To date, guidelines for about 10 species have been drafted which outline step by step the way to carry out a resource assessment which is a mandatory part of a management plan. Furthermore, the guidelines give management and harvesting prescriptions. The guidelines are developed in collaboration with local people based on field experiences and are discussed in detail in the NWFP Working Group meetings. Apart from FRDD, all other interested stakeholders can develop guidelines and present them in the NWFP Working Group for consensus and finalization.

4.4 NWFP cultivation

Many agencies within and outside the Ministry of Agriculture are engaged in one way or the other in NWFP cultivation. For instance, the Natural Resource Development Corporation Ltd. (NRDCL), formerly Forest Development Corporation Limited (FDCL), concentrates on large scale bamboo plantations. In the past two years a total of 86 acres (35 hectares) of bamboo plantations have been carried out; concentrating mainly in the districts of Samtse⁶, Zhemgang, and Samdrupjongkar (Interview with G.S Chhetri, NRDCL, 2008).

Other ongoing cultivation schemes are undertaken by ITMS and RNR-RC Yusipang and include domestication of *Dracopis tanguiticium*, *Carum carvi*, *Inula sp.*, *Aconitum ochryseum*, *Dactylorhiza hatagirea*, *Podophyllum hexandru*, *Angelica glauca*, *Valenriana jatamansi*, *Lycium barbarum*, *Carthamus tinctorius*, *Saussurea lappa*⁷. The two institutions are cooperating in the cultivation of medicinal plants and training of farmers on good collection practices to ensure sustainable production of medicinal plant and resources. The institute has also

⁵ In total there are 37 established Community Forest in the country.

⁶ Includes 10 acres of plantation that has been carried out in P/Ling clubbed under the Samtse activity of NRDCL.

⁷ Full lists of cultivated plants are provided in the Appendix 4.

started developing information management systems with a database on medicinal and aromatic plants and plant products.

In addition, RNR-RC Yusipang has developed cultivation sites for medicinal and aromatic plants spread over ten *dzongkhags*. In 2007 alone, six metric tons of ruta (*Saussurea lappa*) was cultivated in three *dzongkhags* consisting Bumthang, Haa and Gasa, while three metric tons of *Curcuma longa* been successfully cultivated from Zhemgang.

SFD is another agency that supports a number of CFMGs in small scale plantations of cane and bamboo. The National Mushroom Center provides technical assistance through establishment and training of mushroom nurseries for farmers and supplying mushroom billets and related equipment and technology support to promote cultivation skills and knowledge.

V. Marketing and Trade

NWFP marketing is an important source of income for rural households. A variety of NWFPs are sold in the weekend markets in different districts. Some of the examples include cane and bamboo products, wild asparagus, different mushroom species, wild garlic and tubers, ferns and fiddle heads, orchids, herbs and spices, incense, betel leaves, brooms, and many more. With the recent formation of CFMG, member farmers in Bjoka have united to sell cane and yula products through the group. This is currently limiting buyers to accept prices as determined by the farmers (Meijboom, Rai, and Beek, undated). CFMG established weaving centers earn a total annual average income of Nu. 3,475,000 distributing to each household an annual income earning of Nu. 26,320. The group sells 60 percent of their products to the middlemen, 30 percent at exhibitions and trade fairs and the remaining 10 percent directly to customers (Ibid).

The market and trade channels for most of the NWFPs follow a general pattern of forest and meadow to village to road-head⁸, then on to larger trade centers; mainly Thimphu in the case of cordyceps and matsutake. A small percentage of these NWFPs, processed or unprocessed, are exported to Hong Kong, Singapore, China, Canada, United Kingdom and USA. Looking at the export data, matsutake mushrooms, lemon grass extract and cordyceps have great potential in the export market. The government has also recently approved the export of *Swertia chirayita*, *pipla spp.* and *Rubia cordifolia* or tsoe. Some of the NWFPs that are significant in terms of trade are: cordyceps, matsutake, bamboo, essential oils, honey, and medicinal and aromatic plant parts for pharmaceutical products.

⁸ Refers to nearest road accessible by a vehicle.

Four different types of trade is prevalent in the country: a) Firstly, the trade is among community members and in the local markets of commodities for onward trade, b) Second, category of trade is among the middle men and exporters, traders and national institutions, c) third, informal trade across the political boundaries of Tibet to China and d) fourth, formal exports to other countries, which include both the raw material and finished products.

However, marketing and trade in NWFP is abridged with major impediments including: the irregularity of supply and the large number of low volume products involved; unsuitability of product standards to regulations and consumer preferences; inadequate quality control and product information to consumers; and poor transportation infrastructure for rapid transportation of products between production zones and the nearest market. For export markets, bottlenecks are the lack of regulations on the exportation and importation of these products or when they exist, cumbersome administrative customs procedures and lack of harmonization of NWFP export regulations.

5.1 NWFP - Markets, Exports and Marketing System

Bhutan's forest is rich in NWFPs that are regularly collected by the local rural population both for food and for generating income to purchase basic necessities. Many of these products, including lemon grass oil, mushrooms, medicinal products, bamboos, constitute a growing market with increasingly good prices as worldwide scarcity increases. This is evident from Table 1 with export items fetching good monetary value. There is also a growing demand for ecological nature based products (e.g. essential oils or resins), which realize attractive prices for the producers in industrialized countries.

The most commercially important NWFPs exported are high value mushrooms, lemon grass⁹ extract, *Cordyceps sinensis* and incense. Attractive markets for Matsutake mushrooms are in Japan, Singapore, Thailand and United Kingdom. Bhutanese essential oils have been well received in the European markets with growing demands from United Kingdom and Canada. Incense sticks in Singapore, Taiwan, United States of America, United Kingdom and Hong Kong. Cordyceps are in huge demand from Hong Kong, Singapore, China and in the state of California in the USA. Despite static export price and rising production costs, in 2004 the Essential Oils Development Programme reported export sales income of Nu. 2.5 million (Refer Table 1).

⁹ Eastern Bhutan has the capacity to sustainably produce 50 MT lemongrass oil a year. If this could be realized it would capture about 10 per cent of the world market (Dhungyel, D 2002)

Table 1. NWFP export in quantity and value.

Commodity of export	Quantity (Kg)			Value (Nu.)		
	2004	2005	2006	2004	2005	2006
Mushroom	1,286	3,006	1,480.3	5,125,282	5,636,706	3,145,926
Bamboo works	2,600	3	15,130	42,050	550	11,400
Lemon grass extract	4,860	490	4,610	2,470,217	126,000	1,449,000
Incense	2,000	644	132.5	109,000	124,769	49,092
Natural honey	100	45	16	10,970	6,600	7,426
Katha (gum)	12,140	2,080	NA	3,614,500	520,000	NA
Chirayita	1,200	NA	NA	76,100	NA	NA
Natural dye	99	NA	NA	16,208	NA	NA
Handmade paper	896	NA	NA	76,000	NA	NA
Cordyceps	158	196	506	NA	NA	NA

Source: Bhutan Trade Statistics, 2004, 2005, 2006.

The competitiveness of Bhutan's marketing system is reduced by the high transportation costs within the country and unbalanced trade flows, reflected by a shortage of back loads¹⁰. Bhutan's international trade is solely reliant on the Kolkata port in India, using the transit corridor on the Indo-Bhutan border at Phuentsholing. The development of the soft side of trade-related transport logistics, such as harmonization of documents and procedures, needs greater attention. For example, trade in NWFPs within national boundaries is highly unorganized. The existing value chain of NWFP trade involves numerous actors namely, local harvesters, community village level traders, semi-processors, and exporters who sell the locally procured stock to overseas market. These actors are linked through a value chain, with flow of products from production sites and the money originating from business houses and/or single entrepreneurs. The stakeholders living in the communities closest to the areas where NWFPs grow are generally perceived to be poor, living at or below the poverty line, and are heavily dependent on the surrounding natural resources such as forests and pastures for their livelihoods.

Furthermore, the present marketing system exhibits a general lack of market information, incomplete market studies, inadequate transportation and storage systems. Currently, there are no systematic national level comprehensive studies on trade related issues of NWFPs in Bhutan except for few isolated case studies (Interview with Chief Marketing Officer, AMS). There are no comprehensive data about the volume of trade in the country except for the country trade statistics.

¹⁰ For example, the computation of transportation costs while transporting sand or stone boulders from Wangdue and Punakha to Thimphu is calculated by taking into consideration the revenue forgone while making the return journey for lack of business in that direction.

5.2 Marketing Information and Services

Despite the above constraints, Agriculture Marketing Services (AMS) continues to work hard to help provide market information on RNR products through collection, compilation, analysis and dissemination on a regular basis. AMS also identifies, promotes and facilitates intra-regional trade through price and demand broadcast over the national radio. Market information on inputs and markets are collected from relevant agencies. Food Corporation of Bhutan (FCB), *Dzongkhags*, Department of Revenue and Customs, Bhutan Food and Agriculture Regulatory Authority, National Plant Protection Center, Druk Seed Corporation (DSC), NRDCL, and extension agents. In recent years, AMS has started compiling requests for NWFP auction data and market prices. Food Corporation of Bhutan maintains auction data in terms of the total exports going through the auctions. Bhutan Trade Statistics is another document maintained by the government on the country's total imports and exports. Likewise, BAFRA closely monitors the quantity of all exports through export certification including NWFPs. Forest Information Management Systems (FIMS) is another unit within the Forest Protection and Utilization Division (FPUD) that attempts to manage information related to NWFPs.

5.3 Processing and Value Addition

A small percentage of NWFPs collected are processed in Bhutan by a few processing enterprises like ITMS, incense producers, traditional hand-made paper factories, natural dyes and weaving centers in Khaling, and Essential Oils Development Program and weaving of hemp (*Gerardiana diversifolia*) cloth and other fibers. The weaving of bamboo baskets, mats and other goods for daily, seasonal, and ceremonial uses is also common. Other small-scale cottage industries practiced include herbal dye making, honey production from bees, incense making and lemon grass oil production.

Bio-Bhutan has launched the first ever air spray made in Bhutan with organic certified lemon grass. It can be used as an air freshener and even as an insect repellent. Bio-Bhutan is also working on organic certification for NWFP products such as *Cordyceps sinensis*, *Saussurea lappa* and *Carum carvi*. Tarayana Foundation started candle making as an activity using local materials like natural dyes to color the candles. Private plantations for cane and bamboo are initiated in Nangkhon, Mongar with the aim to ensure a sustainable supply of the resources for producing *baagchu* (cane and yula baskets traditionally used as containers) in order to generate rural non-farm income. Similarly, licensed incense manufacturers have undertaken small and cottage scale processing activities using high land medicinal and aromatic plants as main ingredients.

Similarly, ITMS has developed *Tseringma* herbal tea using some of its ingredients (mainly saffron) from India, Cordyplus capsules is another product being launched in recent years using *Cordyceps sinensis* as a major ingredient. Other products include a range of bath elixirs including salts that cures joint aches and rheumatism. There are also other licensed incense processing units producing incense ranging in various qualities for both the domestic and export markets. Small scale basic processing equipment have also been initiated by ITMS with drying units in Lingshi for the higher altitude and one in Langthel, Trongsa for the lower altitude growing medicinal and aromatic plants. The Essential Oils Development Program (EODP) under the Department of Industries continues to promote lemon grass distilleries in Dungsum, Yalang and Toetso in Trashiyantse. Towards the later half of 2007, a lemon grass cooperative has also been formed comprising farmers in the eastern region. According to verbal sources, canning of matsutake, shimeji and *Catathelasma* or *golay shamo* has been carried out in Bumthang Ura by NMC in 2006 and 2007 in collaboration with a farmers group and a mushroom exporter.

However, basic processing, production and packaging technology that are currently used warrant upgrading to enhance product quality and other attributes. Nonetheless, income generated must have proven worthwhile with soaring export earnings in recent years (see Table 1 under Section 5.1). For instance, lemon grass distillation units distributed in the eastern region is one of the activities that have brought about extra cash income to the farmers in the past. Similarly, drying machines for medicinal and aromatic plants installed in Lingshi and Langthel geogs are some of the initiatives that have benefited the farmers significantly.

5.4 Transport

The country is landlocked with huge mountains and deep gorges faces unique transport challenges. While the creation and maintenance of physical infrastructure is critical in pursuing poverty reduction goals through NWFPP utilization, the country's small and dispersed population and rough topography make it difficult to achieve economies of scale in service delivery, and costly to build and maintain vital infrastructure, including motor roads and transport networks.

The country continues to face poor access in rural areas with 21 percent of the Bhutanese rural households located within one to four hours from the nearest all-season road, and another 21 percent have to spend more than half a day (Population and Housing Census 2005, RGOB). To improve rural accessibility, the RGOB plans to make roads accessible within half a day's walk for 75 percent of the rural population by 2012.

Roads in Bhutan are the only means of surface transport for goods and passengers. Road corridors follow the rivers, which serve as an axis for population settlements and transport and provide access to the most fertile wetlands, found in valley floors especially in Paro *dzongkhag*. Certain roads become difficult to drive on during winter months on mountain passes and during the rainy season (June, July, August and early September). Landslides are common during the monsoons, further hindering access. For example, the Phuentsholing–Thimphu highway, the main lifeline for supplies coming from India, often gets blocked for several days during monsoons. Similarly, the highways connecting Wangduephodrang, Trongsa, Mongar and Trashigang are often closed due to snowfall and landslides.

Druk Air the national flight carrier is the only means of air transport to the outside world markets, but such an arrangement is not to undermine marketing potentials, assuming Bhutanese entrepreneurs tap the right market with the right product.

5.5 Intellectual Property Rights

Intellectual property protection is a new area in Bhutan and the fundamental laws, including the Copy Right Act and the Industrial Property Act (including designs, patents and trademarks), were only enacted in 2001. However, with the growing interest in research, market value and commercialization in NWFPs, policy-makers like the Intellectual Property Division within the Ministry of Economic Affairs and other stakeholders are beginning to recognize the need for intellectual property rights regarding the appropriation and use of indigenous/traditional knowledge especially on craftsmanship, ethno-botanical knowledge, geographical indicators (GIs), copyrights and bio-security.

However, a greater understanding and documenting of indigenous knowledge and access benefit sharing is imperative if any system of rights based upon that knowledge is to protect and compensate the rural populations. For example, the *nga dose*¹¹ is a traditional right of communities in Ada geog in Wangdue. This perhaps is one of the most interesting cases for investigating the interface between property rights and conservation in the context of food security and poverty alleviation. Traditional communities must be able not only to manage their resources optimally but also to improve their production systems and technologies, offering products at competitive prices and deriving comparative advantages.

¹¹Fish baked between two hot stone plates is traditional practice by the people in Ada geog for generations and an important source of livelihood to households.

5.6 Entrepreneurship and Business Skills

One of the main agencies promoting small and medium enterprises is the Entrepreneurship Promotion Center (EPC) attached to the Ministry of Economic Affairs. Such initiatives have supported micro, small and medium-scale enterprise development through training, development of business plans and in some cases conducting feasibility studies. For instance, the Nado incense, formerly a cottage industry has now made good business progress with products being exported to Europe, USA, and in the Chinese markets of Southeast Asia.

There are various agencies involved in training entrepreneurs with respect to different item commodities. Some of the main ones are provided below;

Ministry	Agencies involved
Economic Affairs	Entrepreneurship Promotion Center Essential Oil Division Trade Division Regional Trade and Industry Office
Agriculture	Social Forestry Division National Mushroom Center Agriculture Marketing Services Medicinal and Aromatic Plants Project and the Integrated Horticulture Development Project.
Health	Institute of Traditional Medicine and Services
Corporation	Natural Resource Development Corporation Ltd. Bhutan Chamber of Commerce and Industries

5.7 Networking and Information Management

Information management is limited to Forest Information Management Section (FIMS) under Forest Protection and Utilization Division (FPUD) and the auction and export data maintained by the office of Agricultural Marketing Services.

VI. Research and Development

Forest research programs have been taken up as national programs under the management leadership of the Council for RNR Research of Bhutan (CORRB). Research programs on forest products (timber and NWFPs) are coordinated nationally by RNR-RC Yusipang and implemented in regions through RNR-RCs located at Bajo, Wengkhar and Jakar. One important program is the National Forestry Research Program (NFRP) engaged in conducting research and provides a foundation and springboard for achieving the overarching goals of

sustainable NWFP conservation and utilization. The program has eight sub-programs, out of which NWFPs form an important component.

There has been lack of scientific research on different aspects of NWFPs in the country. One glaring example is the lack of proper mention of the subject in the overall national forest policies. Despite the existing of Forest Management Units (FMUs), CFs and Forest Management Planning Codes (FMPC), it is still difficult to give precise information about the extent of distribution of NWFP yielding species in natural forests and their productivity, markets and related information on prices, demand and supply. Although the traditional wisdom and the ancient oral tradition have discussed about when to harvest and how to harvest, the present day foresters are only attempting to scientifically document harvesting time, extent of important NWFP species and the like.

With growing popularity of NWFP resources for medicine, herbal home remedies, aroma and spa, researchers and high value markets are gearing up interest in NWFP research. The DoF, ITMS, NMC, NRDCL and some of the private sector firms have recently started promoting the development of these resources for revenue purpose rather than for research and development. It is hoped that in view of growing popularity of natural products and the large dependence of poor will compel the researchers to spend more time and energy on research on this subject keeping the overall national policies on sustainable forest management and NWFP utilization objectives in mind.

6.1 Biological Research

RNR-RC Yusipang is mandated to undertake research methodologies and strategies for improving scientific base for sustainable utilization of NWFPs to enhance rural income generation. Some of the past research activities carried out include bamboo and cane studies in Bjoka geog in Zhemgang, sustainable agar wood production through artificial inducement, and studying the impact of matsutake collection on local resource economies. Some of the ongoing research initiatives include studying the life cycle and biology of the *Cordycep sinensis*, sustainable propagation and harvesting methods of important bamboo species (*Borinda grossa*) and the development of fern arboretum. Similarly, RNR-RC Bajo focuses on Community Based Natural Resource Management (CBNRM) of NWFPs in certain pilot sites by developing management plans to enable local communities to utilize the NWFPs through sustainable management practices by involving local people in research related activities. RNR-RC Bajo through CBNRM supports action research activities in Bjoka geog in Zhemgang on bamboo and cane management, lemon grass extraction in Dremitse Mongar, sustainable harvesting of pipla (*Piper pedicellatum*) in Nanglam, Pemagyatsel, pasture development in Dhur, Bumthang, *Swertia chirayita* management in

Singkhar lauri, Samdrupjongkar, matsutake in Genekha, Thimphu, Cordyceps in Soe in Lingshi and *Borinda grossa* in Bomdeling, Trashiyantse. The effect of controlled forest fire on the production of lemon grass extract is currently underway in RNR-RC Wengkhar.

ITMS is focusing on medicinal and aromatic plants; using it as active ingredients for manufacturing herbal remedies and cures. Under the MAP project, research has been carried out on a number of medicinal plants. Research priorities of these institutions vary and encompass (a) important NWFPs, (b) selected crops of high economic importance (cordyceps, matsutake, lemon grass oil,) or (c) specific groups of products (e.g. medicinal and aromatic plants).

Private sector involvement in NWFP research is almost non-existent in Bhutan unlike in China, India, Nepal and other countries where indigenous knowledge on traditional medicine is a core competence and harnessed by entrepreneurs.

6.2 Marketing Research

Marketing research is conducted by the AMS, ITMS, NRDCL and the Ministry of Economic Affairs. The office of the AMS continues to conduct market research studies for *pipla spp.*, *Swertia chirayita*, *Rubia cordifolia* and *Illicium griffithii* in the Indian markets of Delhi and Kolkata. Market research in Singapore and Thailand are explored for *Sassurea lappa*, *Aconitum*, *Shilajit*, *Picorhiza kurroa*, and *pipla*. Recently, the supply order opportunities for *Aconitum* from Singapore could not be fulfilled due to inadequate inventory data as a result not being able to estimate the supply quantities and quality (Interview with Chief Marketing Officer, AMS, 2008). Market research has been conducted for matsutake mushrooms in Japan, *Cordyceps sinensis* in Singapore and Hong Kong, turmeric and *Carum carvi* in the world markets and a compendium of medicinal herbs.

In addition, the marketing section within the Pharmaceutical Research Unit (PRU) of the institute of traditional medicine performs related market surveys, audits and selling of products from the sale counter located within the establishment complex. Market research for product development has also been carried out in Singapore and Hong Kong. Past records showed PRU sales recording Nu. 4 million in 2005 with top of the line products including *Tseringma* herbal tea, cordyplus capsules, incense sticks and powder, and herbal bath elixirs. The SFD has plans to establish market linkages to support NWFP development. Similarly, Ministry of Economic Affairs in partnership with the private sector continues to develop markets for lemon grass extracts, incense, mushrooms, handicrafts and traditional textiles.

VII. Sub-sector Analysis

7.1 Institutional and Organizational set-up

One of the major institutional and organizational challenges is the lack of effective cooperation and coordination among and between different organizations in terms of duties and mandates. Streamlining duties and responsibilities of organization(s) under one roof for mandate exclusivity and accountability is still due, despite the formation of the NWFP Working Group to coordinate among different organizations. The NWFP Working Group warrants additional member representative(s) from *geogs*, a member representative from the Ministry of Economic Affairs and a member representative from the Medicinal and Aromatic Plant project and the National Mushroom Center.

The difficulty in mobilizing farmer groups and undertaking group formation activities has been indicated as another major institutional challenge in terms of management and organizational issues. Due to the importance of NWFPs to local communities, many local initiatives and institutional arrangements in the form of village harvesting and marketing groups or cooperatives need to be established in addition to the matsutake and cordyceps farmer groups.

Although SFD has been recently given the national mandate for NWFP development, a single coordinated institutional effort towards non-wood forest resource management and utilization necessitate further strengthening. Coordination between collectors, traders, governmental and non-governmental organizations, export houses and institutional buyers continue to be weak and requires efficient institutions supported by adequate policy and legal instruments. In short, the overall management and utilization of NWFP are *ad hoc* and methodologically arbitrary in approach. Therefore, cross-departmental and cross-ministerial coordination is crucial in order to witness a well developed NWFP sub-sector in the country.

7.2 Policy and Planning

Policies and plans in the forestry sector including NWFPs have evolved with the start of the development process in the country since 1961. However, some of the key policy and legal issues that need to be made clear regarding NWFPs are presented as follows:

Regulations pertaining to NWFPs are still based on conservative policy outlook. For instance, collection permits, bans are contributing to increased bureaucracy and red tape. The current system of determining royalty rates is arbitrary and the rates remain fixed until the rules are changed.

A UNDP report titled, Macro-Economics of Poverty Reduction published in August, 2007 suggest the government imposing stringent environmental conservation policies have resulted in varying degrees of conflicts between conservation and utilization. From a long-term perspective, the precautionary steps taken by the government are laudable, as pressures arising from population growth and commercialization could lead to rapid depletion of forests and overall environmental degradation. Nevertheless, there is an imperative need to move from passive conservation to more active and sustainable utilization of forest resources, especially because forest resources provide one of the main sources of comparative advantages for the country” (UNDP, 2007).

Suggestions as outcomes of the stakeholder workshop for policy improvement are as follows;

- To review the Forest and Nature Conservation Act of 1995 and Forest and Nature conservation rules 2006 to identify sections in the act and rules that hinder proper utilization of NWFPs.
- A new section to be incorporated in order to support NWFP development

Some ways to improve implementation of NWFP regulations are by;

- developing a clear process and criteria for fixing and revision of royalty rates.
- maximizing the opportunities given by the existing legislation for equally promoting conservation and utilization for local development.
- including NWFPs as an integral part of the community forest operational plans and give higher priority to handing over large areas of NWFP rich forest and pasture lands as community forests;
- allowing and supporting farmer user groups to use their NWFP resources for income generation (royalty collection and individual income from sale);
- support to raise policy awareness among forest users, collectors, and traders.

Furthermore, as recommended in the International Expert Consultation on Non-Wood Forest Products (Yogyakarta, Indonesia, 1995 - the Government 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;
- Recognizing the socio-cultural importance/significance of the products and their resource base;

7.3 Management of NWFP resources

Successful management and utilization of NWFPs require adequate resources and efficient and effective management. Some of the issues regarding resource use and management are presented as follows;

- Inventory of NWFP resource base and annual harvesting limits
- Studies on harvesting regimes and its effect on regeneration
- Guidelines for resource assessment and management
- Research on ecological characteristics starting with the prioritized NWFPs
- Research on domestication and propagation
- Cultivation of NWFPs with greater socioeconomic benefits
- Development of NWFP management plans
- Mainstreaming NWFP development in forest planning and management
- Need for a herbarium
- Standardization and classification of NWFPs
- Training in resources assessments, cultivation, harvesting and management of NWFPs
- Need to develop a good database system that is computerized using recent softwares and methods

Solutions include community-based reforms, relaxation of proper resource pricing, research towards cultivation, proper harvesting and storage techniques, and marketing of high value NWFP species. Extension services, demonstration projects and training of villagers should follow together with the provision of low interest rate credits to the collectors or domesticators.

Although resource inventory and sustainable harvest limits in certain community forest exists, there is considerable scope for improving existing plans and upgrading the inventory information to cover other NWFPs. Site specific inventories of NWFP as part of the community forest management group efforts are required for the development of these plans.

7.4 Marketing, Market Information and Trade

Marketing and trade of NWFPs take along different alternative routes. Due to the small amounts of forest products of the individual collector, very few forest products are sold directly from the collector to the wholesaler or processor. The small quantity from each collector depresses the price received from the middleman or the final buyer and prevents the collector from receiving a larger portion of the total income generated from NWFPs. This reminds us of the small and scattered supply quantities from different growing pocket areas. Quality and product standardization is still in the learning stage.

Middlemen, the first in a series of the supply chain, initially buy the product and then move it to the next stage in the marketing channel. In a recent observation, the marketing of cordyceps, road-head traders give funds to village traders who in turn distribute cash advances to collectors. The relationship with the village trader is a life-long relationship of which the cash advance is but one component.

Several village-level traders may have business dealings in the same village, so there is competition between the traders which inhibits the development of the commodity supply chain but rather lures farmers into a more exploitive debt-bondage relationship. The village traders, as do middlemen throughout the country (similar to the scenario of mandarin exports), provide important services to the collector. The trader not only advances money during the period of food shortages, but also arranges for the transport and other post harvest services like porter services, packaging and temporary storage. It is through providing these services that the village trader is able to attract collectors, and it is through his ability to store (and thereby speculate on product prices) that enables the trader to obtain (if he speculates accurately) a fairly high return on his expenditures.

Therefore, in order to get a higher price, farmers may form an organization, whether it is a farmers' group, community user group, cooperative, etc., that will assemble the individual members' small amounts of NWFPs. In the development of marketing systems, the goal should be that such organizations have good market information, not only for the current, but also for future markets.

Rural communities continue to suffer inadequate access to sufficient information regarding market demand and price. As a result, farmers cannot respond adequately to current market trends. The lack of market information knowledge keeps local producers of NWFPs in weaker positions as compared to traders and other middlemen. A more transparent marketing chain in the form of readily available prices and demand, number of intermediaries in the industry, transport companies and their addresses and export market destinations would enable the local producers to be aware of price information from key points in the

marketing chain including what the products fetch in foreign markets. This would give local producers a stronger bargaining power with the traders.

Apart from a transparent flow of information on markets, a thorough understanding of the resource base would enable both government and industry to plan and invest in NWFPs. Sound knowledge is, for example, required on the sources and various uses of NWFPs, their economic and social importance, and the volumes and values traded locally, nationally or internationally. Therefore, keeping good statistical data available in the public domain on all aspects of NWFPs may be an effort towards encouraging transparency.

Information can be obtained on legal exports from official documents, although it should be recognized that products that are carried by porters across a border rather than on an airplane goes unreported. The amount sold, benefits/income distribution, etc., of what is not formally exported, but sold in local markets, or utilized by the forest community is therefore based on estimates from case studies, and the bits and pieces of information that are available. Therefore, one of the major roles that government agencies can play in the development of marketing information systems is in collecting and analyzing information and making it available to all players in the supply chain.

Therefore to facilitate marketing and trade the following strategies were adopted by the stakeholder workshop;

1. Value chain analysis on prioritized NWFP stakes and take care of most of the issues addressed in the issue-list, e.g. market information, market access, inventory of potential NWFPs.
2. Based on the outcomes, a further prioritization process takes place and highlights and addresses issues where intervention is required, e.g. post-harvest, processing, storage, training of entrepreneurs, formation of co-operatives.

Social forestry may commission studies based on the list of prioritized commodities.

7.5 Research

Bhutan is yet to develop specialized forest research institutions involved exclusively in NWFP research. The country's existing forest research institute is lacking in scientific and empirical findings. There is insufficient research on forest policies relating to NWFPs in Bhutan, although the department of forest has recently hosted a mission from FAO attempting to improve the country's national forest policy. On the whole, research efforts are far from adequate and

spread too thinly on several aspects. RNR-RC Yusipang may be a dedicated forest related research center but has limited capacity both technical and human to cover all research topics on NWFP-forest related concerns; especially when reliable documentation is in short supply. It is spread over a variety of products and activities, and the traditional sectoral surveys and studies are unable to capture the totality of the situation. The focus can shift anytime depending on resource availability and the changing perceptions of the management. Due to the lack of focused research in the NWFP sector, institutions are unable to address the issue of technology related to different aspects from inventorization to production and to consumption and markets.

Control is arbitrarily based on permits and ad hoc regulations. Proper quantitative inventory of NWFP has yet to be carried out; and no serious initiatives have been taken for bio-prospecting for the bio-chemical wealth of NWFPs. The full economic potential of NWFPs is yet to be realized; thus not succeeding to contribute significantly to the domestic economy.

Most NWFP research has not picked up to take cognizance of local technical know-how and to facilitate local innovations. Given the large number of products and the limited resources, it is most practical to focus on a prioritized list of NWFPs along the value chain. In this, researchers could act as facilitators and problem solvers. At the operational level, the traditional separation between research, training and extension must disappear to facilitate regular interaction between researchers and local communities. Due recognition and reward of local initiatives may go a long way to demystify research (and researchers) and to bring scientific thinking to grass root level.

Therefore, all research activities carried out within the country should be coordinated by a national agency which should also function as a liaison between national organizations and international institutes for sources of information and technology. Research capacity has to be improved, both qualitatively and quantitatively. In view of the resource constraints, priorities will have to be clearly identified and research should focus on critical high-impact areas. Linkages between institutions have to be strengthened, so that research becomes more demand driven and leads to technologies for enhanced value addition. Considering the limitations of conventional approaches, an alternative framework that provides more scope for local innovations seems necessary. Empowerment of local communities through improved access to information and technology should be a major objective of research. Mechanisms to overcome barriers to technology transfer at all levels have to be devised; otherwise the potential of NWFPs will likely remain unrealized.

Research should emphasize case studies especially those that identify as good potential towards helping communities address food security objectives and

hereafter analyze the causes of success and failure in NWFP development. Case studies are particularly needed in the areas of community management and local ownership, production and cultivation of NWFPs, sustainable utilization, equity among households, and benefit sharing from proceeds derived out of marketing.

7.6 Networking and Information Management

Despite efforts towards the formation of NWFP Working Group, networking and information management towards NWFP development is insufficient. Information on NWFP is limited particularly in terms of biology, inventory, usage and market potential both domestic and overseas. Information management systems for information management and dissemination right from taxonomy to cultivation to collection to marketing are lacking. The existing FIMS under FPUD needs to be upgraded both in terms of qualified human resource expertise and infrastructure in terms of computer networks, LAN connections, data management and processing and timely dissemination.

The current service delivery system for NWFP development in Bhutan lacks a comprehensive market information component. There is a need for a one-stop service center to find out detailed information regarding NWFPs starting from production till markets. Although the AMS, ITMS and Ministry of Economic Affairs are making attempts to address this gap in service delivery, the impression is that an integrated approach toward market information services is still not within reach of the service system today.

For instance, the lack of information on current marketing channels, amount of each product, price variation, demand, etc. cannot engage collectors/farmers in effective negotiations for a higher portion of the product price. However, beyond the information of the current status of product price, information is also needed on future supply and demand of the product, product development, and future price projections. This is the information that is needed to transform the current selling into a marketing system. Such information is not readily available to the community, entrepreneurs and policy makers.

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 is at subsistence level and as a consequence their economic importance is still largely under-estimated.

Some initiatives towards strengthening information management are as follows:

- Attempts for a comprehensive inventory of non-wood forest resources and assessments of their uses are needed.
- Develop adequate market database in terms of prices, supply and demand, markets, trends, etc.
- Surveys and analysis of the degree and extent of the subsistence and local uses of NWFPs should be conducted prior to encouraging intensive commercial exploitation.

8.7 Training and Human Resource Development

The need for building human resource capacity for NWFP development and management has been underscored in past recommendations. For instance, FRDD 2006 workshop proceedings have made clear the importance of specialized training and introducing skill development programs among communities, and introducing community capacity building activities in the areas of marketing and local enterprise development.

Training of foresters should be expanded to provide greater emphasis to non-wood forest resources and their production, utilization, and marketing. The curricula in Langmagonpa forestry institute and other educational institutions at all levels need to be expanded to include more interdisciplinary perspectives, including environmental stewardship, local equity in resource management, marketing, appropriate technology, and sustainable management of NWFPs. Where local knowledge and experience is inadequate, practical training should be provided to local growers, collectors, and processors of NWFPs to ensure sustainable and efficient use of the resources and to increase local income levels at the same time addressing sustainability concerns.

If NWFPs are to be managed sustainably among farmers as an effort towards income security, it is important that adequate human resource is available to oversee these initiatives over time. It is therefore necessary to start training people and building a team composing of well qualified professionals. Trainings may be required at all professional levels, right from management to technical expertise to extension staff at the *geog* and community level. However, such human resource capacity building objectives will need to be supported by legally binding obligation contracts and continuous management support to ensure the long term sustainability of the NWFP institution(s) in the country.

IX. Strategic plan for 2008-2020

9.1 Objectives of 2008-2020

a) Short-term objectives (2008 -2010)

- To review existing rules and regulations by ensuring the legal framework(s) are made conducive for NWFP development as instrument towards poverty alleviation and food security.
- To identify a list of NWFP products that has export potential for revenue earnings.
- NWFPs to be developed into an important export oriented sub-sector.
- To complete studies on NWFP commodity chain analysis based on the priority list as attached in Appendix 3.
- To ensure all NWFP extraction be accompanied by management plans including guidelines for inventory resource assessment.
- Development of adequate monitoring and evaluation methods on the impacts of utilization of the resource base.
- Limit illegal harvest and trade of NWFPs across the northern borders.

Box 1. Possible targets and milestones

By 2010, NWFPs will be reflected as central programs with policy and budget prioritization.

Growth rate in the NWFP value will reach ___ percent per year;

NWFP export value will increase by ___ percent per year. By 2010, the export value should target US\$ ___;

Increased rural employment involved in NWFP collection, production, processing and trade will increase by ___ percent.

Income from NWFPs will reach ___ percent of total income of farmer households; and even 50 percent of total household income in rich NWFP resources areas; contributing to poverty alleviation.

NWFP conservation and development efforts in identified national parks, territorial divisions, and community forests will be realized.

b) Long-term objectives (2008 - 2020)

- By 2020, NWFPs will become a national program in forestry production and development.

- Income from NWFPs will make substantial contributions towards rural income generation and meeting food security objectives.
- Improved capacity and awareness of people and communities on NWFP conservation and development.

Box 2. Possible targets and milestones

Value of NWFPs accounts for ___ percent of total forestry production;
 NWFP export value increases by ___ percent per year. By 2020, the export value reaches US\$ ____;
 ___ percent total unemployed labor force will involve in the NWFP collection, production and trade;
 Income from NWFPs will account for ___ percent of total income of rural households.

9.2 Overall Objectives

9.3.1 Policies, Institutions, Organizations and Legal framework

- a) Short-term objective: Create policies to promote the formation of NWFP precincts within communities and close to processing units wherever feasible through farmers groups and cooperatives.
- b) Long-term objective: Existing policy, legal, institutional and organizational frameworks should form the basis for creating an enabling and stable environment to support development of NWFPs.

9.3.2 Management of NWFP Resources

- a) Short-term objective: Continue to conduct planning for sustainable management and development of NWFP species (both wild and cultivated) in different areas of the country through community-based management initiatives.
- b) Long-term objective: Management guidelines are developed for prioritized NWFPs to promote sustainable management and commercialization in order to generate income. All NWFPs products in the country should be managed on the three principles of;
 - i. Existing policy, legal and regulatory frameworks should form the basis for further development of NWFP program.

- ii. NWFP harvesting should be based on resource availability and sustainable management principles and should not be market driven.
- iii. Resource utilization should be commonly based and not be individual based.

9.3.3 Processing, Marketing and Trade

- a) Short-term objective: Increase NWFP contribution to the national economy with NWFP export value contributing to GDP value.
 - i. Prioritize NWFPs that has processing and export potential in the market(s) according to commodity chain analysis outcomes.
 - ii. To encourage processing units of selected NWFPs.
 - iii. Organic certification of selected NWFPs with adequate brands and trademarks.

- b) Long-term objective: NWFPs to become an important export oriented economic sector through small and medium enterprises in rural areas with well established markets and trade linkages.

9.3.4 Research

- a) Short-term objective: Improve technical capacity for NWFP research organization(s) and timely dissemination of research information with interested stakeholders. To immediately address research questions like resource inventory/assessment (e.g bamboo and cane), ecological questions (regenerations, seed production), harvesting regimes, economic/market value, in close coordination with major stakeholders.

- b) Long-term objective: Focused research on NWFP sustainable management contributing to improvement of rural livelihoods and incomes.

9.3.5 Networking and Information Management

- a) Short-term objective: To upgrade existing information facility to a fully computerized database management system for accurate and timely information sharing.

- b) Long-term objective: To develop and provide an integrated information management and sharing system through use of state of the art technology and skilled human resource.

9.3.6 Training and HRD

a) Short-term objective: NWFP training and extension programs will be established based on needs and applicability at different management levels both outside the country and in the country. For example, training on resource assessment and survey methods based on the prioritized NWFPs is an area that requires attention.

b) Long-term objective: Create close links among research, training and extension of NWFP development to develop human resources to meet the reality of NWFP management and utilization. Improve community capacity in sustainable management of NWFPs contributing to livelihood improvement.

9.4 Overall Strategic Plan of Action

There is need to develop an encompassing framework on NWFPs suitable towards serving the plan objectives of sustainable management of NWFPs for the benefit of rural livelihoods.

The following actions are recommended.

9.4.1 Policies, Institutions, Organizations and Legal Framework

Action plan	Lead agency	Collaboraters
Form a National Coordination Committee on NWFPs chaired by the Head of the Department of Forest.	SFD, DoF	NWFP Working Group Members
Develop a clear terms of reference for the National Coordination Committee on NWFP.	SFD	NWFP Working Group Members
Strengthen the existing working group on NWFPs which will work under the guidance of the National Coordination Committee on NWFPs. (TOR to be prepared by the members).	SFD, DoF	NWFP Working Group Members
Establish policies to promote the formation of NWFP precincts at community levels and if possible close to processing units.	SFD, PPD, ITMS	MEA, GNHC, MoA, DYT, GYT,
Review the legislature (FNCR Act and Rules) and produce suitable recommendations which will be submitted to the NWFP Coordination Committee.	SFD, PPD, OAG	NWFP Working Group Members
Establish clear legal and policy arrangements at geog, dzongkhag and national levels for protection, production, harvesting and commercial development	SFD,	PPD, AMS, ITMS, DYT, GYT, DFO, DzFO, MEA,

of NWFPs. For example, developing a clear process and criteria for fixing and revision of royalty rates.		NRDCL,
Improve NWFP related national policies to support the harvesters and entrepreneurs through a one-stop shop service center.	SFD	NWFP Working Group
Establish policies and incentives to promote the development of NWFP craft villages, SMEs, by reduction / exemption/waivers; or/and low interest credit.	SFD, PPD,	AMS, EPC, DYT, GYT,
Simplify trade procedures to support small business; giving greater latitude to engage in regional and national commercial transactions.	MEA,	SFD, AMS, ITMS
Increase budget investments on prioritized species to encourage the development of major NWFPs both for subsistence and commercial.	PPD, DOF	MoA, GNHC

9.4.2 Management of NWFP Resources

Action plan	Lead agency	Collaborators
Improve coordination among agencies within the Ministry of Agriculture, other ministries, departments, and <i>dzongkhag</i> authorities.	SFD	NWFP Working Group
Develop management guidelines for resource assessment and harvesting methodologies.	SFD	FRDD, RNR-RCs,
Establish NWFP precincts in ecological/community areas.	PPD, DOF	GNHC, NWFP Working Group
Establish community based forest areas for NWFP species, fish ponds and plantations	PPD, DOF	GNHC, NWFP Working Group
Continue to develop NWFP management plans (CFs, Parks, FMUs)	SFD	FRDD, RNR-RCs,
Undertake economic mapping and resource base inventory of prioritized species employing scientific tools and methods.	SFD, RNR-RC Yusipang	DFO, DzFo, Extension staff, ITMS, MEA,
Identify clearly NWFP species for sustainable management in relation to <i>geogs</i> , <i>dzongkhags</i> , and regions based on the prioritized species.	SFD	DFO, DzFO, Extension, RNR-RCs
Cultivate selected NWFPs based on recommendations from technical agencies by exploring and testing possible options for increasing production in a sustainable way, such as improving production from the wild, cultivation, and improving harvesting technologies.	SFD	RNR-RCs, DzFo, ITMS,
Continue to support the establishment of specialized CFMGs like bamboo and cane, medicinal and aromatic	SFD, FRDD,	NRDCL, ITMS,

plants and lemon grass.		
Continue to promote the CBNRM activities for NWFP conservation, development and utilization through CF initiatives.	SFD, RNR-RC Bajo	RNR-RCs,
Regular monitoring and evaluation on impacts of utilization of the resource base.	SFD	DzFO, RNR-RCs,

9.4.3 Processing, Marketing and Trade

Action	Lead Agency	Collaborators
Carry out Commodity Value Chain Studies based on the prioritized list of NWFPs to further prioritize a list within the prioritized list to focus on major product groups that have good market potential and social gains.	SFD, AMS	PPD, CORRB, NMC, ITMS,
Develop a strategy of linking groups across localities through marketing groups, cooperatives and associations as an important mechanism for strengthening the bargaining power of community groups.	SFD,	NWFP Working Group
Promote local value addition to NWFPs by introducing or developing appropriate processing technologies. Conduct planning for processing and marketing networks; planning for NWFP craft villages and enterprises.	SFD	Private sector representatives, Tarayana Foundation, NRDCL,
Cerification and branding of NWFP products.	BAFRA, SFD, AMS,	PPD, MEA
Strengthen public private partnership through developing small and medium enterprises.	MEA	NWFP Working Group
Establish strategy for advertising, marketing, market information system and Bhutanese NWFP trademarks (certification).	AMS, PPD,	ITMS, private sector representatives,
Provide marketing support services to community farmer groups through business plans/feasibility studies.	AMS, MEA	NWFP Working Group
The products must be made internationally competitive (high quality, various designs and packaging and competitive pricing).	AMS, SFD	NWFP Working Group

9.4.4 Research

Action	Lead Agency	Collaborators
Strengthen existing NWFP research activities towards conducting focused research. Accordingly, strengthen research capacity in central and local levels especially in national parks, territorial divisions, FMUs and CFs.	RNR-RC Yusipang, SFD, ITMS	RNR-RCs, DFO, PM, FRDD, DzFO,
Strengthen the existing annual sectoral Research Coordination Committee. Research needs from the private sector and other agencies will need to be incorporated by the working group members.	RNR-RC Yusipang, SFD, ITMS	NWFP Working Group
Establish cooperation mechanism in research, training, extension and issues relevant to intellectual property rights and bioprospecting.	SFD, MEA	RNR-RCs, DzFO, ITMS, PPD
Associate NWFP research to actual production to solve technical problems and transfer technology for production.	RNR-RC Yusipang	DzFO, PM, DFO, Extension, CFMG,
NWFP research network is necessary to strengthen; and a system of NWFP training, extension, production and trade should be established.	RNR-RC Yusipang	PPD, HRD (MoA), DoF, MEA, ITMS,
Conduct scientific studies on harvesting regimes and effect on regeneration.	RNR-RC Yusipang	RNR-RCs, ITMS, SFD, FRDD,
Prioritize the ecosystems, habitats, species, and products for research in close collaboration with farmers.	RNR-RC Yusipang	SFD, GYT, CFMG, DzFO,
Collaborative works with research institutions, NGOs and private sector to be strengthened for possible solutions to the problems facing different management stages (production period and techniques, processing, protection, marketing, valuation, utilization, etc.) of NWFPs.		

9.4.5 Networking and Information Management

Action	Lead Agency	Collaborators
Establish and expand network linkages with regional and international institutes to foster collaboration and networking.	DoF	NWFP Working Group
Expand regional and international cooperation.	DoF	NWFP Working Group
Upgrade existing information management unit with adequate resources including both hardware and software components providing a computerized database	FPUD	SFD, FRDD, AMS,

for effective decision making.		
Develop adequate information management systems and build reliable data from production source to downstream markets in order for decision makers to make informed optimum decisions.	FPUD	SFD, FRDD, AMS,
Conduct information sharing (through workshops, seminars, forums, and study tours, etc.)	FPUD	SFD, FRDD, AMS,
Develop NWFP market information database/system.	AMS, ITMS,	NWFP Working Group

9.4.6 Training and HRD

Action	Lead Agency	Collaborators
Establish plans for human resources development for NWFP training and extension for different management levels, sectors and relevant organizations.	HRD, SFD,	PPD, MoA, ITMS, MEA, RNR-RCs,
Institutionalize a national plan on training and extension for different management levels, sectors and relevant stakeholders pertaining to NWFPs.	HRD, SFD,	PPD, MoA, ITMS, MEA, RNR-RCs,
Establish and implement the capacity building strategy for human resources development.	HRD, SFD	PPD, MoA, ITMS, MEA, RNR-RCs,
Training on sustainable management of NWFPs at different management levels both inside and outside the country.	HRD, SFD	Forest Institute, NRTI,
Develop document materials and models for training and extension for different subjects, levels and profession.	HRD, SFD	Forest Institute, NRTI,
Develop NWFP training and extension methodologies.	HRD, SFD	Forest Institute, NRTI,

X. Conclusion

Conservation and development of NWFPs is a new and strategic direction contributing to sustainable forest management and forestry socialization. Inputs to the national strategy for NWFP development of 2008-2020 is an important document. It is a basis for *geogs*, *dzongkhags*, departments and relevant organizations to study and establish plans, programs and projects on sustainable management of NWFPs. However, in order to cater to increasing levels of subsistence as well as commercial needs of a broad range of communities involved in the NWFP sector, more intensive management and utilization of NWFP is desirable. In this context, the Bhutan National Food Security Strategy Paper (BNFSSP) and the upcoming 10th Five Year Plan (2008-2013) has also

identified NWFP management as one of the critical areas of intervention contributing to sustainable use of natural resources and livelihood development.

To implement such a plan, it is necessary to have comprehensive measures like a list of quantifiable, time-bound targets that are specific, practical and realistic. Interventions must be technically feasible and financially affordable. Initiatives may be needed to create awareness, trigger policy reforms, mobilize resources, motivate actors, and forge a coalition between and within organizations to meet the goals of developing NWFPs as a powerful tool towards biodiversity preservation and commercialization benefits. It is important to establish adequate policies; capacity building for management bodies; and establishment of mechanism to ensure the participation of local people, communities and enterprise in policy establishment, monitoring and evaluation of the plan. In addition, the support from the government at a national decision making level, bilateral and multilateral development partners, NGOs, private sector and rural communities is important to realize such initiative.

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Appendix 1

ToR for the preparation of the Input paper for the NWFP strategy 2008-2020

Background

The importance and potential of NWFPs for additional income generation, food security, and biodiversity conservation has been widely acknowledged in Bhutan. As a result, NWFP development for poverty alleviation and economical development is an important priority in the 10th Five Year Plan. However, as of now, there is no strategy to guide the further development of NWFPs. The need for such a strategy was realized during the national workshop on the development of NWFPs in Thimphu at the end of last year.

The Forest Resources Development Division (FRDD) under the Department of Forest has the national mandate for NWFP development and is therefore responsible to coordinate the preparation of the National NWFP strategy. With financial support from WWF, FRDD is looking for a national consultant to prepare the inputs for this National NWFP strategy.

Specific tasks:

The national consultant will in consultation and cooperation with FRDD:

- Preparation of a clear and detailed work plan, which needs to be approved by FRDD
- Hold regular meetings to inform FRDD about the progress made
- Consult and have meetings with all parties involved in the NWFP sector, including but not limited to Ministry of Agriculture, Ministry of Trade and Industry, private sector, and donors/ foundations and NGOs
- Prepare an input document according to the outline (see Appendix 1);
- Organize and facilitate two Workshops, one half way and one at the end at the preparation of the “Current status of the NWFP situation” (see Appendix 1, Part I)
- Hold and facilitate a series of workshops for the preparation of the “Analysis of the current status of the NWFP situation” and for the strategic plan 2008-2020 (See Appendix 1, Part II and III)
- Preparation of a final document on the input to the National NWFP Strategy

Deliverables:

Input document to the National NWFP strategy according to the outline as provided in Appendix 1 in both hard and soft copy.

Time:

The total time is 3 months; the first two months are full time to prepare the part on the “Current status of the NWFP situation in Bhutan” (expected August /September 2007).

The last month (22 days) will be spread out over the period October to December for the facilitation of workshops needed to analyze the current status and develop the strategy.

Reporting:

The consultant will report to the national NWFP Working Group, which is headed by Joint Director, FRDD.

Requirements:

- At least 5 years of working experience in a relevant field
- Experience in the facilitation of workshops
- Proven record of fluency in English
- Preference will be given to people with an University Degree, experience in NWFPs and/or with experience in developing strategies

Application deadline:

Please send your CV, cover letter and copies of your degrees to Joint Director, Forest Resources Development Division.

Appendix 2

Outline for the National Strategy for NWFP development in Bhutan

Introduction

- Reasons/justification for the strategy
- General vision
- Objectives

NWFP current status

- Organizations & institutions working in the field of NWFPs
 - Government institutions: MoA and MTI
 - Private sector, NGOs and others
- Existing policy framework related to resource management, marketing, and research; planning
- NWFP resources in Bhutan
 - Priority species
 - Distribution of priority species
 - Management of NWFP resources growing in the wild
 - NWFP cultivation
- Marketing and trade
 - NWFP commodities on national market and exported
 - Marketing information and marketing services
 - Processing and value addition
 - Transport
 - Intellectual property rights
 - Entrepreneurship and business skills
- Research
 - Biological research
 - Marketing research
 - Product development
- Networking and information management
- Training and Human Resource Development

Analysis of NWFP current status

- Strengths and constraints in the field of
 - Institutional and organizational set-up
 - Policy and planning
 - Management of NWFP resources
 - Marketing and trade
 - Research
 - Networking and information management
 - Training and HRD

Strategic plan for 2008-2013

- Long term vision

- Objectives for 2008-2013
 - Overall objective and specific objectives for
 - Institutional and organizational set-up
 - Policy and planning
 - Management of NWFP resources
 - Marketing and trade
 - Research
 - Networking and information management
 - Training and HRD
 - Overall strategic plan and specific plan for:
 - Institutional and organizational set-up
 - Policy and planning
 - Management of NWFP resources
 - Marketing and trade
 - Research
 - Networking and information management
 - Training and HRD

Conclusions

Appendix 3

Priority species and their distribution¹²

Species	District	Geog
Bamboo & canes		
<i>Neomicrocalamus andropogonifolius</i> (Yula)	Mongar	Silambi, Gongdue
	Sarpang	Sershong, Dekeling
	Zhemgang	Nanglam, Bjoka, Goshing
<i>Borinda grossa</i>	Bumthang	Chomey, Chokhor, Tang
	Chhukha	Geling, Chapcha
	Lhuentse	Jarey, Metsho
	Paro	Doteng
	Samtse	Chengmari, Nainital, Samtse, Dorokha, Sipsoo
	Trashigang	Radhi, Phongmey, Bidung, Merak, Sakteng, Shongphu
	Trashiyangtse	Bumdeling
	Trongsa	Langthel, Drakten, Nubi, Tangsibji
<i>Dendrocalamus sp.</i>	Dagana	D/gang, Tsangkha, Khibisa, Kana, T/gang
	Chhukha	Metakha, Getena, Bjabchho, Bongo, Bhalujhora, Drala, Phuentsholing, Lokchina
	Lhuentse	Jarey, Metsho, Khoma
	Mongar	Saling, Tsamang
	P/gatshel	Shumar
	S/Jongkar	Louri, Serthi, Orong, Wangphu, Gomdar, Martshala, Dewathang, Phuntshothang, Pemathang
	Samtse	Bara, Tendu, Chengmari, Nainital, Samtse, Pagli, Denchukha, Bucca, Tading (all geogs)
	Sarpang	All geogs
	Trashigang	Radhi
	Trongsa	Langthel, Korphu
	Tsirang	All geogs
	Wangdue	Phangyul, Ruepisa, Gatseshoom, Gatseshogom, Nahi, Daga
	Zhemgang	Nanglam, Bjoka, Goshing, Trong, Nangkhor, Shingkhar, Bardho
<i>Calamus acanthospathus</i>	Chhukha	Getena, Metakha, Geling, Bongo, Phuentsholing, Lokchina
	Mongar	Saling, Tsamang, Silambi
	Samtse	Chengmari, Samtse, Dorokha, Sipsoo, Nainital
	Sarpang	Gelephu, Bhur, Umling, Sershong, Hilley, Jigmecholing, Dekeling, Singi
	Trongsa	Langthel
	Zhemgang	Nanglam, Bjoka, Goshing, Nangkhor, Bardho, Trong, Singkhar
<i>Calamus latifolius</i>	Chhukha	Bongo
	Mongar	Saling, Tsakalig, Tsamang, Thangrong
	Sarpang	Nichula
	Trongsa	Langthel
	Zhemgang	Nanglam, Bjoka, Goshing, Nangkhor, Bardho, Trong,

¹² This list is prepared by FRDD based on inputs from forestry officers from all Dzongkhags and former reports from Prabhat Mukhia.

		Singkhar
<i>Calamus sp.</i>	Dagana	Lajab, Tseza
	Chhukha	Bongo, Bhalujhora, Phuentsholing, Lokchina
	Lhuentse	Khoma
	S-Jongkhar	Langchenphu
	Samtse	Samtse, Chengmari, Dorokha, Sipsoo, Bara, Tendu, Nainital, Pagli, Denchukha
	Sarpang	Gelephu, Bhur, Jigmecholing, Hilley, Singi, Dekeling, Deorali
	Tsirang	Betini
	Trashigang	Kangpara
	Trashigang	Yangneer, Samkha
	Trashiyangtse	Yangtse
Trongsa	Langthel, Drakten, Nubi, Tangsibji	
<i>Plectocomia himalayana</i>	Chhukha	Metakha, Geling, Getena, Bjabchho, Bongo, Phuentsholing, Lokchina
	Dagana	D/ gang, Tseza, Lajab, Dorona
	Lhuentse	Jarey, Metsho
	Mongar	Shermung, Saling, Silambi, Tsamang
	Punakha	Kabji
	S/Jongkhar	Serthi, Lanchenphu, Orong, Wangphu, Gomdar, Martshala
	Samtse	Throughout the Dzongkhag
	Sarpang	Lhamoyzingkha, Nichula, Dovan, Jigmecholing
	Trongsa	Langthel, Korphu
Wangdue	Daga, Athang	
Medicinal & aromatic plants		
<i>Aconitum heterophyllum/ lacinatum</i> (Tsendhug)	Gasa	Lunana, Chamsa, Nawgang, Laya
	Trashigang	Sakteng
<i>Aconitum sp.</i>	Bumthang	Chag, Chokor, Chomey
	Chhukha	Chapcha, Geling, Bjabchho
	Dagana	Tseza
	Haa	Samar, Essu
	Paro	Doteng, Luni
	Samtse	Tendu
	Thimphu	Soe, Lingzi, Naro
	Trashiyangtse	Bumdeling
	Wangdue	Kazhi, Phobjika, Gangte
<i>Acorus calamus</i> (Chudala)	Mongar	Saling
	Gasa	Khatoe, Khamoe
	Punakha	Kabji, Lingmukha, Talo, Shenga, Tewang
	Samtse	Dorokha, Denchukha, Bara, Sipsu, Dumtoe, Dorokha
	Sarpang	Dovan, Jigmecholing
	Trashigang	Radhi
	Trongsa	Langthel
<i>Adhatoda vasica</i> (Tro Bashaka) – flower as vegetables	Lhuentse	Jarey, Metsho
	Mongar	Saling, Tsamang
	Trashigang	Kanglung
	Wangdue	Daga

<i>Cordyceps sinensis</i> (Yartsa guenbup)	Bumthang	Tang, Chokor
	Gasa	Lunana
	Lhuentse	Khoma
	Thimphu	Soe, Naro, Lingzi
	Trashiyangtse	Bumdeling, Yangtse
	Wangdue	Kazhi, Sepu, Dangchhu
<i>Cymbopogon spp.</i> (Lemon grass)	Lhuentse	Tsengkhar
	Mongar	Chali, Chaskar, Dramitse, Drepong, Kengkhar, Mongar, Narang, Ngarshang, Saling, Tsakaling, Tsamang
	P/gathsel	Shummar, Zobel
	Punakha	Talo
	Trashigang,	Uzorong, Bartsham, Yangneer, Khaling
	Tsirang	Patala
	Wangdue	Nahi
<i>Illicium griffithii</i>	Chhukha	Bongo
	Mongar	Shermung
	S/Jongkhar	Louri, Serthi
	Trashigang	Yabrang
<i>Picrorhiza scrophulariifolia</i> (Hong-len) <i>Neopicrorhiza kurroa</i>	Bumthang	Chomey, Tang, Chokor
	Dagana	Tseza
	Gasa	Lunana
	S/Jongkhar	Louri
	Thimphu	Dagala, Soe, Naro, Lingzi
	Trashigang	Sakteng, Merak
	Trashiyangtse	Bumdeling
	Wangdue	Phobjika, Gangte
<i>Swertia chirayita</i>	Chhukha	Bongo, Drala, Lokchina
	Pemagathsel	Nganglam, Zobel
	S/Jongkhar	Louri
	Samtse	Bara, Tendu
	Sarpang	Hilley, Dovan
	Trashigang	Khaling
	Trashiyangtse	Yangtse
	Tsirang	Betini
Incense		
<i>Juniperus squamata/</i> <i>J. pseudo sabina</i> (shup)	Bumthang	Chomey, Tang, Chokor
	Chhukha	Geling, Bongo, Bjabchho, Getena
	Gasa	Laya, Khatoe
	Mongar	Shermung, Saling
	Paro	Doteng, Luni
	S/Jongkhar	Louri
	Samtse	Denchukha, Dorokha
	Thimphu	Naro, Linzi, Soe, Toep
	Trashigang	Khaling (upper part), Merak, Sakteng, Shongphu
	Trashiyangtse	Bumdeling
	Trongsa	Nubi, Tangsibji
	Wangdue	Sepu, Dangchhu, Nahi, Nabesa, Phobjika, Gangte

<i>Ephedra geradiana</i> (Tsey) ¹³	Punakha	
	Wangdue	
<i>Rhododendron anthopogon</i> / <i>Rhododendron ciliatum</i> / <i>Rhododendron setosum</i>	Bumthang	Tang, Chokhor, Chomey, Ura
	Chhukha	Chapcha, Getena, Bjabchho,
	Gasa	Lunana, Laya, Khatoe
	Lhuentse	Khoma
	Mongar	Shermung
	Paro	High altitude of Bitekha & Susuna
	Punakha	Lingmukha, Tewang
	Samtse	Tendu
	Thimphu	Soe, Naro, Lingzi, Toep
	Trashigang	Sakteng, Merak, Khaling
	Trashiyangtse	Bumdeling
	Wangdue	Kazhi, Gangte, Phobjika
<i>Nardostachys grandiflora</i> (Jatamansi, pangpoi)	Bumthang	Tang, Chomey, Chokhor
	Chhukha	Bjabchho
	Gasa	Lunana, Laya
	Samtse	Denchukha
	Trashigang	Merak
	Trashiyangtse	Bumdeling
	Wangdue	Sephu
<i>Cinnamomum tamala</i> (Shintsa, Teespata, Dalchini)	Zhemgang	Ngangla, Bjoka, Goshing
	Chhukha	Bongo, Metakha, Getena, Lokchina
	Dagana	Dorona, Tsangkha
	Gasa	Khamoe, Khatoe
	Mongar	Shermung
	Pemagatshel	Dungmin, Nganglam, Shummar
	Punakha	Kabji, Lingmukha, Talo, Chhubu, Tewang
	S/Jongkhar	Langchenphu, Serthi, Orong, Wangphu, Gomdar, Martshalla, Pemathang, Phuntshothang, Dewathang
	Samtse	Pagli,, Sipsu
	Sarpang	Gelephu, Jigmecholing, Bhur, Sershong, Chhuzagang, Hilley, Shompangkha, Singye, Dekiling
	Trashiyangtse	Yangtse
	Tsirang	Betini
	Wangdue	Sephu, Nahi
Zhemgang	Nangkhor, Nangla, Bjoka, Goshing	
<i>Tanacetum nubigenum</i> (Sanse kaju)	Chhukha	Chapcha, Bjabchho
	Gasa	Laya
	Thimphu	Wang Bama, Genekha
<i>Terminalia chebula</i> (Aru), <i>Terminalia bellirica</i> (Baru)	Chhukha	Bongo, Bhalujhora
	Dagana	T/kha, T/ding,
	Gasa	Khatoe, Khamoe
	Lhuentse	Jarey, Metsho, Khoma
	Mongar	Saling, Tsamang
	P/gathsel	Nganglam, Shumar
Punakha	Kabji, Talo, Goenshari	

¹³ This species is regarded as one of the most important incense species by “Nado incense”. They source this species from Wangdue and Punakha districts (FRDD, 2006).

	S/Jongkhar	Langchenphu, Orong, Wangphu, Gomdar, Martshalla, Pemathang, Phuntshothang, Dewathang
	Samtse	Pagli, Sipsu, Biru, Samtse, Chengmari, Nainital
	Sarpang	all geogs except Dovan & Jigmecholing
	Thimphu	Soe, Naro, Lingzi
	Trashigang	Khanglung
	Trongsa	Langthel
	Tsirang	Patala
	Wangdue	Athang, Daga
	Zhemgang	Ngangla, Bjoka, Goshing, Trong, Nangkhor
Natural dyes		
<i>Rubia cordifolia</i>	Chhukha	Metakha, Geling, Getena, Chapcha, Bjabchho, Bongo, Drala, Lokchina
	Dagana	Tseza, Layab
	Lhuentse	Khoma, Jarey, Metsho
	Mongar	Shermung, Saling, Tsamang
	P/Gathsel	Nanong, Shummar
	Punakha	Kabji, Talo, Tewang, Lingmukha, Guma, Shenga, Liimbu, Goenshari
	S/Jongkhar	Orong, Wangphu, Gomdar, Martshalla, Pemathang, Phuntshothang, Dewathang
	Samtse	Pagli, Tendu, Bara, Biru, Sipsu, Dumtoe, Dorokha, Tading, Samtse, Chengmari, Nainital
	Sarpang	Jigmecholing, Dovan, Hiley
	Thimphu	Chang, Mewang, Toep
	Trashigang	Radhi, Phongmey, Shongphu, Yangneer
	Trashiyangtse	Bumdeling, Yangtse
	Trongsa	Nubi, Langthel
	Tsirang	All geogs
	Wangdue	Gatseshoom, Gatseshogom, Nahi, Ruepisa, Kazhi, Nyisho
Zhemgang	Ngangla, Bjoka, Goshing, Trong, Nangkhor	
<i>Rhus spp. (sewood varnish)</i>	Chhukha	Chapcha, Bjabchho, Bongo, Drala, Lokchina
	Gasa	Khatoe, Khamoe
	Lhuentse	Khoma
	Mongar	Shermung
	Punakha	Kabji, Talo, Tewang, Lingmukha, Chhubu, Guma, Shenga
	S/Jongkhar	Langchenphu
	Samtse	Chengmari, Chargharey
	Sarpang	Gelephu, Bhur, Jigmecholing, Hilley, Shompangkha
	Thimphu	Chang
	Trashigang	Shongphu, Yangneer, Khaling
	Trashiyangtse	Bumdeling
	Trongsa	Langthel, Drakten, Nubi, Tangsibji, Korphu
	Tsirang	All geogs
Wangdue	Gatseshogom	
Zhemgang	Ngangla, Bjoka, Goshing	
<i>Phyllanthus emblica</i>	Dagana	All geogs
	Chhukha	Bongo, Bhalujhora, Darla, Phuentsholing, Lokchina
	Lhuentse	Khoma
	Mongar	Saling, Tsamang

	P/gathsel	Shummar, Khar, Chemong
	Punakha	Guma, Talo, Kabji, Dzome, Shenga, Tewang, Chubu, Limbu, Goenshari
	S/Jongkhar	Langchenphu, Orong, Wangphu, Gomdar, Martshalla, Pemathang, Phuntshothang, Dewathang
	Samtse	Pagli, Tendu, Denchukha, Biru, Sipsu, Dorokha, Tading, Samtse, Chengmari, Nainital, Ghumauney, Chargharey
	Sarpang	all geogs except Dovan & Jigmecholing
	Trashigang	Shongphu, Yangneer, Bartsham, Radhi
	T/Yangtse	Yangtse
	Trongsa	Langthel, Drakten
	Tsirang	All geogs
	Wangdue	Kazhi, Nyisho, Dangchhu, Phangyul, Thedtsho, Ruepisa, Uma, Daga, Gatseshoom, Gatseshogom, Nahi
	Zhemgang	Tong, Nangkhor
Vegetables and food crops		
<i>Asparagus sp.</i> (Wild asparagus)	Dagana	Kana, D/gang
	Lhuentse	Khoma, Manji, Manbee, Gangzur
	Mongar	Shermung, Chali Chaskar, Dremitse, Drepung, Kengkhar, Mongar, Narang, Ngatshang, Saling, Tsamang
	Punakha	Kabji, Lingmukha, Talo, Shenga, Tewang, Lingmukha, Zome
	Samtse	Dorokha, Denchukha, Barra
	Sarpang	Lhamoyzingkha, Nichula
	Trashigang	Khaling, Yangneer, Bartsham
	Trashiyangtse	Bumdeling, Yangtshe
	Tsirang	L. T/Lingkhar, Patala, B/shong
	Wangdue	Phangyul, Ruepisa, Gatseshoom, Gatseshogom, Nahi
	Zhemgang	Trong, Nangkhor, Ngangla
<i>Dioscorea bellophylla</i> / <i>Dioscorea hamiltonii</i> (Tubers)	Chhukha	Metakha, Geling, Getena, Bjabchho, Bongo, Bhalujhora, Drala, Phuentsholing, Lokchina
	Dagana	all geogs
	Gasa	Khatoe, Khamoe
	Lhuentse	Khoma, Jarey, Metscho
	Mongar	Saling, Silambi, Gongdue, Khenkhar, Jumei, Mongar, Chaskhar, Ngatshang, Tsamang
	P/gathsel	Mikuri
	Punakha	Kabji, Chhubu, Tewang, Talo
	Samtse	Chengmari, Nainital, Pagli, Tendu, Sipsu, Bara
	S-Jongkhar	Langchenphu, Orong, Wangphu, Gomdar, Martshalla, Pemathang, Phuntshothang, Dewathang
	Sarpang	All geogs
	Trashigang	Khaling
	Trashiyangtse	Yangtse
	Trongsa	Langthel
	Tsirang	all geogs
Wangdue	Nahi	
Zhemgang	Nangkhor	
<i>Diplazium</i>	Dagana	all geogs

<i>esculentum</i> (Nakey)	Chhukha	Metakha, Geling, Bjabchho, Chapcha, Getena, Bongo, Bhalujhora, Drala, Phuentsholing, Lokchina
	Gasa	Khatoe, Khamoe
	Haa	Samar, Sombaykha
	Lhuentse	Jarey, Metsho, Minji, Tsengkhar, Gangzur, Dungkhar
	Mongar	all geogs
	P/gathsel	all geogs
	Punakha	Kabji, Shenga, Tewang, Lingmukha, Dzome, Talo, Guma, Limbu, Goenshari
	S-Jongkhar	Lauri, Serthi, Langchenphu, Orong, Wangphu, Gomdar, Martshalla, Pemathang, Phuntshothang, Dewathang
	Samtse	Bara, Tendu, Chengmari, Nainital Samtse, Pagli, Denchukha, Sipsu, Biru
	Sarpang	Gelephu, Jigmecholing, Bhur, Sershong, Chhuzagang, Darachu (Hilley), Lhamoyzingkha, Nichula, Karmaling
	Thimphu	Toep, Mewang
	Trashigang	Shongphu, Yangneer, Uzorong, Bartsham, Khaling, Sakteng, Merak
	Trashiyangtse	Bumdeling, Yangtse
	Trongsa	Langthel, Nubi
	Tsirang	all geogs
Wangdue	Dangchhu, Ruepisa, Gatseshoom, Gatseshogom, Nahi, Athang, Daga	
Zhemgang	Trong, Nangkhor, Nangla, Bjoka, Goshing	
<i>Elatostema spp.</i> (Damroo)	Chhukha	Metakha, Geling, Getena, Bjabchho, Bongo, Bhalujhora, Drala, Phuentsholing
	Dagana	Kana, Lajab
	Gasa	Khamoe, Khatoe
	Haa	Samar
	Lhuentse	Jarey, Metsho
	Mongar	Shermung, Silambi, Gongdue, Khenkhar, Jumei, Saling, Tsamang, Drepong, Tsakaling, Thangrong
	P/gathsel	all geogs
	Punakha	Tewang, Kabji, Lingmukha, Goenshari, Shangana, Talo
	S-Jongkhar	Serthi, Lauri, Orong, Wangphu, Gomdar, Martshalla, Pemathang, Phuntshothang, Dewathang
	Samtse	Bara, Tendu, Chengmari, Nainital Samtse, Pagli, Denchukha, Sipsu
	Sarpang	Jigmecholing, Dekiling, Dovan
	Thimphu	Toep
	Trashigang	Radhi, Phongmey, Bidung, Yangneer, Uzorong and Shongphu, Sakteng, Merak
	Trashiyangtse	Bumdeling, Yangtse
	Trongsa	Langthel, Drakten, Nubi, Tangsibji
Tsirang	all geogs	
Wangdue	Gatseshoom, Gatseshogom, Nahi, Daga	
Spices		
<i>Piper betleoides/peepuloides.</i> (Pipla)	Lhuentse	Jarey, Metsho
	Mongar	Saling, Tsamang
	Samtse	Pagli

	Trongsa	Langthel, Korphu
	Wangdue	Nahi
<i>Piper hamiltonii</i>	Gasa	Khatoe, Khamoe
	Samtse	Bara, Chengmeri, Nainital, Samtse, Pagli, Denchukha
<i>Piper longum</i>	Chhukha	Bongo, Bhalujhora
	Samtse	Tendu, Chengmeri, Nainital, Denchukha, Pagli
	Sarpang	Dovan, Jigmecholing, Hilley
<i>Piper pedicellatum</i>	Lhuentse	Khoma
	Sarpang	Dehiling, Hilley, Bhur, Chhuzagang, Umling
<i>Piper sp. (long)</i>	Mongar	Shermung, Saling
	P/gathsel	Nanong
	Sarpang	Singye, Dekiling, Lhamoyzingkha, Karmaling
	Trashiyangtse	Bumdeling
	Tsirang	Betini
	Wangdue	Nahi
	Zhemgang	Ngangla, Bjoka, Goshing
<i>Piper sp. (round)</i>	Mongar	Shermung, Saling
	Punakha	Kabji, Tewang, Lingmukha
	Wangdue	Nahi
	Zhemgang	Tong, Nangkor, Ngangla, Bjoka, Goshing
	Samtse	Pagli, Bara, Tendu, Denchukha
<i>Piper sp.</i>	Chhukha	Geling, Bongo, Bhalujhora, Phuentsholing
	Gasa	Khamoe, Khatoe
	Lhuentse	Minji, Tsengkhar
	Mongar	Gongdue, Mongar, Chaskar, Chali, Tsakaling, Silambi, Gongdue, Khenkhar, Jumey
	S-Jongkhar	Orong, Wangphu, Gomdar, Martshalla, Pemathang, Phuntshothang, Dewathang
	Sarpang	all geogs except Doan & Jigmecholing
	Trashigang	Yangneer, Khaling
<i>Zanthoxylum armatum</i> (Sichuan pepper)	Bumthang	Chokor
	Chhukha	Geling, Bjabchho, Chapcha
	Gasa	Khamoe,, Khatoe
	Haa	Samar, Essu
	Lhuentse	Jarey, Metsho, Khoma
	Mongar	Saling, Tsamang, Silambi, Gongdue, Khenkhar, Jumey
	Paro	Doteng, Luni
	P/gathsel	All geogs
	Punakha	Guma, Kabji, Dzome, Shenga, Tewang, Lingmukha, Talo, Chhubu
	S-Jongkhar	Gomdar, Orong, Wangphu
	Thimphu	Baap, Toep
	Trashigang	Khaling
	Trashiyangtse	Yangtse
	Trongsa	Langthel, Drakten, Nubi, Tangsibji, Korphu
	Tsirang	All geogs
Wangdue	Ruepisa, Thedtsho, Sephu, Gatseshogom, Phangyul	
Other plant species		
<i>Daphne spp.</i>	Chhukha	Metakha, Geling, Getena, Bjabchho, Bongo, Drala, Lokchina
	Dagana	Tseza

	Gasa	Khatoe, Khamoe
	Lhuentse	Dungkhar, Manji, Gangzur
	Mongar	Shermung, Ngatshang, Mongar, Saling, Tsamang
	S-Jongkhar	Louri
	Samtse	Bara, Denchhukha, Dumtoe, Tading, Chengmari, Chargharey
	Sarpang	Dozam, Jigmecholing
	Thimphu	Toep
	Trashigang	Bartsham, Khaling
	Trashiyangtse	Bumdeling, Yangtse
	Trongsa	Langthel, Drakten, Nubi, Tangsibji
	Wangdue	Athang, Daga, Ruepisa, Dangchhu
<i>Edgeworthia</i> sp.	Chhukha	Metakha, Geling, Getena, Bjabchho, Bongo, Drala, Phuentsholing
	Lhuentse	Gangzur, Dungkhar
	Mongar	Silambi, Gongdue, Khenkhar, Jumey
	P/gathsel	Zobel
	Samtse	Bara, Biru, Denchhukha, Dumtoe, Dorokha, Pagli, Chengmari, Chargharey
	Sarpang	Jigmecholing, Dovan
	Trashigang	Shongphu
	Zhemgang	Trong, Nangkhor
<i>Lycopodium</i> sp. (Zala-gadang)	Mongar	Saling
	S-Jongkhar	Langchenphu
	Tsirang	all geogs
	Wangdue	Phobjikha, Sephu, Dangchhu
<i>Elaeocarpus</i> sp.	Chhukha	Bhalujhora, Drala, Lokchina
	Mongar	Saling
	S-Jongkhar	Louri
	Sarpang	Nichula, Dovan, Jigmecholing
	Trashigang	Yangneer
	Trashiyangtse	Yangtse
<i>Sarcococca hookeriana</i>	Chhukha	Chapcha, Getena, Bjabchho, Bongo
	Paro	Doteng, Luni
	Punakha	Talo, Changchena
	Thimphu	Genekha, Begana, Chamena,
<i>Gerardiana diversifolia</i> (Nettle plant)	Chhukha	Drala, Phuentsholing, Metakha, Bjabchho
	Lhuentse	Jarey, Metsho
	Mongar	Saling, Tsamang
	Samtse	Tendu, Chengmari Nainital
	Trongsa	Langthel
<i>Thysanolaena</i> sp. (broom grass)	Chhukha	Metakha, Geling, Getana, Bjachho, Bongo, Bhalujhora, Drala, Phuentsholing, Lokchina
	P/gathsel	Zobel, Shummar
	Dagana	T/kha, Kana
	Lhuentse	Jarey, Metsho
	Mongar	(Shermung) Balam, Tsakaling, Saling, Tsamang, Chaskar, Thangrong, Dremitse, Silambi, Gongdue, Khenkhar, Jumey
	Punakha	Kabji, Talo, Tewang, Lingmukha, Chhubu, Guma
	S-Jongkhar	Langchenphu, Orong, Wangphu, Gomdar, Martshalla,

		Pemathang, Phuntshothang, Dewathang
	Samtse	Tendu, Chengmari Nainital, Sipsu, Biru (and further throughout the Dzongkhag)
	Sarpang	Gelephu, Jigmecholing, Bhur, Sershong, Chhuzagang, Hilley Dekiling
	Trashiyangtse	Yangtse
	Trongsa	Langthel, Drakten, Nubi, Tangsibji
	Tsirang	all geogs
	Wangdue	Nahi
	Zhemgang	Trong, Nangkhoh
Mushrooms		
<i>Tricholoma matsutaki</i> (Sangay shamu)	Bumthang	Ura
	Chhukha	Geling, Chapcha.
	Gasa	Lunana, Laya
	Haa	Bjee, Isu
	Mongar	Saling
	Thimphu	Geney, Mewang
	Trongsa	Nubi
<i>Cantharellus cibarius</i> (Sisi shamu)	Bumthang	Chokor, Chomey, Tang
	Chhukha	Metakha, Geling, Bjabchho, Chapcha, Getena, Bongo, Bhalujhora, Drala, Phuentsholing, Lokchina
	Gasa	Laya
	Mongar	Kengkhar, Jurmey
	Paro	Doteng, Luni
	Punakha	Talo, Kabji, Shenga, Lingmukha, Toewang, Dzome, Chhubu, Guma, Limbu
	Samtse	Throughout the Dzongkhag
	Sarpang	Gelephu, Jigmecholing, Dekeling, Shompangkha, Lhamoyzingkha
	Thimphu	Chang, Mewang
	Trashigang	Yangneer
	Trongsa	Nubi
Wangdue	Keyla, Gasellu, Nahi	
<i>Rozites caperata</i> (Dungshi shamu)	Bumthang	Chokor, Chomey, Tang, Ura
	Chhukha	Bjabchho
	Gasa	Lunana, Laya, Khatoe
	Haa	Kalay-la
	Paro	Doteng, Luni
	Trashigang	Khaling
	Wangdue	Khotokha, Selela
<i>Lyophyllum shimeji</i> (Ngala shamu)	Bumthang	Ura
<i>Auricularia sp.</i> (Jili namcho)	Chhukha	Getena, Bongo, Drala, Phuentsholing
	Gasa	Laya, Khatoe
	Punakha	Talo
	Samtse	Bara, Biru, Sipsu, Laharemi, Tading, Samtse, Chengmari, Nainital, Chargharey
	Sarpang	Hilley, Dovan, Jigmecholing, Chuzagang, Sershong, Phigsoo, Shompangkha, Deorali, Lhamoyzingkha

	Thimphu	Dechencholing, Yushipang
	Trongsa	Nubi
	Wangdue	Gasellu area, Khotokha

Appendix 4

List of cultivated NWFP species

Botanical Name	Transliteration
<i>Myristica fragans</i>	Za-ti
<i>Syzygium aromticum</i>	Li-shi
<i>Elettaria cardamom</i>	Sug-smul
<i>Carthamus tinctorius</i>	Gur-gum
<i>Malva verticillata</i>	So-ma-ra-zha
<i>Santalum album</i>	Tsan-den-dkar-po
<i>Pterocarpus santalinum</i>	Tsan-den-dmar-po
<i>Crocus sativus</i>	De-zang
<i>Piper nigrum</i> (white)	Pho-ba-ri-dhar-po
<i>Piper nigrum</i> (black)	Pho-ba-ri-nag-po
<i>Roscota purpurea</i>	Yung-ba
<i>Glycyrrhiza glabra</i>	Shing-mnar
<i>Cuminum cyminum</i>	Ze-ra-dkar-po
<i>Vitis vinifera</i>	Grun-drum-dkar-po
<i>Carum copticum</i>	La-la-phud
<i>Marabilis himalaica</i>	Ba-spru
<i>Tríbulus terrestris</i>	gZe-ma
<i>Mucuna imbricata</i>	Jam-bras
<i>Asparagus racemosus</i>	Ni-shing
<i>Choenomeles lagenaria</i>	Se-yab
<i>Genciana urnula</i>	Gang-ga-chung
<i>Carum carvi</i>	Go-snod-dru
<i>Triplostegia glandulifera</i>	Sga-tig-nag-po
<i>Geranium sp.</i>	Gla-sgang
<i>Codonopsis convolvulaceae</i>	Sin-ba
<i>Selinum vaginatum</i>	Tang-kun-dkar-po
<i>Corydalis gerdae</i>	sTong-ri-zil-pa
<i>Lancea tibetica</i>	Pa-yag
<i>Hypecoum leptocarpum</i>	Par-pa-ta
<i>Dracocephalum tanguticum</i>	Pri-yang-ku
<i>Chesneya nubigena</i>	sTsa-stag-sha
<i>Aconitum orochryseum</i>	Bong-dkar
<i>Aconitum sp.</i>	Bong-dmar
<i>Onosma hookeri</i>	Bri-smug
<i>Dactylorhiza hatagirea</i>	Dbang-lag
<i>Delphinium brunonianum</i>	Bya-rgod-spos
<i>Meconopsis horridula</i>	Tsher-snon

<i>Chrysosplenium forestii</i>	Gya-kyi-ma
<i>Herpetospermum pendunculatum</i>	gSer-gyi-me-tog
<i>Inula sp.</i>	Ru-rta
<i>Meconopsis simplicifolia</i>	Aut-pal
<i>Terminalia chebula</i>	A-ru
<i>Polyalthia simiarum</i>	sNing-zho-sha
<i>Cinnamomum tamala</i>	Shing-tsha
<i>Aguilaria agallocha</i>	A-ga-ru
<i>Punica granatum</i>	Se-bru
<i>Angelica sp.</i>	Ca-ba
<i>Strychnos nux-vomica</i>	Ko-byi-la