

I. BACKGROUND AND JUSTIFICATION

Lebanon is a small mountainous country with an area of 10 452 km² and a population estimated at about 3.4 million (1994). It comprises six administrative Muhafazats (governorates), namely Mount Lebanon, North Lebanon, South Lebanon, Nabatiyeh, the Bekaa Valley and Beirut, sub-divided into 24 “Cazas” (districts).

Until the mid-seventies, Lebanon was a prosperous middle-income country driven mainly by the service sector which contributed more than 70 percent of the GDP. From 1975 and for a 17-year period, the country, its economy and its population, has been suffering the destructive effects of a severe civil war. Since then, the progressive recovery of normal economic activities have led the public sector to concentrate its efforts towards the reconstruction of infrastructures and the improvement of population welfare, more particularly concerning the most vulnerable groups. An estimated 76 percent of the population live below poverty line.

As a consequence of the civil war and the freeze of development programmes for about two decades, Lebanon's environmental and natural resources base is deeply damaged and under serious threat. The scale and intensity of deforestation, loss of biological diversity, uncontrolled urbanisation, overgrazing, overexploitation of the limited resources and soil erosion, associated with declines in overall land fertility and forest productivity are unparalleled.

This alarming advance of land cover/use change and subsequent environmental degradation after two decades of war is being pushed by economic and population growth that is placing increasing demands on the renewable and non-renewable natural resource base. Over 35 percent of the Lebanese depend directly or indirectly on the agricultural sector and a large proportion relies on forests and tree resources for their livelihood. In the absence of adequate policies and regulations, the economy is geared towards over-exploitation of the Lebanese limited natural resources. Land utilisation is changing rapidly at the detriment of the naturalness and the fragile environment of the country. Lebanon is losing about 0.4 percent of its forest cover every year by deforestation (FRA 2000). Some authors agree that deforestation has reached alarming proportions and reduced the forest formations by approximately 25 percent in the recent time and since 1975. The forest cover has been severely depleted since long ago. The long history of over-exploitation of forests, associated with massive erosion, have transformed the rich formations into relics of forests and degraded lands. Only few climactic and para-climactic forests survive. New development projects and investment activities are often approved without due attention to their potential negative impacts on the environment. The Government of Lebanon is increasingly concerned by the deep social, economic and environmental consequences of resources depletion. Even when appropriate policies and procedures exist, the government frequently lacks the resources and institutional capacity to apply them or to monitor effectively the impact at local level. The integral use of a local capacity to effectively report and monitor these changes through the development of this capacity and the establishment of monitoring system with the support of this project will enhance ability of the national institutions to plan and respond to this dynamic situation.

The recent FAO report (FRA 2000), estimated the forest cover at 36 000 hectares (approximately 3.5 percent of the country land area), the other wooded land composed essentially by shrubs (maquis) at 35 000 ha and the other land where trees outside forest resources occur at 954 000 ha. The forest is composed of broadleaved species, essentially oaks,

and conifers notably pine, juniper, cedar and cypress. The dominant tree species are oaks, pine and juniper which account for about 80% of the forest cover.

The forest is desperately needed in Lebanon to provide various goods and services notably timber and fuel-wood, control of soil erosion and water conservation, wildlife habitat/ecosystem conservation, tourism and recreation, etc. The rapid loss of forest cover has put the forest functions at risk. All species have been reduced to critical levels and the Cedar (*Cedrus libani*) of Lebanon has been particularly affected.

The sources of accurate information on forest cover and forest resources in general are scarce and with very low reliability. Two data sets on forests exist in Lebanon. The first is the one produced in 1963-65 from 1:50,000 scale mapping of the forests in Lebanon. The second refers to the results of the land cover mapping carried out between 2000-2002 under the TCP/LEB/2801(T). The 1963-65 information, besides being very outdated, is produced in broad classes of limited usefulness to forests and forestry nowadays. The 2000-2002 data set was generated from a mapping that was designed for agricultural census with broad forest classes, imprecise terminology and unclear definitions of forest and land use classes. It is of very limited usefulness to foresters.

Timely, easily available and accurate information on forest and tree resources and their utilisation is a precondition for sustainable management of these resources based on economically, environmentally and socially balanced forest policy. The present extent and quality of forestry information in the country is insufficient for adequate national policy decisions and data are simply lacking to take corrective measures and halt resources depletion and environment degradation.

Institutionally, the forestry administration remains far behind the other sectors in terms of capacity to devise and implement development strategies and programmes. Some attempts to institute sustainable management of the country's reduced resources base have been made, but these lacked knowledge on the state and quality of the resources and on the extent of their contribution to the wellbeing of the local population. A forestry action plan initiated in the nineties but was never finalized for lack of necessary information on the resources. A broad knowledge on the forest and trees outside forest is therefore critically needed to enable the forestry administration to redefine its policy, design a new strategy and develop a comprehensive forestry action plan. The Government considers formulation of its forestry action plan as a first priority after completing the present pilot forest inventory project and findings will be made available with a highlight of the opportunities and risks the forestry sector.

The Government has requested FAO technical assistance, under the Technical Cooperation Programme to assist the DRDNR to develop capabilities to survey the country's resources, monitor trends and changes, describe their nature and localities and advise on protective measures where required for resources at risk. The thematic frame of the pilot inventory covers and integrates products and services provided by forests and trees outside forests with focus on the manner they are managed and used by the different stakeholders and on the extent to which forests and trees contribute to food security.

To date, the Forestry Administration in Lebanon has not carried out any single forest inventory to quantify and assess the resources on the basis of data collected from field samples. The main reason for the information gap is the low capacity to plan and execute field surveys. The result is that the information base on forests is insufficient.

Despite all these problems, people continue to exploit trees and forests and inflict serious damage to the resources base and to the country's fragile environment. A number of *ad hoc* measures were taken to halt resources depletion and environment degradation. These measures were taken without being supported by accurate statistics on the state of the resources and their trends. Effect of these measures have not been properly assessed for lack of know how.

Through this project and follow-up activities, the forestry administration has decided to commit itself to tackling all the issues that are contributing to deforestation and depletion of the resources and to assessing their consequence on the environment and on the economy of the nation.

A special effort focussing on data collection and analysis is required to provide information necessary for national and international purposes. The project intends to focus on the three functions of the forest and trees so as to assess their potential for food security and how they contribute in alleviating poverty especially among the rural population.

II. OBJECTIVES OF THE ASSISTANCE

The main objective of the project is 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 forestry, through training of national staff on forest and tree inventory and assessment.

III. EXPECTED OUTPUTS

- 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 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.

IV. WORKPLAN

Project Approach:

Training: will be secured through workshops, courses and study tour to two senior officers from the FD. Four workshops will be organized. Depending on the subject, professionals from the Ministry of Agriculture, universities, the Ministry of Environment, the Lebanese Agriculture Research Institute, the National Centre of Remote Sensing, the Regional Development Services and NGOs will participate in the workshops. These should lead to a consensus on the monitoring approach of the forest and tree resources, the classification system and the national list of attributes to be assessed.

The project will organize and run introductory and practical courses for both the national team from the DF and the field crew members. The first course will be organized for at least 8 officers (2 from the DF and 6 from the regional services). The second course will be held in two sessions of 2 weeks each to accommodate all the participants recommended by the Government: 18 technicians from the regions, 10 people from other ministries and 15 students. The trained national personnel will serve as members of the field crews in the pilot inventory, and will contribute in enhancing the capacity of their institutions in collection and processing of data on forestry and local population.

The on-the job training will be provided throughout the project implementation on planning, mapping, survey, database construction, data processing/analysis and information management.

Mapping: The satellite landsat TM data available in the UTF/LEB/016, within the Directorate of Studies and Coordination of the Ministry of Agriculture, will be used as input to the pilot forest assessment project. The satellite scenes will be interpreted visually on computer screen to create polygons of the forest types and other land use classes according to the standardized classification that will be prepared for the purpose taking into consideration the FAO classification used by the FRA 2000 for global reporting and the national requirements of resources management. The 1:50,000 scale topographic maps will be used as a basis for the construction of the forest type and land use map. The map will constitute a solid cost-effective basis for future monitoring of the changes within and between the forest types and other land use classes and for assessment of the multiple benefits from forests and trees.

Field survey: For the purpose of national capacity building, the approach developed by FRA for forest inventory/assessments will be used to design the pilot assessment according to the Lebanese conditions and information needs. The statistical design is a non-stratified sampling and has been selected as a 2-stage allocation of sample plots, firstly by a systematically located 1 km² “tracts”, and secondly by a systematic spatial arrangement of a cluster of four sample plots within the tract. Each plot may include one or more land use classes. The purpose of this sampling design is to serve the basis to monitor in periodic surveys changes occurring between different land use classes and the forest in the selected sites.

The first allocation stage will locate the clusters on a pre-determined systematic coordinate grid, based on latitude and longitude. X and Y coordinates of south-west corner of the tracts will be defined using the grid applied. Absolute positions will be pinpointed using GPS units.

The second allocation stage will locate four sample plots, each of 5 000 m², arranged systematically in the cluster. Plot shapes will be rectangular (250 m x 20 m), each positioned 250 m from the tract edge and oriented N, E, S, W. Relative positions and plot layout will be carried out using GPS units. Subplots will be defined for the different land use classes. Subplots will be measured for assessment of regeneration and population in the smaller size classes.

The sampling intensity will be set at around 0.04 percent, which in terms of number of sample plots is equal to 800 plots or 200 clusters. The target overall sampling error for the major parameters of the pilot resource assessment has been set at 10 percent.

These plots in selected and representative sites should form the basis for periodic forest inventories, and so consideration must be given to permanent, yet unobtrusive, demarcation of plots.

As the basis for budgeting the following inventory work plans, the work rate is based on movement from base to a tract, and all interviews, observations and measurements in the tract and in the four sample plots belonging to the cluster within the tract and the corresponding subplots and nested plots. For one crew, comprising one (1) senior technician (ST) as leader, one (1) junior technician (JT), and two (2) field workers, a standard output of one (1) cluster per 4 working days is assumed. Six (6) field crews are foreseen to carry out the field survey while being adequate training in local population interviews and forest and tree measurements.

Data will be collected through fieldwork at these sites, including measurement/observation of biophysical properties, as well as interviews with local stakeholders as to the uses and management of the forest/trees. It is expected that all sites can be visited within 7 months, thus generating new national level information with known precision after a relatively short time.

Variables to be collected are to be defined by national interests and requirements. FAO has selected a base set of variables, representing international information requirements. Starting from these, national variables can be specified to refine the data collection within important fields. For Lebanon this includes to ensure that all selected Indicators are represented, and to include variables related to particular forest products.

Information generated by field crews at these sites, as well as aggregated findings, will be made public. The project will assist the GOL in the organisation and dissemination of information.

Information system: The project will produce appreciable amount of field data from the selected sample plots. A functional forest and trees information system will be established to structure and manage the collected inventory data, store it and process it to generate the needed

information. The field data will be geo-referenced for integration and spatial representation of findings.

The base for the information system will be a structured database, which will include various levels of internal relations. The system will permit storage of data from sequential surveys in order to detect and estimate changes and establish trends. This work will constitute as practical exercise during which the national team will be adequately trained in information system development, data processing and analysis, information management.

Work Plan

A summary of the project activities is given in annex 4 with scheduling information. The project will be implemented in three phases during which activities of common type are undertaken.

Phase 1: Includes all the preliminary arrangements and preparatory work of the project, namely training of the national supervisors and field crews from all Mohafazas, adjusting the forest and tree inventory methodology, harmonizing classification system and variables according to national requirements, acquisition of equipment and recruitment of the national and international personnel.

It is a major capacity building activity for the DF. The national team will be familiarized with the techniques and methods of national forest inventories and assessments, the forest and land use classification systems, and identification of forest and tree attributes. The FRA approach of national forest inventory and long-term resources monitoring will be the base of discussions. The sampling design and data collection model in the approach will be reviewed and adjusted when necessary. The land use classification system harmonized for pilot forest inventories and to facilitate national reporting to international processes will be analyzed and improved in view of the national and international information requirements. The list of biophysical and management/use variables thoroughly analysed and adjusted to include all parameters of national interest. The environmental, social and economic functions of the forests and trees should be properly described by the pilot inventory. The project outputs should include an assessment of the products and services provided by forests and trees, of the role of these in food security and the responsibility of the stakeholders (man, woman, children, entrepreneurs, NGOs, etc) in resources management and exploitation. As part of training, two national officers from the DRDNR will participate in a study tour to a country where a successful national forest inventory for long-term monitoring purpose is running. Among these countries, the following may be considered: the Philippines, Cameroon and Guatemala.

This phase will also be dedicated to setting up the project management unit as part of the DF without being an official structure within the organigram of the DRDNR. The DRDNR will deploy a secretary to assist the NC and a technician to operate the information system.

Phase 2: Activities under this phase include materialisation of the permanent sample plots in their selected field location, and data collection from measurements, observations and interviews with local people and data entry in the information system.

In this project, fieldwork is a crucial activity for the training of the national personnel from the central and Mohafazas levels. The planned outputs will depend largely on it. Permanent observation sites will be established for long-term monitoring of forest and tree resources in representatives forest and land use classes in the country. GPS is a key instrument in locating plots with the help of latitude/longitude coordinates defined in advance on the topographic

maps. The starting point of each plot will be marked with a metal pole driven in the ground. Reference points around the starting points of the plot will be identified, for which distance to and compass reading from the starting point of the plot will be taken and recorded to facilitate relocating plots in future surveys. Photographs will be taken as support documents for future plot location.

Measurements of forest and tree characteristics will be done in all land use classes (forest and non-forest land). Observations of vegetation structure, health and spatial arrangements, and human activities will be recorded. Variables will be defined for this purpose during a workshop in the first phase of the project. Interviews of key informants from the local population, NGOs, and entrepreneurs, etc. will be done in every sample site to identify major users of the resources (men, women, children and other groups), the products and services provided by the forest and tress, the way these are managed and used.

The field crews will be trained adequately to carry out future surveys and maintain the established field sample plots. The national team from the DF will also be trained in organisation and supervision of the fieldwork.

The information system will be set up, on which the national personnel in charge will be trained and the data collected by the field crews will be progressively entered.

Phase 3: Includes the development of the database with maps and field data, training of the national staff in charge of the system, data processing and analysis, reporting of project findings. A national workshop will be organised to review the project findings and **recommend** on follow up actions including formulation of the national forestry action plan, review and adjustment of sectoral policy, identification of specific inventories and other conservation/development activities.

V. CAPACITY BUILDING

The backbone purpose of the project is national capacity building in the areas of forest and tree and assessments. The project will use international and national experts/consultants to achieve the project objectives. These experts/consultants will contribute to national capacity building, mainly through on-the-job training. Considering the highly specialised activities of the project including design and implementation of an integrated inventory and assessment of forest and tree resources in one side and the lack of national capacity in this area in the other, an international expert will be seconded to the project for a short period (3 month) to provide a series of group training courses to the project staff. He will conduct jointly with the national consultants a series of workshops that will assure a wide involvement of national institutions in defining information needs and options for efficient implementation of the project.

The services of a technical cooperation expert under TCDC is strongly recommended for a period that covers part of fieldwork activities; and database construction, data entry/storage and data processing/analysis. The expert will train the field crew members, ensure harmonization of data collection among the crews and provide technical guidance to the national team in measurements of forest and tree attributes, observations and interviews with different stakeholders and train and supervise data processing and analysis.

One study tour will be organized for two national senior officers from the DRDNR to a country with on-going integrated national forest inventory project. FAO is currently supporting national forest and tree resources inventories in Asia (the Philippines), Africa (Cameroon) and Central America (Guatemala). The study tour will be organized to the country with the most successful project in terms of capacity building, organization of the field survey, timely implementation of project activities, forest and tree information system, etc.

VI. INPUTS TO BE PROVIDED BY FAO

The FAO Representative in Lebanon will be operationally responsible for the project and the Forest Resources Development Service (FORM) will, through the Forest Resources Assessment Program, BE responsible for coordinating the technical inputs, with other technical units as required e.g. FORC. The national counterpart in Lebanon will be the Directorate of Rural Development and Natural Resources in the Ministry of Agriculture.

The project will provide:

Personnel

- International consultant in forest inventory and mapping (3 m/m),
- International TCDC consultant in forest inventory (7 m/m)
- Experts from the Forest Resources Assessment Programme (1.5 m/m) with expertise in the area of capacity building, forest mapping using remote sensing techniques, pilot forest inventory design for long term resources monitoring, and database with GIS platform. Their role will be to co-ordinate the project work in their respective areas, train the national team from the DRDNR, participate in the training of field crews, assist in the finalization of the design of the forest mapping and forest inventory, provide technical guidance to the Department of Forestry of DRDNR and synthesise the results of the national consultants. For a better harmonization of the information needs at the national and international levels, the international consultant should have confirmed familiarity with the requirements of global forest resources assessments and other international processes.
- National consultant in the area of forest inventory (7m/m).
In close collaboration with the international consultant and expert, the national consultant will participate in the training of the project personnel, supervise project activities during his interventions.
- National consultant in the field of remote sensing applied to forestry (3m/m)
- National consultant, Institution specialist (4m/m).

These consultants will participate in the training of the national team from the DRDNR, plan and supervise implementation of the project activities. They will contribute in implementing the technology transfer programme and enhance the on-site production capacity of the DRDNR.

Technical services provided by FAO

- The visits of FAO staff members from the Forest Resources Assessment Programme to run and service the workshops, and technically backstop the project for a total of six weeks in 3 missions.

The terms of reference are attached in annex 3.

Contractual services

For the interpretation of the satellite images and forest/land use map production. The contract shall include use of facilities, the mapping experiences built within the DSC by the land cover mapping, procurement of material and supplies and field checking of interpretation and reproduction of the map.

Training

Training of national staffs will be organized in the following fields:

- 5-day workshop on methods of forest and tree resources assessment applied to long term integrated resources monitoring including forest classification, terminology and definitions harmonization to meet national information requirements and to facilitate country reporting to international processes. At least 30 scientists and resources managers will participate from the Directorate of Studies and Coordination, the Ministry of Environment, the Lebanese Agriculture Research Institute, the National Centre of Remote Sensing, NGOs, the universities, the Regional Development Services and representatives from the donor community present in the country.
- 5-day workshop on forest and tree information needs and the required set of biophysical and management/use variables to be covered by the forest and tree resources assessment for an integrated land use assessment, options of each variable and definitions. At least 30 scientists and resources managers will participate from the Directorate of Studies and Coordination, the Ministry of Environment, the Lebanese Agriculture Research Institute, the National Centre of Remote Sensing, NGOs, the universities, the Regional Development Services and representatives from the donor community present in the country.
- 2-day workshop on institutional strengthening of the Forestry Department in the DRDNR at central and regional levels and outputs of the forest and tree information system for long term monitoring of the land use dynamic. At least 30 people will participate from the Ministry of Agriculture, the Ministry of the Environment and the Regional Development Services and representatives from the donor community present in the country.
- 5-day workshop on the use of project results in policy development and influences, sector activity planning and for forestry action plan design. This workshop should bring together information users from all stakeholders and intervening ministries in the forestry sector. 30 to 40 people will participate in the workshop.
- Two-week theoretical and practical training in forest inventory and assessment to the national team from the DRDNR who will assure training of the field crews and supervision of project activities.
- Introductory and practical training organized in two sessions of 2 weeks each to forestry technicians from the Regional Development Services in the Mohafazas, ministries involved in forest and tree development, students from the universities. The trained staff will be members of the field crews in the pilot inventory, and enhance the capacity of their institutions in data collection on forestry. This training will be assured by the national team already trained on the subject and assisted by the international and national consultants.

- Study tour for two forestry officers from the DRDNR to a country with ongoing project of national forest and tree inventory and information management.

Equipment and facilities

- Procurement of specialized forest inventory equipment. This will include the equipment and supplies shown in the list in annex 1.
- Procurement of equipment and supplies for the forest and tree information system. List of equipment, software and configuration of the information system is produced in annex 1.

VII. REPORTING

The National Project Coordinator (NPC) will provide FAO and the relevant technical services through the FAOR in Lebanon Quarterly Project Implementation Reports summarizing the activities performed, the progress and outcomes of the project and, a revised work plan for the next period as appropriate.

Each consultant (international and national) will present at the end of each mission a technical report containing the main results, conclusions and recommendations of his/her missions. The NPC under the supervision of the Directorate of Rural Development and Natural Resources will also prepare the draft Terminal Statement of the project according to TCP procedures. After finalization by the responsible Lead Technical Unit at FAO/HQ (FORM), the terminal statement will be submitted to the Government of Lebanon.

The FAO Lead Technical Unit (FORM) will be responsible for ensuring that the technical reports of consultants are submitted in a timely manner, are technically sound and will distribute them to other FAO units participating in the project. At the end of every mission, FAO officers providing supervisory and advisory technical services will prepare a technical report with results, conclusions and recommendations and conduct briefings with other FAO staff as necessary.

VIII. GOVERNMENT CONTRIBUTION AND SUPPORTING ARRANGEMENTS

The DRDNR will provide all physical facilities (offices for staff and forest information system, training space, local transportation including for the seven-month fieldwork, communications means, etc) and the needed national counterpart staff at secretariat and professional level. The Government will provide to the project the national personnel for data collection in the field and data entry and processing.

The Government will contribute to the project for fuel and maintenance of the vehicles used to perform the project activities.

The project will be based within the premises of the Directorate of Rural Development and Natural Resources (DRDNR) in the MoA. The overall responsibility of the project

implementation will be vested with the Department of Forests (DF) of the DRDNR who will be assisted by an internationally recruited expert in natural forest inventory and capacity building and locally recruited consultants.

The DRDNR will have the overall co-ordinating role, including the training of the national personnel, the design and planning of the pilot forest inventory project. DRDNR will act to reinforce its Department of Forests (DF) and develop its capacity of forestry resources inventory and assessment and information management at national and regional levels. The DF will be mandated to develop and maintain the base information on forest and tree resources up-to-date.

The Government will appoint a National Project Co-ordinator (NPC) and will also arrange for a quick clearance of experts, custom clearance of equipment, tax-free local purchase of project equipment and supplies.

Under the supervision of the Director of RDNR, the NPC will work with the international experts and national consultants to supervise the project activities, organize the forest mapping and field crews making use of the staff in the Regional Development Services. He will i) coordinate interventions of the national institutions and individuals involved in the project; ii) facilitate training of field crew members; iii) oversee fieldwork and secure timely deployment of the necessary logistical support to the field crews; and iv) participate in the design and development of the forest information system, processing the field data and reporting of project findings. DRDNR will be the responsible national institution for the project implementation and will have, through the DF, the overall role for the supervision of the project progress, including biophysical measurements/observations/interviews at the selected sites for the pilot assessment. DRDNR will also take responsibility for initiating follow-on activities upon completion of the project.

The DRDNR will set up for the project a Steering Committee (SC) whose responsibility will be the overall supervision of implementation of the project activities, facilitate inputs to the project in all phases and ensure wider dissemination of results. The SC will be composed of representatives from: The Directorate of Studies and Coordination (DSC), the Ministry of Environment (MoE), the Lebanese Agriculture Research Institute (LARI), the National Centre of Remote Sensing (CNRS), one from NGOs, two from the universities and FAO. The meetings of the SC will be called by the Director of DRDNR and the FAO Representative once every two months or more frequently if needed to review progress of the project activities, assess achievements against the planned results, analyze work plan for next periods and recommend actions to be taken in case of identified constraints. Meetings will be held at the FAO Representation or in the Offices of the DRDNR. The Steering Committee will be chaired by the Director of DRDNR.

The Directorate of Studies and Coordination will provide, through its land cover mapping project, the existing spatial information (Landsat TM scenes) required for the preparation of the forest/land use map. The DSC will also provide the image processing facilities and its trained staff for the interpretation of the satellite imagery and the production of the national forest map. A memorandum of understanding will be established between the DRDNR and the DSC for the use of satellite data, facilities and trained personnel by the mapping component of the project. The National forest inventory project will cover all expenses incurred by the forest mapping in connection with the international consultant, national consultants, use of physical facilities and personnel, material and supplies and fieldwork.

The Regional Development Services (RDS) in the Mohafazas, will provide the staff for the training and field crew composition to carry out the field survey in the selected sample sites over a period of seven months. The RDS will have full responsibility for maintaining the established permanent sample plots through periodic visits using the records of geographic location of all plots.

The technical assistance will have the duties to assist the NPC in planning the overall project activities, training the national team in all areas of forest inventory design and planning, conducting field surveys, mapping and data processing. It will help defining the needs of national personnel and equipment and assure their deployment according to the work plan and time schedule. The NPC will have to co-ordinate with the Heads of the RDS in the Mohafazas to allocate the necessary human resources for the forest and tree survey in their Mohafazas.

Terms of Reference
for the International Forest Inventory and Mapping Consultant

The MoA is undertaking a programme national capacity building in the area forest inventory and assessment through the implementation of different relevant activities such as forest and tree cover mapping, pilot inventory and assessment project, and information management. The training aims at helping the country to develop its capacity for detailed national and specific inventories and long-term monitoring of the forest and tree resources and GIS-based information management. The pilot forest inventory will provide inputs for the preparation of the national forestry action plan. Three major activities are planned, namely: capacity building within the Directorate of Rural Development and Natural Resources in the area of resources monitoring, forest inventory and setting up of a forest and tree information system.

Under the direct supervision of the Forest Resources Assessment Programme/RNER and the technical supervision of the Technical Backstopping Officer in FRA, FAO HQ, and in collaboration with the national authorities and with the national forest inventory consultant and the national staff, the consultant will provide the technical assistance and support to the Department of Forests within the Directorate of Rural Development and Natural Resources in training of the national personnel, planning and implementation of the pilot forest inventory and setting up the information system. The main tasks of the Consultant will be:

- to prepare, in collaboration with the forest inventory consultant, a training programme for the national personnel involved in the project and assist the DF in its implementation;
- to provide training to the national personnel including the team of supervisors through workshops and courses;
- to work with the national team from the DF to review and adjust when necessary the inventory methodology, vegetation classification and biophysical and socio-economic variables;
- to assist in supervising interpretation of satellite scenes using the vegetation classification prepared with the national staff and the production of the map;
- in collaboration with the national consultant prepare a plan of project activities with inputs from the project and the Government;
- to assist in data analysis, reporting of findings and outline of follow up plan of action.

Duration: 3 m/m divided between 3 missions to take place in the beginning of first phase, at the start of the fieldwork and towards end of project.

Duty station: Beirut.

Qualifications: The consultant should have a strong background in remote sensing, forest inventory design and planning. The consultant must be competent in forest information system development and information management and have confirmed experience in capacity building and project implementation. Fluency in English is required and French is preferred.

Terms of Reference
for the TCDC Forest Inventory Consultant

The MoA is undertaking a programme national capacity building in the area forest inventory and assessment through implementation of different relevant activities such as forest and tree cover mapping, pilot inventory and assessment project, and information management. The training aims at helping the country to develop its capacity for detailed national and specific inventories and long term monitoring of the forest and tree resources and GIS based information management. The pilot forest inventory will provide inputs for the preparation of the national forestry action plan. Three major activities are planned, namely: capacity building within the Directorate of Rural Development and Natural Resources in the area of resources monitoring, forest inventory and setting up of a forest and tree information system.

Under the direct supervision of the Forest Resources Assessment Programme/RNER and the technical supervision of the Technical Backstopping Officer in FRA, FAO HQ, and in collaboration with the national authorities and in collaboration with national forest inventory consultant and the national staff, the consultant will provide the technical assistance and support to the Department of Forests within the Directorate of Rural Development and Natural Resources in training of the national personnel, planning and implementation of the national forest inventory and setting up the information system. The main tasks of the Consultant will be to:

- work in close collaboration with the national personnel and international consultant and provide inputs for the elaboration of a training programme to be given to the national personnel involved in the project and assist the DF in implementing it;
- participate in the implementation of the training programme for the national personnel including the team of supervisors, the field crews and database personnel through the planned workshops and courses;
- assist the DF in purchasing, installing and using the equipment and supplies planned for the project;
- in close collaboration with the national consultant, prepare a plan of the project activities and identify timely inputs form the project and the Government;
- provide supervision of the field crews during the beginning of the survey and provide technical guidance as to homogenise data collection and best interpretation of variables and definitions;
- assist in organizing collection field crews outputs and filing;
- assist in developing the national forest database, entering/storing the field data, preparing functions for data processing and initiate data processing;
- assist in data analysis, reporting of findings and elaboration of the project terminal statement.

Duration: 7 m/m .

Duty station: Baalbeck, Beirut

Qualifications: The consultant should have a background in national forest inventory design, planning and competence in forest information system management and have confirmed experience in capacity building and project implementation. Fluency in English and Arabic are required and French is preferred.

Terms of Reference
for the National Forest Inventory Consultant

The MoA is undertaking a programme national capacity building in the area forest inventory and assessment through the implementation of different relevant activities such as forest and tree cover mapping, pilot inventory and assessment project, and information management. The training aims at helping the country to develop its capacity for detailed national and specific inventories and long-term monitoring of the forest and tree resources and GIS based information management. The pilot forest inventory will provide inputs for the preparation of the national forestry action plan. Three major activities are planned, namely: capacity building within the Directorate of Rural Development and Natural Resources in the area of resources monitoring, forest inventory and setting up of a forest and tree information system.

In close collaboration with the TCDC international expert, the national consultant will assist the Department of Forests within the Directorate of Rural Development and Natural Resources in training the national personnel, planning and supervising the national forest inventory. The main tasks of the Consultant will be to:

- work in close collaboration with the national personnel and international consultant and provide inputs for the elaboration of training programme to be given to the national personnel involved in the project and assist the DF in implementing it;
- participate in implementing the training programme for the national personnel including the team of supervisors, the field crews and database personnel through the planned workshops and courses.
- assist the DF in purchasing, installing and using the equipment and supplies planned for the project;
- in close collaboration with the international consultant, prepare a plan of the project activities and identify timely inputs form the project and the Government;
- provide supervision of the field crews during the survey and provide technical guidance as to homogenise data collection and best interpretation of variables and definitions;
- assist in organizing field crews outputs and in filing them;
- in close collaboration with the TCDC Expert, assist in developing the national forest database, entering/storing the field data, preparing functions for data processing and initiate data processing;
- assist in data analysis and reporting of findings;
- prepare the project progress report and the terminal statement

Duration: 7 m/m for the whole duration of the project .

Duty station: Beirut

Qualifications: The consultant should have a background in national forest inventory design, planning and competence in forest information system management and have experience in capacity building and project implementation. Fluency in English and Arabic are required and French is preferred.

Terms of Reference
for the National Consultant in Remote sensing

The MoA is undertaking a programme national capacity building in the area forest inventory and assessment through the implementation of different relevant activities such as forest and tree cover mapping, pilot inventory and assessment project, and information management. The training aims at helping the country to develop its capacity for detailed national and specific inventories and long-term monitoring of the forest and tree resources and GIS based information management. The pilot forest inventory will provide inputs for the preparation of the national forestry action plan. Three major activities are planned, namely: capacity building within the Directorate of Rural Development and Natural Resources in the area of resources monitoring, forest inventory and setting up of a forest and tree information system.

The consultant will assist the Department of Forests within the Directorate of Rural Development and Natural Resources in training the national personnel, planning and implementing the national forest inventory and setting up the information system. The main tasks of the Consultant will be to:

- work in close collaboration with the international consultant and provide inputs for elaboration of the training programme for the national personnel involved in satellite imagery interpretation and mapping;
- participate in implementing the training programme in connection with the remote sensing component for the production of the forest map/land use map;
- work in close collaboration with the international consultant and the national team from the DF to review and adjust when necessary the vegetation classification taking into account the national requirements and the FAO terminology, definitions and classification used the global Forest Resources Assessment 2000;
- assist the DF in purchasing, installing and using the equipment and supplies planned for the project;
- in close collaboration with the international consultant, prepare a work plan of the mapping activities and identify timely inputs form the project and the Government;
- supervise the interpretation of the satellite images available in the Land cover project, ground checking of the interpretation results and finalisation of the map;
- report on mapping results.

Duration: 3 m/m .

Duty station: Beirut

Qualifications: The consultant should have a background in applied remote sensing to forestry and experience forest mapping using remote sensing techniques. Fluency in English and Arabic are required and French is preferred.

Terms of Reference
for the National Consultant in Institutional development

The MoA is undertaking a programme national capacity building in the area forest inventory and assessment through the implementation of different relevant activities such as forest and tree cover mapping, pilot inventory and assessment project, and information management. The training aims at helping the country to develop its capacity for detailed national and specific inventories and long-term monitoring of the forest and tree resources and GIS based information management. The pilot forest inventory will provide inputs for the preparation of the national forestry action plan. Three major activities are planned, namely: capacity building within the Directorate of Rural Development and Natural Resources in the area of resources monitoring, forest inventory and setting up of a forest and tree information system.

The consultant will assist the Department of Forests within the Directorate of Rural Development and Natural Resources in training the national personnel, planning and implementing the national forest inventory and setting up the information system. The main tasks of the Consultant will be to:

- work with the Director of the DRDNR to review the mandates of the DF and the Regional Development Services and propose improvements as to extend to resources monitoring and periodic assessments;
- propose a new organization of the DF within the DRDNR and strengthening of the Regional Development Services encompassing the new mission regarding forest and tree monitoring and assessments;
- define human and financial resources needed by the DF of forests and the Regional Development Services to implement resources monitoring programme and carry out periodic assessments;
- assist the DRDNR in defining implementation procedures of the recommendations of the consultancy and prepare a report for discussion during the workshop on project findings.

Duration: 4 m/m .

Duty station: Beirut

Qualifications: The consultant should have at least 10 years experience in institutional support and administrative management. Fluency in English and Arabic are required and French is preferred.

FAO BACKSTOPPING
3 missions for a total of six weeks

Under the direct supervision and technical direction of the Forest Resources Assessment Programme/RNER and in collaboration with the national authorities, the backstopping officer will undertake periodic missions in support of the project as foreseen in the workplan. The backstopping officer will also provide technical assistance and guidance on aspects of:

- forest and tree inventory methodology development including sampling design, classification system harmonization, and variables;
- forest type and land use mapping;
- training of the national personnel in the areas of mapping forest inventory and information management;
- field survey for data collection on forest and tree resources;
- data processing, information system development and reporting;
- supervise and interact with international staff on the local training courses;
- overall technical supervision of project implementation and delivery at the national level;
- technical editing and clearance of project reports including the terminal statement.

Terms of Reference for the Provision of Contractual Services

The MoA is undertaking a programme for national capacity building in the area forest inventory and assessment through the implementation of different relevant activities such as forest and tree cover mapping, resources inventory and assessment, and information management. The training aims at helping the country to develop its capacity for detailed national and specific inventories and long-term monitoring of the forest and tree resources and GIS based information management. Three major activities are planned under the project, namely: capacity building within the Directorate of Rural Development and Natural Resources (DRDNR) in the area of resources monitoring, forest inventory including forest type/land use mapping and setting up of a forest and tree information system.

For the implementation of the mapping activities under the present TCP project, a memorandum of understanding will be established between the DRDNR and the Directorate of Studies and Coordination (DSC) for the use of satellite data, the computer and space facilities and the trained personnel in remote sensing interpretation and mapping. Under this contract, the Directorate of Studies and Coordination shall:

- provide the DRDNR with the full remote sensing data available with the UTF/LEB/016 in the Ministry of Agriculture;
- put at disposal of the present TCP and the National Remote Sensing Consultant all such remote sensing data and the computer facilities developed by the DSC for satellite images interpretation and mapping;
- assign the technical personnel from the DSC with preliminary training in remote sensing interpretation to participate in additional training focussing on forest type/land use mapping, to work and fully collaborate with the National Consultant of Remote Sensing, and under his technical guidance interpret the images covering the country and prepare the national forest type/land use map at the scale that will be defined by the DRDNR.
- facilitate the use of topographic maps and access of the project personnel to the mapping offices within the DSC.
- participate with the national team from the DRDNR as part of the Steering Committee to prepare a national harmonized forest type/land use classification to serve a basis of future mapping in the country and of standardized reporting.

Duration: Open according to the project needs over the project cycle of 18 months.