Forestry Department
Food and Agriculture Organization of the United Nations

FOREST RESOURCES ASSESSMENT

NATIONAL FOREST ASSESSMENT DRAFT WORKING PAPER:

NFA INFLUENCE ON NATIONAL POLICY MAKING

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The Forest Resources Assessment Programme

Forests are crucial for the well being of humanity. They provide foundations for life on earth through ecological functions, by regulating the climate and water resources and by serving as habitats for plants and animals. Forests also furnish a wide range of essential goods such as wood, food, fodder and medicines, in addition to opportunities for recreation, spiritual renewal and other services.

Today, forests are under pressure from increasing demands of land-based products and services, which frequently leads to the conversion or degradation of forests into unsustainable forms of land use. When forests are lost or severely degraded, their capacity to function as regulators of the environment is also lost, increasing flood and erosion hazards, reducing soil fertility and contributing to the loss of plant and animal life. As a result, the sustainable provision of goods and services from forests is jeopardized.

In response to the growing demand for reliable information on forest and tree resources at country and global levels, FAO initiated a programme to provide support to national forest assessments (NFA). The programme includes developing a harmonized approach to NFAs, information management and support to policy impact analysis for national level decision-making.

The purpose of the initiative is to introduce countries to an alternative approach designed to generate cost-effective information on forests and trees outside forests, including all benefits, uses and users of the resources and their management. Special attention is placed on monitoring the state and changes of forests, and on their social, economic and environmental functions. Another main objective is to build national capacities and harmonize methods, forest related definitions and classification systems among countries.

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Purpose of paper: To illustrate how the results from the NFA project in Lebanon can provide input to current policy discussions at national level.

1. Introduction

The Republic of Lebanon is situated on the Eastern shores of the Mediterranean Sea, approximately between 35.2 - 36.6 E and 33.1 – 34.7 N.

Lebanon covers a total of 10452 km^2. The topography is characterized by the Mount Lebanon and the Anti-Lebanon mountain chains that run parallel to the coast and are separated by the Beqaa Valley. [1] Please refer to figure 3 for a topographic map of Lebanon.

The ecological conditions of Lebanon are determined largely by topography and vary with altitude and exposition. The climatic conditions vary from Mediterranean climate along the coast and the mid altitudes of the mountain ranges, via sub alpine or mountain Mediterranean climate on the highest slopes to arid/sub-desertic in the northern plains.

Most rainfall occurs between November and March. The mean annual rainfall on the coast ranges between 700 – 1000 mm.

The central part of the Mount Lebanon coastal range receives up to 1600 mm annually. In the Beqaa Valley the rainfall ranges from 200 mm in the north east to 800 mm in the south.

The Anti Lebanon receives between 600 mm in the north to 1000 mm on Mount Hermon.

Based on the climatic index (CI = Precipitation / evapotranspiration) Lebanon can be divided into the following Zones (MOA 2003).

Arid		0.10 < CI < 0.25
Dry Sub-humid		0.25 < CI < 0.65
Semi Arid		0.65 < CI < 1
Sub-humid humid	and	CI > 1

The main forest and OWL species of Lebanon are *Quercus calliprinos, Q. infectoria, Q. cerris, Juniperus excelsea, Cedrus libani, Abies cilicica, Pinus pinea, Pinus halepensis, Pinus brutia*, and *Cypressus sempervirens*. The bulk of the forest area consists of oak and pine stands (ASMAR, F.R., 2003).

Existing datasets
Prior to the National Forest and Tree Inventory and Assessment of Lebanon (TCP/LEB/2903) two datasets existed (MOA/FAO 2003):

[1] FAOSTAT area of Lebanon is 10400 km^2

The 1962-1965 1:50.000 Forest Type Map of Lebanon.

This data set is prepared from 1962 aerial photography at 1:25.000 with substantial ground checking. (DIRECTORATE OF GEOGRAPHIC AFFAIRS, LEBANESE ARMY, 1965**).**

The dataset is of very high quality but as the last 4 decades have seen major changes in the land cover of Lebanon, the 1962-1965 dataset is somewhat outdated. The dataset distinguishes between the following forest types:

Forest Type	Crown closure	Species
Oak coppice – open	10 – 30 %	*Quercus calliprinos, Q. infectoria,* with or without some *Pinus brutia, Juniperus* and Maquis *spp*. in varying proportions.
Oak coppice – closed	> 30%	
Oak standards – open	10 – 30 %	*Quercus calliprinos, Q. infectoria, Q. brantii, Q. cerris*
Oak standards – closed	> 30%	
Pinus brutia – open	10 – 40 %	*Pinus brutia*
Pinus brutia – closed	> 40%	
Pinus pinea –	predominantly regeneration or pole stands	*Pinus pinea*
Pinus pinea – open	10 – 40 %	
Pinus pinea – closed	> 40%	
Cedar – open	10 – 40 %	*Cedrus libani* with or without some *Quercus spp., Juniperus spp.* and *Abies silicica* in varying proportions
Cedar – closed	> 40%	
Fir – open	10 – 40%	*Abies cilicica* and *Juniperus spp*. with or without *Cedrus libani*, *P. brutia and Quercus spp*. in varying proportions.
Juniper – open	10 – 30 %	*Juniperus excelsea, J. foetidissima* with or without *Quercus calliprinos and Q. infectoria* in varying proportions
Juniper – closed	> 30%	
Cypress		*Cypressus sempervirens*, usually in mixture with *P. brutia.*
Areas of mean crown closure <10% i.e. scattered trees and / or dispersed stands too small to map individually are also indicated in the forest type map.		

The 2000-2002 mapping of the Land Cover / Land Use (LCLU) under TCP/LEB/2801.

The mapping of the land cover was designed for agricultural census and is based on FAO's Land Cover Classification System (LCCS). The mapping is very accurate and employs minimum polygon-areas of 2000 m^2. The merged set of Landsat 5 and IRS-1D were used to produce the map supported by extensive ground validation. The resolution of the merged images is about 5 meters.

As far as the areas of forest and OWL are concerned the LCCS does not translate readily into the global classes employed by FRA because different threshold levels for stand height and crown cover are employed to distinguish forests and OWL from other land. The minimum area employed for the Land Cover Land Use (LCLU) map is 0.2 ha, while it is 0.5 ha for FRA. Being based on remote sensing with some ground verification, the LCLU map does not contain stand parameters, related to standing volume, uses and management (DALSGAARD, S., 2003A).

Justification

As a consequence of the 1975 - 1992 civil war, developmental programmes were brought to a stand still for 2 decades, the environmental and natural resource base of Lebanon has been badly damaged and is under serious threat from causing factors such as urban sprawl, overgrazing, quarrying etc. Following the end of hostilities the resource depletion has been fuelled by the growth in economy and population.

The Government of Lebanon is increasingly concerned about the deep social, economic and environmental consequences of the depletion of the natural resources. The government requested the assistance of FAO in order to build the local capacity to monitor and report these changes in land cover with special focus on the woody resource thus enhancing the ability of the national institutions to plan for and respond to this dynamic situation.

Timely, easily available and accurate information on forest and TOF resources and their utilization is a precondition for sustainable management of these resources based on an environmentally, socially and economically balanced forest policy. The pre-TCP/LEB/2903 level (extent and quality) of information on the forest and TOF resource of Lebanon was perceived inadequate to support national policy decisions and to monitor and counteract resources depletion and environmental degradation.

A broad knowledge on the forest and TOF resources is critically needed for redefining the policy and strategy of the Forest Department as well as for developing a comprehensive national forestry action plan. The Government considers the formulation of its forestry action plan as a first priority once the results of the current inventory are analyzed and reported upon.

The Government therefore requested the technical assistance of FAO under the Technical Cooperation Programme to assist the Directorate of Rural Development and Natural Resources (DRDNR) to develop capabilities to survey the country's resources to monitor trends and changes, to describe their nature and localities and to advise on protective measures where required for resources at risk (MOA/FAO 2003).

Objectives of the Study

According to the Project Document of TCP/LEB/2903, the main objective was to reinforce the capacity of the Directorate of Rural Development and Natural Resources (DRDNR) in collecting, compiling, analyzing and disseminating reliable and up–to-date information on the forest and trees outside the forest (TOF) resources of Lebanon through training of the national staff on forest and tree inventory.

To meet this target six main project outputs are described in the Project Document (MOA/FAO 2003):

Output 1 The capacity of the Forestry Department of the DRDNR to plan and implement forest inventories, monitor the resources, manage the related information, and contribute to advance sustainable forest and tree management by enabling an increased use of forestry knowledge in forest policy development and implementation enhanced and strengthened.

Output 2 The national team within the Forestry Department and the Regional Development Services adequately trained in forest inventory and assessments techniques and project management through on-the-job training, workshops and study tours.

Output 3 As part of the training programme, a forest and tree cover map produced at appropriate scale on the basis of harmonised and standardised vegetation classification system according to national and international requirements. The satellite Landsat TM data available with the UTF/LEB/016 within the Ministry of Agriculture will be used.

Output 4 Methodology of forest and tree assessment defined on the basis of the approach developed by FRA and taking into account the information needs for national use and international reporting, pilot assessment carried out in selected and representative field sample sites in the country with focus on the multiple functions (environmental, social and economic) of the forest and tree resources, their management, uses and users, health and monitoring of the forest and tree resources set up and a register of permanent observation sites for future surveys established.

Output 5 A data base based on the pilot assessment on the forestry resources established and the results disseminated to users.

Output 6 Priority areas identified and recommendations given to the trained national team from the Forestry Department to build on the project findings in order to develop a forestry action plan, reformulate forestry policy/strategies if needed, identify specific projects for detailed forest inventories, forest and tree resources development and/or conservation, etc.

2. NFA project implementation

Institutions involved in the implementation of the NFA

TCP/LEB/2903 is undertaken by the *Directorate of Rural Development and Natural Resources* (DRDNR) and is implemented in the field by the *Rural Development Services* (RDS), in collaboration with the Forestry Department of the *Food and Agriculture Organization of the United Nations* (FAO). It is implemented under the *Technical Cooperation Programme* (TCP).

Among the other institutions and organizations that have contributed significantly to the progress of the NFA specifically the following should be mentioned:

The *Ministry of Defence- Department of Cartography* provided the project with georeferenced colour topographic maps (1:20.000) allowing for the production of accurately georeferenced field maps for the field teams. The Cartography office also assisted with the scanning and georeferencing of the 1962-1965 map of forest types.

The *Ministry of Defence- Office of Demining* provided the maps of the known mined areas – to be used along with the field maps and to identify inaccessible areas (mined areas or areas that for other military reasons are inaccessible).

A formalised collaboration between the DRDNR and the *Directorate of Studies and Coordination* (DSC) within the Ministry of Agriculture concerning the use of and access to data and equipment was encouraged by the Project Document. Although a formal Memorandum of Understanding was not signed, there was full access for the TCP/LEB/2903 to use the merged satellite images, the LCLU map and the A0 plotter of the DSC that were products of the Land Cover Land Use (LCLU) Mapping Project (TCP/LEB/2801).

The *National Council of Scientific Research* (NCSR) has made recent satellite images available to the project and been supportive in the original analysis of the LCLU map.

The following institutions and organizations contribute to the project through their appointment of professionals and scholars to the Project Steering Committee: *Université St. Joseph*, *National Council of Scientific Research*, *Lebanese National University*, *Directorate of Studies and Coordination*, *Ministry of Environment*, *Association for Forest Development and Conservation* (*AFDC - an environmental NGO*).

Staff

In accordance with the Project Document, the DRDNR provided all the needed national counterpart staff at secretariat and professional level. The DRDNR through the RDS provided all the national personnel for the field work. The Government appointed a National Project Coordinator, who held the overall responsibility for all aspects of the project activities, with direct reference to the Director General of MOA.

5 field teams were established, equipped and trained during the first phase of the project. Each field team is headed by the Team leader who is normally the Chief of the NRRDD under MOA/Regional Services in the respective Mohafazas.

In accordance with the Project Document, the following consultants / FAO Staff support was attached to the Project: International Consultant Forest inventory and Mapping; TCDC Forest Inventory Consultant; National Consultant Forest Inventory; National Consultant Remote Sensing; National Consultant Institutional Development.

At the start of the third phase of the project, the recruitment of a specialist in data analysis and statistics was unanimously recommended by the NPC, the IC, the FAO technical backstopping officer and FAO Lebanon to ensure high quality data processing and statistical analysis on the large quantity of detailed field data collected during the field work phase. The specialist has through the data-processing and analysis work ensured that the staff of the RDNRD was adequately trained in data processing and statistical analysis so that the staff of the Directorate can perform the tasks related to data processing and analysis in future repetitions of the inventory. Thus the recruitment of the specialist has implied a substantial capacity building component for the RDNRD.

3. How can the NFA support national policy discussions?

Prior to this project, the figures and estimates that were used in the country showed the following land cover areas:

Forests with cover of at least 10%:	7%
Forests, sparse (less than 10%):	6%
Abandoned lands:	7%
Rocky, non-cultivated lands, degraded rangelands:	52%

The National Forest and Tree Inventory and Assessment of Lebanon (TCP/LEB/2903), implemented by the Directorate of Rural Development and Natural Resources in the Ministry of Agriculture has allowed for a precise estimation of the land use area:

Type	$\bar{x}$%	S_x	S_E	S_E%	

The forest area in Lebanon, estimated to 13.3% of the total area is divided into three sub-classes: Coniferous, Broadleaved and Mixed forest.

Type	$\bar{x}$%	S_x	S_E	S_E%	(ha)
Coniferous	32.2	0.1056	0.207	66.35	44,879
Broadleaved	56.6	0.1112	0.218	37.01	78,887
Mixed forest	11.2	0.112	0.057	113.13	15,610
Total area	**100**				**139,376**

The results show that the forest area in Lebanon is dominated by the broadleaved forests representing 56.6% of the total forest area (78,887 hectares). The coniferous forests can be considered as the second important class for 32.2 % of the forest area (or 44,879 hectares). The Mixed Forest class, defined as a forest containing at least 25% of one component and 75% of the other components, is about 11.2% (or 15,610 hectares) of the forest class.

One of the main objectives of the Government of Lebanon, in terms of forest development has always been to reach a level of 20% of forest cover in the country. This objective was rather unrealistic as it was based on emotional drives. The figures provided through the NFA show that the total surface area of the woodlands exceeds this 20% objective (Forests + OWL = 23.7%). Different objectives should now be set, based on realistic facts and figures. Reforestation/afforestation remains a must, but the objectives should be set differently, and most importantly, the availability of lands to this purpose should be identified.

As in most of the Mediterranean countries, wood does not constitute a major forest product, despite the fact that some of the Lebanese species, like the cedars, the junipers and some oaks could produce a wood of a very good quality. However, the present structure, cover and distribution of the forests do not allow for such a production. Several rural communities still depend on fuel-wood and on charcoal production despite the fact that current legislation forbids the production of charcoal. Non-wood forest products are the main income generating activity from the forests and several rural communities depend on these products for their living. These are mainly pine nuts, carob pods (for the production of edible molasses), aromatic and medicinal plants and grazing. An estimated number of 212 species in Lebanon have an economic value and are considered as medicinal plant species or edible crops. The current expansion of ecotourism, agri-tourism and rural tourism is leading to a sharp increase of the role of the forests in poverty alleviation. The appropriate management of the forests and other wooded-lands would play a very important economic role, allowing for the sustainable harvesting of wood and non-wood products and for the provision of services with a high market value, such as eco-tourism. This sustainable management would have a direct and tangible effect on the different efforts aiming at the alleviation of poverty.

Severe constraints hinder the development of the forestry sector in Lebanon, the most important of which being the little interest given by the Government to this sector and the very limited budget allocated to the development of this sector.

One of the most important challenges facing the forests and forestry in Lebanon is the conflict on land use. The development of urbanization and the need to increase the agricultural production can only be at the expense of the forests and range lands. This challenge can only be faced with proper land use planning, and certainly the adoption of the land planning scheme (Schémas Directeur de l'Aménagement du Territoire Libanais) or the development of another integrated land use program.

The Rural Development and Natural Resources Directorate will soon start developing a forest policy and national forest program, in collaboration with the different concerned state and non-state stakeholders. Another important challenge to be faced is the integration of the policy and the program in the overall development programs of the country.

The free trade and open markets policies and the decrease of interest in the agricultural sector, could have a positive consequence on the forestry sector, by reducing the development of new agricultural projects, thus reducing the risk of land use conflict in this respect.

The low income generated by the traditional forest related activities will certainly decrease the stress put on the forests and the overexploitation of the resources. However, if the exploitation is not controlled, and if illicit felling still occurs, some of the rural population may have the tendency to overexploit the resources in order to meet their immediate needs and demands. This double sided blade will only be dealt with through appropriate legislation, awareness raising and sustainable management.

The encouragement of forest plantations will present another opportunity as it will allow for the exploitation of these plantations at maturity, for fuel and industrial wood thus reducing the stress caused on the natural forests. This activity could also offer the opportunity of applying certain aspects of international treaties and agreements.

The different ecosystems in Lebanon are submitted to several constraints, linked to climate and its irregularities, lands and their narrowness and are strongly affected by the socio-economic conditions. Erosion, drought, inundations, salinisation and forest fires add to these constraints. Different solutions were brought to overcome these constraints and difficulties (terraces, collective management of the resources, irrigation schemes…). However, these solutions were very demanding in terms of manpower with a relatively low yield. They were therefore not able to survive the 20th century with its demographic, political, technological and socio-economic evolutions.

The abandonment of these good cultural and land management practices, caused by a higher demand under strong economical constraints has led to overexploitation in some parts of the country and to an agricultural regression in some other parts. This had a strong negative impact on the landscape and on the lands: erosion on abandoned terraces, salinization, degradation of the vegetation cover, overgrazing, loss of biodiversity and of landscape diversity, increase in forest fires…However, the abandonment of the cultural practices and the migration from rural areas has also allowed for a "biological recovery" with forests and other wooded lands reinvesting marginal lands and agricultural fields.

The forest ownership in Lebanon is almost equally distributed between the private sector, the public sector and the religious communities (1/3 for each group), under several tenure systems. However, cadastre is not always updated and surface areas and boundaries are not always clearly set. The different land tenure systems are the following:

The Waqf: they are usually lands owned by religious communities or by extended families. They are managed by individuals assigned by the group of owners or by the community.

The Macha'a: they are communal lands owned by a municipality and managed by the municipal council.

The Amiri: they are lands owned by the state, normally managed by the Ministry of Agriculture, but sometimes their management is referred to the communities.

The Mulk: they are private lands, owned by individuals.
The users of the forest areas may not be the owners. Rentals, usufructs, customs and agreements are used to regulate this system. Forest workers, private rural companies or shepherds may be allowed to use the space under these usage systems.

The figures provided by the NFA show that the ownership of the forest can be divided into private, state, municipality community, other and not known. The proportion and the estimated area are shown in the following table:

Land tenure	$\bar{x}$%	S_x	S_E	S_E%	(ha)
private	60.8	0.124	0.243	40	84,741
State	25.2	0.112	0.22	87.3	35,123
municipality	10.6	0.076	0.149	140.5	14,774
community	1.7	0.034	0.068	400	2,369
Other forest	0	0	0	0	0
Not Known	1.7				2,369
Total	**100**				**139,376**

For the other wooded land area, we consider the three classes: Private class, Public class in which we merge the State, municipality and community classes into the same class, and Not known class where all other forms of ownership are classified.

Land tenure	$\bar{x}$%	S_x	S_E	S_E%	(ha)
Private	82.5	0.09	0.18	21.8	89,412
Public	15.1	0.087	0.172	114	16,365
Not Known	2.4	0.035	0.07	291.6	2,601
Total	**100**				**108,378**

The monitoring system implemented through the NFA, will allow for the identification of the trend of privatization of public land, and the way this land is being utilized. As no figures existed before, it is difficult to understand these trends.

There is no written forest policy in Lebanon. The Ministry of Agriculture is developing laws, legislation and projects in a certain framework, aiming at the conservation, promotion, development and management of the forest and tree resources. The Ministry of Environment has developed and is implementing a reforestation plan.

Among the activities the MOA is undertaking, we cite:

- Enforcement of the law and legislation
- Issuing of new laws, decrees and legislation
- Forest conservation and development
- Reforestation/afforestation
- Promotion of non-wood forest products
- Capacity building of concerned stakeholders
- Institutional development
- Conservation of monument and heritage trees
- Design and implementation of public gardens

Despite the very limited budget allocated to the Ministry of Agriculture, the RDNRD is undertaking a series of activities aiming at increasing the forest cover of the country and improving the living conditions of several local communities.

Forest seedlings are distributed every year to municipalities, community based organizations, NGOs and particulars. Those seedlings are usually planted along the road sides or on communal plots for reforestation or afforestation. The RDNRD is undertaking the plantation of trees along the road sides in several villages and rural towns and along national roads. This directorate is also developing public gardens in several villages in different parts of the country.

In an effort to preserve monumental trees, the RDNRD undertakes the restoration of very old monumental oak trees, usually planted in villages next to churches or mosques.

One of the tasks assigned to the Rural Development and Natural Resources Directorate in the MOA is the reforestation and afforestation. During the 1960's and 1970's the MOA has undertaken major projects in different parts of the country. During the years of war, several sites were prepared, roads opened and terraces built. However no major reforestation/afforestation activities were carried out, because of lack of budget, personnel and political stability.

Plantations undertaken until the beginning of the civil war include mainly indigenous species. The largest plantations are made of *Pinus pinea* raised for the production of the pine nuts, *Pinus brutia, Pinus halepensis, Cedrus libani* and *Cupressus sempervirens.* The main objective of these plantations is the rehabilitation of the vegetation cover.

At the end of the war, the MOA's main concern was to restructure itself and build the capacities of the newly recruited guards and engineers. Very little was done in terms of reforestation/afforestation.

Since 2002, and despite the lack of budget allocated to the RDNRD, a trans-boundary afforestation project is launched between Lebanon and Syria, on the Eastern slopes of the Anti-Lebanon chain. The RDNRD is in charge of the Lebanese part of the project which consists of several hundreds of hectares at an altitude ranging between 1,200 and 1,450m. Several indigenous species, native to the area

are used. These species are known for their drought tolerance, as the area is submitted to a semi-arid climate, with a strong influence from the Syrian Desert. The species used are: *Cedrus libani, Quercus calliprinos, Pistacia palaestina, Pirus syriaca, Amygdalus orientalis* and *Rhus coriaria*. A drip irrigation system is installed to provide water during the summer, thus increasing the chances of survival.

Wood production is a minor activity of the forestry sector in Lebanon. Non-wood forest products constitute a major aspect of this sector and a major activity in several rural areas. As other low forest cover countries in the Mediterranean region, the wood production in Lebanon is very limited and restricted to fuel wood in some areas. However, future plantations could play an important role in this aspect, if the appropriate species are planted.

The exploitation of non-wood forest products is tolerated in some cases and encouraged in some other cases. As a matter of fact, wild *Origanum* sp. and Salvia sp. are harvested for local consumption and for export. A decree was issued to regulate and organise the harvesting and export of these plants. The decree allows the harvesting after the flowering period. This insures the sustainability of the species, in addition to the fact that these flowering aromatic plants are highly appreciated by honey bees. *Origanum* for example can only be exported if processed, thus encouraging the development of small industries. Uprooting of both species is forbidden. This decree is therefore a good tool for rural development and nature conservation in the same time. The exploitation of the *Pinus pinea* forests for the production of the pine nuts is strongly encouraged, along with that of the *Ceratonia siliqua* for the production of the carob molasses, which is locally used and exported as a desert. Residues of the molasses production are used as animal feed and as compost. Seeds are exported to be utilised in several industries. The Ministry of Agriculture encourages reforestation with those two species in the appropriate areas (500m and below for the *Ceratonia siliqua*). Several rural communities depend on these two species for their living.

A tax policy is being applied to encourage the production of pine nuts from *Pinus pinea*. The Ministry of Agriculture has set a maximum price for the kilogramme of pine nuts (20 USD) above which the top quality nuts should not be sold on the local market, in addition to the imposition of taxes on the import of nuts. This policy encourages the local production and pushes the consumer to give the priority to the local pine nuts.

Ecotourism is an expanding activity in the forests of Lebanon, attracting local and foreign tourists. However the valuation of this service is not properly studied yet, as currently only private initiatives are developing this sector.

Until today, very little coordination exist between the ministries in charge of the forestry sector, namely the Ministry of Agriculture, the Ministry of Environment, the Ministry of Energy and Water (watershed management), the Ministry of Interior (municipalities) and the Ministry of Finance. The coordination among all the concerned institutions and the stronger collaboration with the civil society will have a great influence on the sustainable management, the protection and the conservation of the forests and other natural resources.

Strengths, Weaknesses, Opportunities and Threats analysis

Realizing the importance of the initiation of a national dialogue for the elaboration of a national forest policy (or forest and range policy), prior to the preparation of the National Forest Programme, the DRDNR has used the momentum created by the NFA project to introduce the concept of forest policy. To that effect a SWOT analysis was undertaken during one of the workshops organized in the framework of the project. The participants in the workshop, from different institutions, government and non-government organizations and universities and research centres, came up with the following analysis:

Strengths	**Weaknesses**
Administrative resources • Qualified staff, in the central administration and in the regional offices • Efficient, well trained and educated forest guards • Efficiency of administrative procedures • Forest legislation • Technical team, RDS are based in the regions and are responsible for the forest protection. • Database • Maps • Statistics • Protection • Law enforcement Natural conditions • Climate • Topography, geology, landscape • Ability to renew and exploit • Biodiversity Human resources • Recruitment of more forest guards • Good environmental awareness • Community and NGOs • Public commitment to laws Forest Exploitation • Many NWFP give an added value • Grazing • Ecotourism • Fuel wood production	Administrative • Lack of forest policy • Restrictions • Contradictory laws • Political implications • Absence of forest management plans • Absence of policies to raise awareness concerning forests • Weak coordination between concerned organizations • Overlapping responsibilities for different ministries • Absence of land zoning and land use planning • Gaps in legislation • Low salaries • Lack of forest research • Need for further capacity building at all levels (forest guards, engineers, civil society…) Natural conditions • Presence of dry areas • Topography and geology Human resources • Raising awareness is not high priority • Greedy exploiters • Weak educational program concerning forests • Weak programmes aimed at NGOs and local communities Forest Exploitation • Overgrazing and absence of rangeland management • Illicit wood harvesting • Lack of framework law for ecotourism

	• Illicit harvesting of some NWFP • Economical crisis: abuse of natural resources • Mismanagement of communal land • Weakness in forest fire management • Weakness in pre and post fire management

Opportunities	**Threats**
• Presence of national and international projects and funding • Availability of skilled people • Potential for selling forest products • Knowledge of forest production • Reforestation projects • National Forest Programme for Sustainable Forest Management • Presence of rural population – forest protection • Potential land for reforestation • Presence of nurseries • Legislation: Government can reclaim deserted land • Agro and Ecotourism • Introduction of forest knowledge in educational programmes • Management of forest resources • Benefit of the positive support • Advertising • Management of medicinal plants • Publication of booklets • Distinction between reserves and forest areas • Reforestation • Reinforce the role of the municipalities • Awareness raising program • Communal forests	• Forest fires • Urban expansion • Quarries and gravel pits • Overexploitation of the forest • Greediness • Political implication • Misinterpretation of responsibility • Urban expansion • No participation from local stakeholders • Pollution • Increasing poverty level • Rural poverty • Increasing degradation/desertification due to human and natural causes • Lack of implementation of the forestry law • Urbanization • Insects and diseases • Climate change

The SWOT analysis indicated many strengths and opportunities, as well as areas where there are still possibilities for further work and potential hazards to the national forest heritage. Using the many strengths of the present organization and making use of the opportunities the challenges can be overcome.

Among the perceived strengths of the forest sector in Lebanon the presence of the forest centers in rural areas and the fact that the DRDNR through forest guards is present throughout the country. The forest guards have good local knowledge as they are part of the local communities. The high level of skills among the forest guards, technicians and engineers as well as the recent NFA data were recognized by the working groups as assets. Active NGOs and environmental awareness among the rural population were likewise perceived as strengths. The sheer topography of Lebanon provides some protection to the forests as there are difficult to exploit and at times even inaccessible for exploitation.

The need for land zoning and management plans e.g. for communal land was identified as areas in need of focus. Ensuring coordination, coherence and comprehensiveness of legislation and enforcement of law were identified by the working groups as areas for further consideration. Economical crisis often leads to overexploitation and overgrazing with a potentially serious impact on the forest resources. The need for better management of grazing, forest management plans and a stronger rural presence of MOA were identified. The need for detailed forest maps for management purposes was expressed.

The continuous capacity building of the staff in the Ministry of Agriculture and the presence of projects to support sustainable forest management were identified as opportunities.

Ecotourism was indicated by all groups as an opportunity for combining use and protection of forests. The groups pointed to the possibilities that lie in engaging the rural population in forest management and forest protection.

The potential threats to the forest were identified as largely of a human nature e.g. forest fires, and the negative impacts of poverty and over-utilization. Conversion to other land uses e.g. through urban expansion, quarrying and degradation were identified as issues of concern. The presentations emphasized the importance of involving the local stakeholders actively.

All groups pointed to the importance of increased collaboration between institutions (administrative, research, NGOs etc).

The NFA contributes in the acquisition of an increased knowledge of the forest and tree resources. It also helps the start-up of a process where the forest sector in Lebanon through combined efforts can advance even further by using timely and relevant information provided by the NFA. The relevance of the gathered information is largely decided by how it is put to use at national level for e.g. policy making and how the information collected can help steering towards the target. The gathered information also helps identifying remaining information gaps and areas in need of further study.

Among key issues that were recommended to be encompassed by a national forest policy were the importance of linking forest management to rangeland management policies and also to distinguish between legislation related to forest areas and to protected areas. General measures such as increasing awareness on the

importance of forests among users and decision makers were identified. Introducing reforestation fees when land is cleared from forest was suggested. Some groups pointed to the need for less restrictive laws for allowing for a more active sustainable forest management. It was indicated that the sector should be allocated more staff to be in a better position to enforce laws and involve the local population in the management of the resources. The importance of embedding the NFA as a regular activity for future monitoring was emphasized.

The overall recommendations for institutions for collaboration points to numerous possibilities for future collaboration as there are many areas of common interest between the different stakeholders (line ministries, municipalities, local communities, research community, NGOs etc).

Identification of key issues

After the SWOT analysis, the participants brought the following suggestions for key issues to be addressed by a national forest policy document and the utilization of the NFA in this process:

- Law enforcement taking into consideration the results of the NFA.
- Definition of the potential of the forest to be exploited, for wood, non-wood forest products and other forms of exploitation, like ecotourism.
- Restoration of the relationship between the forests and the neighbouring communities.
- Development of a framework legislation for protected areas.
- Distinction between forest legislation and the protected areas legislation, definition of protection levels.
- Promotion and support of scientific research.
- Assessment of potentials of forest products and services
    - Rangeland
    - Wood
    - Charcoal
    - NWFP (medicinal, aromatic and culinary plants, fruits, mushrooms, honey…).
- Provision of necessary funds and staff to secure the periodical conduction of NFA (every 5 years).
- Use of information provided through the NFA for the implementation of sustainable forest management.
- Collaboration with universities and other research institutions for the development of research works on issues like: carbon and biomass estimates; growth models…
- Provision of a continuous training system for NFA through the regular measurement of additional tracts.
- Use NFA methodology to study fodder species, or include range species in next NFA exercise.
- Development of a link between forest and rangeland policies, or a common forest and range policy.
- Development and implementation of a proper awareness raising strategy:
    - Importance of forests/owl/ToF/rangelands…

  - Laws
  - Publications
- Development of a derived forest map.
- Combination between the forest map and cadastre maps to identify areas to be reforested/afforested.
- Implementation of natural corridors to reduce the level of fragmentation of the forests and other wooded lands.
- Development of a forest fire management policy (including pre and post fire management)
- Promotion of partnership and cooperation between government and citizens
- Encouragement of forest plantations for the production of NWFP e.g. carob, pine, walnut
- Development of appropriate legislative amendments
- Increase in the production capacity of local nurseries
- Integration of wood demand and removals in the annual reforestation/afforestation programmes.

The current political situation in the country and in the region being unstable and unpredictable, it is very difficult to analyze the effects it might have on the forest and the forestry sector.

The increasing role of the Ministry of Environment and the direct implication of the civil society in the different aspects related to natural resources will certainly lead to some changes in the forestry sector.

The Ministry of Agriculture is currently revising some aspects of the forest legislation. The ban on the production of charcoal was recently cancelled to allow for a controlled exploitation and stop illicit felling. The charcoal production will contribute to the reduction of the highly flammable biomass and will directly contribute to poverty alleviation. The consequences of the return to the controlled production of charcoal will be monitored and evaluated by the team of the Rural Development and Natural Resources Directorate.

A new decree is being currently proposed to impose a ban on the clearing of coniferous forests for agricultural purposes. While this decree will contribute to a certain degree to the conservation of the coniferous forests, it will only be efficient if it is accompanied by other measures aiming at the valorization of these forests. If this measure proves to be efficient, other important and fragile ecosystems will be protected by similar decrees.

The protection and conservation of forests and ecosystems induces consequences on the land owners and users. The laws and legislations that govern the protection and conservation measures impose controlled exploitation or sometimes forbid exploitation. While these legislations contribute to the protection of these ecosystems and have a positive effect on the natural resources in Lebanon, they may have direct consequences on the food security and on the income of the owners and users. Economical and compensational measures will have to be studied and applied in order to insure the sustainability of the legislation.

On the other hand, and in light of the international discussions on decentralization and its consequences on the forestry sector, the Rural Development and Natural Resources Directorate is currently studying the possibility of applying decentralization up to a certain level. The effect of this institutional change will lead to a higher involvement of the local community groups, the municipalities and the grass-root organization in the different questions related to forest management. However this would only be applied after the implementation of a capacity building and awareness raising campaign.

Lebanon has signed most of the environmental conventions and treaties. National action programs are developed and being implemented with the assistance of international organizations and bilateral and multilateral partnership agreements. These conventions and treaties have helped in the increase in the level of awareness and concern of the population towards natural resources and environmental issues.

Several protected areas and nature reserves are established. The issues related to sustainable forest management are being dealt with properly. The land planning scheme (Schémas Directeur de l'Aménagement du Territoire Libanais) is proposing a system of national parks and protected areas to be implemented in the country. It is also proposing the establishment of a cedar and mountain arboriculture corridor on the summits of Lebanon. However, major issues remain to be dealt with at this level: the development of a framework law for the protected areas, and the adoption of appropriate definitions with their translation into Arabic. This will require the participation of the different actors involved (line ministries, civil society, international organizations…).

The civil society is directly involved at different levels and is playing a major role in the implementation of the conventions and treaties. This has also influenced the level of expectation of the population from the forests and natural resources.

The NFA and the Millennium Development Goals

As part of the commitment towards the international conventions, treaties and agreements, and in view of an efficient implementation of the Millennium Development Goals, mainly those directly linked to the forests, poverty and hunger, the Government of Lebanon, through the Ministry of Agriculture, will be able to utilize the results of the FRA and the future FRA exercises, to insure and monitor the implementation of the MDGs.

Goal 1: Eradicate Extreme Poverty and Hunger
Target 1: Halve, between 1990 and 2015, the proportion of people whose income is less than one dollar a day.
Target 2: Halve, between 1990 and 2015, the proportion of people who suffer from hunger.

Goal 7: Ensure Environmental Sustainability
Target 9: Integrate the principles of sustainable development into country policies and programmes and reverse the losses of environmental resources.

- Charts on forest areas
- Forest areas map

- Chart on protected areas
- Chart on energy sources
- Chart on carbon dioxide emissions
- Carbon dioxide emissions map

The forests and OWL in Lebanon will contribute to the achievement of the goals concerned by extreme poverty and hunger, and by ensuring environmental sustainability. This will be addressed through the sustainable management of the resources, the encouragement and promotion of non-wood forest products, ecotourism, charcoal production and grazing. The results of the NFA clearly show the opportunities for an appropriate exploitation. The combined management of the resources, the adoption of an integrated rural development, based on the sustainable management of agriculture, range lands and forestry, the development of small rural industries and the development of the ecotourism sector, will clearly contribute to the reduction of poverty and hunger. The monitoring that will be undertaken through a regular NFA exercise (every 5 years, at least) will ensure that the resources are not overexploited.

The different charts of the forest resources assessment will provide the necessary data for the charts on forest areas and on protected areas and for the forest map. It will also bring some contribution to the charts on energy sources. The information necessary to feed the charts and maps on carbon dioxide emissions will have to be provided by other sources of information.

The different charts and maps will provide the appropriate guidance for the sustainable management of the resources. They will serve as a tool during the consultations with the concerned stakeholders on the elaboration of a national forest policy.

Now that the NFA is finished, what is next?

It is very important to keep in mind that the results of the National Forest and Tree Resources Assessment will be utilized by the Ministry of Agriculture and by the interested concerned institutions and organizations.

Forests and wooded lands are important for:

- Rural development
- Poverty alleviation
- Combating desertification
- Conservation of biodiversity
- Other

The assessment and monitoring of the tree and forest resources will lead to:

- Institutionalization and integration of the assessment and monitoring activities in the duties to be undertaken by the Directorate of Rural Development and Natural Resources / Forestry Department
- Follow-up, identification of gaps, research
- Capacity building and continuous training

- Assessment of rangelands for a better integration of grazing in forests and other wooded lands
- Other assessments if needed (biodiversity, land degradation…)

The follow-up and institutionalization will allow for a better monitoring and management of:

- Insects and diseases
- Illicit activities
- Fires
- Grazing

It will also allow for a better allocation of funds.

The DRDNR will develop the reporting capacities for a better evaluation of the quantity and value of wood and non-wood forest products and other important issues such as the employment in forestry.

One of the main concerns of the forest guards, engineers and other concerned stakeholders is the evolution of the role of the forestry sector, and the forestry department in general and of the forest guards in particular, mainly in terms of involvement in:

- Awareness raising activities
- Ecotourism
- Production and protection
- Mapping
- Development of forest nurseries
- Management

One of the issues to be addressed in the near future is decentralization and deconcentration and their implications in terms of quality of work (bureaucracy burden, working time…), efficiency …

In order to protect, conserve and develop the forests and other wooded lands it is very important to look at the following:

- Encouragement of forest plantations for wood production
- Reforestation/afforestation
- Management of nurseries/ seed provenance/ seed handling
- Sustainable forest management

The MOA should develop a better approach to protection of soil and water and to conservation of biodiversity

As in all Mediterranean countries, the forests in Lebanon are not highly productive. Their maintenance by the local population would only be possible if they are associated with an economical value. To that extent, the MOA should encourage ecotourism as one of the possible management objectives. This will imply the development of tracks and signing in forests and parks, as well as outdoor facilities.

The DRDNR should work on an information/communication strategy for the forestry department (media, image de marque, web page, brochures…)

The DRDNR has expressed its willingness to work on:

- Forest research development
- Forest education
- Collaboration, participation, coordination…

with concerned institutions.

The development of sustainable forest management plans should be undertaken with the participation of the concerned stakeholders.
Sustainable management could include:

- Production and exploitation of wood
- Production and exploitation of non-wood forest products
- Grazing/ carrying capacity
- Ecotourism
- Other services

The Preparation of the National Forest Programme will be undertaken in a participatory manner

The DRDNR will be working on the improvement and amendment of the forest legislation, in the very near future.

In order to achieve better management of the forest resources and to meet the objectives of conservation, protection and sustainable forest management, the DRDNR will be working on the development and implementation of a National Forest Policy along with the concerned state and non-state stakeholders.

4. The way ahead

One way to approach the development of a national forest and range policy would be the combination of the results of the NFA with the scenarios proposed in the forest outlook study for Lebanon. This study is undertaken in the framework of the FAO led initiative: Forest Outlook Study for West and Central Asia (FOWECA). The study starts by looking at the present situation of the forestry sector in Lebanon; the analysis of the different driving forces is then undertaken; it is followed by the proposal of three scenarios for development of the sector; then the priorities for the year 2020 are proposed. The preparation of the outlook paper was undertaken in a participative approach with the participation of different stakeholders. The scenarios and the priorities could be used to direct the talks on the forest policy, as they emanate form the visions of the different stakeholders.

Scenario 1: Aggravation and Degradation

- The need for an increase in agricultural production in order to face the negative effects of the open markets policy and the international agreements, and to face an increase in the demands for food and agricultural products, would cause the development of new agricultural fields on the expense of forests, other wooded lands and rangelands. This development would occur at a very high cost, would not necessarily lead to the expected yields and would

not meet the expected demands. However, it would certainly lead to a severe decrease in the productivity of the lands, to degradation of the soils and to desertification.

- The aggravation of the economic situation with the reduction of the productivity of the agricultural sector, would lead to an increase in the demand on the existing forests and other wooded lands as sources of fuelwood and on these resources as a source of other basic needs, thus causing the degradation of the resources.

- The development of the existing cities to meet the demand of an increase in the migration from rural areas, along with the confirmation of Lebanon as a main tourist destination and the unplanned development of this sector, would occur on the expenses of the remaining peri-urban forests and other wooded lands. This chaotic development would increase the fragmentation of the forests and other wooded lands and would progressively destroy the main assets of Lebanon, the main reason for the touristic development, which are the landscape and the climate.

- Overgrazing is causing a dramatic degradation of the lands in some parts of the country (Baalback – Hermel), while undergrazing is causing the closing of the woodlands, the loss of biodiversity and an increase in forest fires in some other areas (Mount Lebanon).

- The unplanned development of the tourist sector, of the cities and of the agricultural sector would be accompanied by a loss of interest in forests and forest related activities, which would lead to an increase in the biomass, a closing of the ecosystems and a loss of biodiversity. This would also mean a strong increase in the occurrence of forest fires and a progressive loss of the remaining forests and other wooded lands.

- Finally, the current economic situation and the severe budget restrictions hindering the recruitment of new personnel (guards, technicians and engineers) would lead to the inability of the concerned authorities to properly manage the resources and to apply law enforcement measures in the appropriate way.

Scenario 2: The Status Quo

- The agricultural sector is unable to face the challenges of the international agreements and other arrangements, despite the agricultural strategy that the Ministry of Agriculture has developed and is currently in the implementation phase. This means a loss of interest in the agricultural production and the abandonment of agricultural lands in rural areas, and a continuation of the intensive production in the Beqaa valley and in the coastal plains. The recent development of some crops and some related industries, like the grape vines and the wine industries is certainly giving a great push to the agricultural sector. However the effect of this development on the forests and other wooded lands is not clear yet. The loss of interest in agriculture and the abandonment of agricultural production in some parts of the country is

translated by the reinvestment of these lands by forests and other wooded lands.

- The regular growth of cities caused by the demographic growth and the migration from rural areas is at the expense of the forests and other wooded lands.

- The current efforts being put at the different levels for the protection, conservation and management of the ecosystems, along with the strong implication of the civil society and the partnerships created between the different stakeholders are succeeding in the maintenance of a certain equilibrium between the urban chaos and the beauty of the landscape; the illicit harvesting of wood and non wood forest products, the creation of parks and gardens and the reforestation/afforestation efforts.

- The continuation of the multiplicity of efforts and the scattering of the forestry sector between several government and non government authorities with the dramatic lack of cooperation will certainly succeed in a certain increase in the total forest cover of the country. However, these efforts will remain vain, if they are not accompanied by a sustainable management of the resources and a confirmation of the role of the forest in food security, poverty alleviation

- The lack of interest in the forests and other wooded lands and the banning of grazing and other forms of management is leading, in many parts of the country, mainly in the Mount Lebanon, to the increase in the number of forest fires witnessed in the past few years. If this “no management” policy is continued, it will result in an increase in the number of forest fires.

- The production of pine nuts from the *Pinus pinea* forests remains one of the rare income generating activities related to forests and other wooded lands. It would be affected by the open market strategies, mainly because of the high production costs. The *Pinus pinea* stands are also affected by the uncontrolled urban crawl, by lack of labour and by the aging of the trees. The continuation of the current situation will result in a progressive lack of interest in the production of pine nuts and a relative reduction of the total surface area of the stands caused by forest fires (*Pinus pinea* does not regenerate spontaneously after fire) and by urban crawl.

- The Forest Guards, affiliated to the Ministry of Agriculture, are playing a very important role in terms of law enforcement. Along with the engineers, some of them have contributed to the forest and tree resources assessment and inventory. The team is able to carry on the different reporting activities and exercises requested by the FAO and other organizations, agreements and conventions.

- A commendable effort is undertaken by the regional offices of the Ministry of Agriculture in terms of contacts with the local municipalities and community groups to encourage them on the controlled exploitation of the forests and other wooded lands, through grazing and some charcoal production. This initiative is very likely to increase the interest of the local populations for their

forests and other wooded lands, therefore making these populations keen on conserving their resources.

- Some research is currently undertaken in research institutes. These research efforts would continue to bring an important input for a better understanding of the different issues related to the forestry sector.

- The overall balance of the current situation is the maintenance of the total surface area covered by forests and other wooded lands and eventually a certain increase in this overall surface area. This balance is achieved thanks to the reinvestment of abandoned unproductive agricultural lands by the forests and thanks to the different reforestation/afforestation and conservation efforts.

Scenario 3: Improvement and Development

- The third scenario will look at the sustainable development and the adoption and implementation of the different strategies and national plans: the Agricultural Strategy, the National Action Programme to Combat Desertification, the "Schéma Directeur d'Aménagement du Territoir Libanais", and the National Forest Programme. The implementation of these strategies would result in a better management of the resources and an appropriate resolution of the conflicts on the land use. The optimal approach is the integration of all the different strategies and plans into one global sustainable development programme for the country.

- The implementation of the agricultural strategy would encourage and promote a sustainable production of competitive crops with an added value. It would encourage new investments in agriculture and reduce the rate of migration. This would mean the stabilization or even an increase in the rural population and a valorisation of the agricultural fields.

- The promotion of tourism and ecotourism would on the one hand lead to the creation of niche markets for luxury agricultural products, traditional crops and organically produced crops; and on the other hand it would contribute to the development of a new management approach to the woodlands to enhance their role in the tourism sector.

- Grazing is managed in a very sustainable way, with the participation of the shepherds in the decision making process, thus contributing to the conservation of the ecosystems and the promotion of the traditional management. In addition to the income generated by the livestock production, the rental of the lands for grazing constitutes a good source of income for the municipalities.

- Keeping the criteria and indicators of sustainable forest management as the major reference, different management systems would be proposed to the different forests and other wooded lands, based on the vocations and on the objectives. The multiple functionality of these woodlands would always serve as a base line for the management plans. Focus would be put on the protection from forest fires, conservation of biodiversity and food security.

- The relatively high level of fragmentation of the forests and other wooded lands would be reduced by the creation of natural corridors through reforestation/afforestation. This implies a thorough analysis of the lands and a very close cooperation between the different authorities.

- The role of the forest guards would be strengthened and broadened, as they would be involved in extension services, in ecotourism and in forest education as much as they would be trained on the new technologies applied to forest management. The forestry department would play a confirmed role in the different aspects related to forest management, forest development and conservation. A forestry and natural resources training centre would be established and opened to all concerned stakeholders and would build the capacities of these stakeholders.

- More efforts would be put on research, and a forestry research institute would be created.

- Meeting the requirements of the different conventions and agreements would not be an objective in by itself, but rather the result of the sustainable management being applied at all levels.

- This scenario means being able to find an equilibrium between the *hortus*, the *ager*, the *silva* and the *saltus*, or the agro-silvo-pastoral system, to which modern dimensions are added, tourism, rural industries and other social and environmental services.

- This scenario may not lead to a drastic increase in the total forest cover of the country as it would imply the integrated management of the resources, in terms of agriculture, tourism, forestry, small industries and range management. It would not exclude the development of the cities but would rather allow this development on specific sites.

5. Priorities and strategies for forest and forestry to the year 2020

The sustainable management of the woodlands (forests and other wooded lands) is a challenge for the future. These woodlands are essential for the protection of soils, water and biodiversity. They are sources of wood, non-wood forest products and rangelands for the rural population. They answer the need for nature of the urban population. They play a very important role in the development of the economy and the tourism sector of Lebanon. Although the future cannot be predicted, with the way future generations will be looking at the woodlands, it is assumed that the conservation of these important ecosystems will contribute to the well being and food security of these future generations.

This integrated management would result in the encouragement of the multiple functionalities of the rural space which would result in:

- The reduction of migration from rural areas
- The reduction in the abandonment of agricultural land
- The reduction in the reinvestment of forests on these abandoned lands

- The encouragement of new initiatives and activities linked to woodlands, like ecotourism and outdoor activities
- A marked contribution of the forestry sector in poverty alleviation and food security.

The improvement and development of the current situation would mean the following issues:

<u>The integration in a global sustainable development plan</u>

- The overexploitation of the natural resources caused by poverty and by the satisfaction of immediate needs is overcome through forest plantations on abandoned lands. This would not only provide the necessary wood for the rural population, but also reduce the stress on natural forests and contribute to combating desertification. These planted forests would also constitute a source of wood for the less needy population (barbecues, chimneys, …).
- The extension of the existing woodlands along with the reforestation/afforestation would greatly contribute to the commitments of Lebanon towards the international conventions and agreements (CBD, FCCC, UNCCD…)
- This would be accompanied by measures aiming at the reduction of the exploitation of the forests and other wooded lands for construction purposes.
- The preparation and implementation of the National Forest Programme would be a major achievement. This programme will be prepared in close collaboration with all the concerned government and non-government stakeholders, taking into account all the values of the woodlands, monetary and non monetary, all the expectations and all the challenges.

<u>The application of a “natural management” approach</u>

Different techniques were developed over time to face the challenges and constraints imposed by and on the Mediterranean forests and other wooded lands (reforestation, erosion control, forest fire fighting, range improvement…). These techniques will also need to evolve with the evolution of the society and the emergence of new needs; new techniques would eventually be introduced. Some issues would need to be addressed:

- The production of wood cannot be considered under the current international market trends, as the wood that could be produced in Lebanon could not compete with wood produced in different conditions. A few species could however be considered for the future, like Cedar, Fir, Juniper, Oak…The wood produced from these species could only be for a niche market of luxury items and handicrafts. The production of timber and logs is beyond the scope of this study, as it would go beyond 2020.
- The valorisation of the woodlands would be achieved through non market values and services offered (landscape, biodiversity, leisure, carbon sequestration…).
- The increase in the risk of forest fires would require the development of special fire fighting techniques, pre fire and post fire management. The woodlands would be managed in a way to reduce their susceptibility to

fire; burnt forests would be allowed to regenerate spontaneously, except when certain objectives are set, like the production of pine nuts.
- The planned development of ecotourism and outdoor activities would bring a substantive financial contribution to the local population and would allow for a better conservation of the ecosystems.

The participation of the civil society
- The local community groups, NGOs and grass-root organisations will be more involved in the decision making process related to legislations, policies, management and conflict resolution.
- This implies capacity building at the local level, and the development of news bonds with the civil society, through which the local population would be considered as a partner.

The evolution of the institutional and economical systems
- The participatory approach would involve a transformation of the institutional system and an evolution towards decentralization. The policies, legislations and management options would be implemented in partnership with the local community groups and other members of the civil society.
- The implementation of modern multidisciplinary management tools would also be considered. These management options or tools are those combining protection, production, conservation, involvement of local populations, exploitation and traditional and modern uses. These tools would be implemented through: the Regional Parks, the Biosphere Reserves (UNESCO), the Forest Landscape Restoration (IUCN), the Model Forests (Canadian Model Forests Network).
- The integration and collaboration of all planning authorities (tourism, environment, public works, agriculture…) for a better management and development of the resources and the reduction of the negative impacts, like fragmentation.
- The development of economical tools aiming at a better valorisation of the resources. The reactivation of the reforestation fund would bring a major contribution to that effect and would encourage several forest related activities. A financial tool would be developed for the reimbursement of land protected for some specific purposes and no longer exploitable by the owners.
- The creation of an independent forest authority, for a better management of the forests and other wooded lands a better integration of the concerns of all government and non-government stakeholders.

Research and capacity building
- The creation of a forest research institute will bring a substantive contribution to the development and the positive evolution of the forestry sector.
- The creation of a forest and natural resources training centre would greatly contribute to the capacity building of all the concerned government and non-government stakeholders.

International cooperation

- The strengthening of the cooperation with the different international partners is necessary.
- The Technical Cooperation Projects approach developed by FAO for the assistance of the countries on specific issues remains one of the most appropriate approaches.
- Different forms of cooperation may be developed with different partners, involving larger budgets than those provided through the TCPs.

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