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Food and Agriculture Organization of the United Nations

NATIONAL FOREST ASSESSMENT

TECHNICAL MEETING

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National Forest Monitoring

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 both country and global levels, FAO initiated an activity to provide support to national forest monitoring (NFM). The support to NFM includes developing a harmonized approach to national forest assessments (NFAs), information management, reporting and support to policy impact analysis for national level decision-making.

The purpose of the NFM 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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Abbreviations

ANAFOR:	Agence nationale d'appui au développement forestier
COFO:	Committee on Forestry
CONAP:	National Assembly for Protected Forests
DRDNR:	Rural Development and Natural Resources of Lebanon
DENR:	Department of Environment and Natural Resources
FAO:	Food and Agriculture Organisation of the United Nations
FMB:	Forest Management Bureau of the Philippines
FRA:	Forest Resources Assessment
GOG:	Government of Guatemala
INAB:	National Forest Institute in Guatemala
LoA:	Letter of agreement
MINEF:	Ministry of Environment and Forestry of Cameroon
MoA:	Ministry of Agriculture
NFA:	National Forest Assessment
NGO:	Non Governmental Organisation
NPC:	National Project Coordinator
NWFP:	Non wood forest products
ONADEF::	National du Développement des Forêts
PAFG:	Plan de Acción Forestal para Guatemala
SC:	Steering Committee
SIDA:	Swedish International Development Cooperation Agency
TCP:	Technical Cooperation Programme
TCDC:	Technical Cooperation among Developing Countries
TOF:	Trees Outside Forest
UNICED:	United Nations Conference on Environment and Development
UVG:	Valley University of Guatemala

Summary

On request from its member countries, FAO has provided technical and financial support to countries that have requested it for forest and tree resources assessment and monitoring. The FRA 2000 concluded that most countries lack reliable information on all types of forests and trees. Few countries have prepared national forest inventories. Due to the high cost involved, updating of the national forest inventories was not done. In the past, forest inventories focused solely on timber, while most of the other social, environmental economic functions forests and trees outside the forests have been neglected.

Over the last five years, FAO has worked with experts, scientists, academicians and decision makers from all regions to develop a cost-effective approach to national forest and trees outside forests assessments and long term monitoring. The approach aims at broad assessments that include various aspects of forest and tree resources, such as biological diversity, forest health, resource use, users and management. The assessment was broadened in some countries to include other land use resources, which improved institutional collaboration in the countries and helped address cross-sectoral issues.

The support to national forest assessment was provided to a group of five countries (Costa Rica, Guatemala, Cameroon, Lebanon and the Philippines) with different social and ecological contexts. It has rapidly expanded to cover other countries from Central America, Africa and Asia. The list of countries that requested FAO assistance (both technical and financial) is long. The national forest assessments (NFAs) in the first countries led to valuable information on various aspects of all forest types and trees outside forests.

From 9 to 11 March 2005, FAO convened an international meeting to: Evaluate the approach to NFA; assess the use and utility of the results in the process of policy impact analysis; recommend ways to improve the scope, quality and use of the NFA results; provide guidance to FAO to improve its assistance to the countries; and explore mechanisms that would enable the countries to sustain the achievements of the NFA.

Four groups of people were invited to the technical meeting: Scientists and experts in different areas relating to the resources assessment; decision makers in the forestry sector; specialists in field implementation of the NFAs; and specialists who contributed to the development of the approach and methodology. In all, 27 people participated in the Meeting. The agenda of the meetings was structured to provide participants with insight on the programme of support to NFAs, the linkages of NFAs with national policy processes and international processes and fora, the results achieved in some countries and the use of information in the policy discussions.

Conclusions from the Technical Meeting

On the approach to NFA it was concluded that:

- The NFA approach is credible. It is simple and straightforward in its design and therefore simple to implement and to make estimations. It is methodologically/statistically sound and is built on state of the art forest inventory research. The design elements are proven ones that are flexible enough to be adapted to all forest and “inventory-management” conditions.
- The NFA enables countries to produce reliable information in a relatively short time and at low cost through a nationwide network of permanent sample sites, thereby allowing for monitoring changes over time and hence increasing the value of the collected data with every re-measurement.

- The NFA, being based on permanent sample sites, will increase in value with every re-measurement as this allows for capturing change of information.
- NFA, as a more progressive approach to collecting information on forests and TOF resources, functions as a catalyst for further research and provides new information that challenges existing perceptions.
- The perceived benefits of the NFA approach are numerous. Per invested dollar, the benefit is greater for the current NFA compared to the standard inventories.

On relevance of the NFA approach to policy development needs it was concluded that:

- NFAs contribute to the development of national policies and macro-planning (national forest programmes), address cross-cutting issues of gender, poverty, environmental degradation, etc. and guide their implementation
- NFAs enable countries to produce objective, transparent and defensible data and help identify information gaps for follow-up studies where needed.
- NFA is an evolving programme and is likely to satisfy shifting future needs for forest and tree resource information by national and international policy makers.
- NFAs provide a focus on trends in forest and TOF resources and require that results be more simplified and disseminated to make them better understood and more accessible by non-technicians and decision-makers.
- NFA data provides information on the rights of indigenous people and the various user groups. It helps illustrate the role of women in the use and extraction of forest resources.

On the scope of the NFA it was concluded that:

- There is a need for further development of data collection methodology on biodiversity.
- There is need for improvement to the interview-based, socioeconomic components of NFA.
- The extension of the forest resource data collection to other land uses and TOF is considered necessary and useful. It should be considered where appropriate to work across sectoral boundaries.
- The appropriate scope of the NFA must be country-specific depending on country priorities (drawing a distinction between information that is “must know” and “nice to know” and “feasible to gather” and “not-feasible to gather”).

On the exchange of knowledge it was concluded that:

- The use of Technical Cooperation among Developing Countries (TCDC) experts promotes the sharing of experiences, methodologies and systems that have already been developed elsewhere, thus reducing start-up costs.

On the FAO assistance to countries it was concluded that:

- There is satisfaction regarding the achievements accomplished by FAO in supporting NFAs in relatively short time.
- There is general recognition of the instrumental role played by FAO in initiating the NFA programme, helping countries carry out NFAs, developing capacities and stimulating the process of policy developments.

Recommendations from the Technical Meeting

The recommendations to the countries were that:

- Countries must focus on defining “real information needs” to better adapt the approach to their national settings, priorities and to gather the most relevant data.
- Countries should work to make the data/findings widely known and readily accessible to both policy makers and the public.
- Policy briefs and leaflets based on the NFA findings should be produced as concrete outputs from the NFA programme.
- A public relations component should be added to the design – which is deemed extremely important to the overall success of the NFA exercise.
- A team of core staff should be permanently established for maintaining the NFA and the database thus making the built capacity robust enough to secure continuity and make the NFA less vulnerable to staff changes.
- A regular budget should be allocated for maintaining NFA and database.
- The research communities should be involved, allowing them to use the raw data and the sample sites in order to broaden the utility of the NFA and disseminate the information.
- The time intervals and the expected range of changes should be identified and a strategic plan for the re-measurement of the sample sites and the maintenance/updating of the database and institutional capacity be defined.

The recommendations to FAO from the Technical meeting were that:

- FAO continue to develop the NFA programme and work to strengthen the achievements accomplished.
- FAO integrate NFAs into the work on streamlining and harmonization of international reporting carried out by the Collaborative Partnership on Forests.
- FAO track the use of NFA results in countries to get feedback on users, uses and new needs.
- FAO reinforce the database management, data processing and analysis as a standard part of an NFA project.
- FAO elaborate more on interviewing as well as the path of analysis, interpretation, and reporting of interview data.
- Methodology development should be pursued for data collection on biodiversity and for measuring ecosystem fragmentation with possible support with remote sensing.
- Care should be taken not to spread resources too thin in the quest for data (quality vs. quantity). Continued focus should be on producing timely, relevant, cost-effective data that is credible, defensible and transparent.
- Work should be pursued to improve NFAs across sectoral boundaries and to capture other resource data where this integrated land use assessment is considered appropriate.
- NFAs should shed light on the ways in which forests and TOF contribute to food security through NWFPs and other goods and services.
- The presentation of how the forests and TOF in conjunction with other sectors are of use to the rural population should be strengthened.
- The use of TCDC experts should be pursued by FAO to promote the sharing of experiences, methodologies and systems between countries, ultimately reducing start-up costs.
- Follow up meetings should be convened every couple of years for key NFA staff in countries conducting NFAs.

- The NFA approach should be subjected to studies and collaboration by the research community.

1 Introduction

From 9 to 11 March 2005, FAO convened an international meeting to:

- Evaluate the approach to NFA in light of the results achieved;
- Assess the use and utility of the results in the process of policy impact analysis;
- Recommend ways to improve the scope, quality and use of the NFA results;
- Provide guidance to FAO to improve its assistance to the countries
- Explore mechanisms that would enable the countries to sustain the achievements of the NFA.

Four groups of people were invited to the technical meeting. The first included scientists and experts in different areas relating to the resources assessment and included: statisticians/biometricians, a remote sensing specialist, a social science specialist, a biodiversity specialist and forest inventory specialists. The second group was composed of decision makers in the forestry sector from some countries, including heads of the forestry administration¹. The third group was composed of specialists in field implementation of the NFAs and included specialists from Africa, Central America and Europe. The fourth group was composed of specialists who contributed to the development of the approach and methodology. The mix of professionals at the meeting allowed for deep discussion in all aspects of the work done by FAO and the countries where NFAs have been implemented. In all, 27 people participated in the Meeting.

The agenda of the meetings was structured to provide participants with insight on the programme of support to NFAs, the linkages of NFAs with national policy processes and international processes and fora, the results achieved in some countries and the use of information in the policy discussions. It also allowed for in-depth discussions of the various aspects of the support to NFAs programme.

1.1 Objectives of the meeting

The Technical Meeting (TM) aimed at analyzing the approach and its relevance to meeting countries' specific needs as well as reviewing requirements for sustainability of the NFA programme in the countries. The ongoing maintenance of NFA activities depends largely on countries' commitments to maintaining the system put in place in terms of skill, databases and national network of sample sites. It also depends on the readiness of the donor community to continue providing support to countries to secure that the NFA programme is operational. The TM allowed for an exchange of views on international partnerships on NFAs and their linkages to countries' priorities, policy processes and forestry planning – national forestry programmes.

Specifically, the objectives of the TM were to:

- Review the results of NFAs from four selected countries (Guatemala, Philippines, Lebanon and Cameroon);
- Evaluate the NFA approach: sampling design, techniques of data collection, data quality, processing and analysis of data, information management and long term monitoring;
- Evaluate the use and impact of the NFAs on the process of decision making for policy development and forestry planning;
- Evaluate the utility of the NFA approach to satisfy countries' needs of information and fill the information gaps;
- Redefine the focus of the NFAs: capacity building, institutional strengthening, scope of information and resources, target users and long term monitoring;

¹ Bangladesh, Cameroon, Congo, Cuba, Guatemala, Honduras, Lebanon, the Philippines, Vietnam, Zambia

- Identify the requirements for lasting NFA programmes in countries;
- Assess the relevance of the NFA to national and global policy developments;
- Share experiences among countries and international experts.

1.2 Background information on the NFA approach

As per its mandate, FAO conducted periodically, since 1948, an assessment of the world forest. The first assessment of the forest resources of the world was carried out in 1948 and was repeated in 1963, 1970, 1980 1990 and 2000. Initially, the assessments focussed on timber potential, and the scope of the assessment broadened gradually to encompass a wide range of forest and trees outside forest attributes. The Global Forest Resources Assessment Update for 2005 (FRA 2005), was requested by COFO 2001 and COFO 2003, where it was recommended that global forest resources assessments should: (a) be carried out at 5 year intervals, (b) be related to international forestry processes and (c) be implemented as a broad based assessment.

The global FRAs have always been based on information provided by the countries. One of the main conclusions of the FRA 2000 was that most countries do not have the needed information to sustainably manage their resources and therefore are unable to meet international reporting obligations. Neither the scope nor the quality of information at country level is satisfactory from the policy maker's point of view. In terms of statistics, 20 countries, corresponding to 12% of the forest area in the developing countries, have information produced through field sampling. 48 countries, or 69% of the forest area, have information derived from detailed mapping. And 94 countries or 25% of the forest area have not carried out inventories in the past. This shows that approximately 88% (Saket 2002/2003) of forests in the developing countries have information only on forest area coverage, emphasizing the severe lack of national knowledge on various forest products and services.

In 2000, FAO created a programme with the aim to support developing countries in creating and maintaining the needed information on the state, use and users of the resources forest and trees outside the forest. FAO collaborated with experts, scientists, academicians and decision makers from all regions to design a cost-effective approach to national forest and trees outside forests assessment and continuous monitoring. The approach aims to broaden the concept of assessments to include various aspects of forest and tree resources, such as biological diversity, forest health, resource use, users and management. In some countries, the concept was broadened to include other land uses, which improved institutional collaboration in those countries and helped address cross-sectoral issues.

The approach to national forest and tree resources assessment was tested in a pilot project in Costa Rica in 2001 and was based on systematic sampling across the entire country and hence all land use systems. Field sampling is often complemented with remote sensing.

The design of the approach was based on the following considerations:

Information needs: What information is needed? Who needs it? For what purpose? Users of information from national forest inventories are many and from all levels. However, meeting all possible needs can make the inventory costly and very heavy to undertake and is not easy to update in the future. The NFA approach was thus designed to meet the needs of policy makers at the national level and to help countries report to international processes. The information scope is not only on area and volume of forests, but now includes the use of the resources and the services of forests and trees outside forests. In defining information needs, linkages can then be made with issues of poverty, environment degradation, gender, etc.

Users of information: The target users are national policy makers on issues involving the social, economic and environmental functions of the forests and trees.

Cost effectiveness: Cost effectiveness is a major issue in forest inventory. The rarity of national forest inventories is due to the high cost involved. Fieldwork in conventional forest inventories is very costly. The approach was designed to allow for data collection in the field at a moderate cost. This is expected to encourage countries to maintain the monitoring system and periodically update the information base.

Rapidity of data collection and update procedures: In the past, scores of national forest inventories have not been completed. Many have stretched over years, rendering the produced data already outdated and the operation cost very high due to changes in cost.

Accuracy and consistency of output data in space and time: National forest inventories are strategic in the sense that they provide data for good policy formulation, and provide the overall knowledge to judge the success, progress, and benefits of policies and resulting practices by capturing deviations from the baseline over time. They are therefore not forest management oriented inventories. Foresters and information users tend to require detailed and accurate data on local population elements. This changes the objectives of the national forest inventory and renders it too costly. To reconcile the amount of information needed for strategic decisions, the accuracy (precision) of such information and cost involved, one has to optimize the sampling intensity that can lead to reliable information for national policy makers. The consistency of national forest assessment outputs in space and time can be achieved if a stable approach is followed in successive field inventories.

Flexibility for adaptations to various national requirements: Each country has its national requirements but also obligations to report according to internationally agreed reporting formats. The NFA approach has to be adaptable to national contexts but enable the countries to have information framework comparable to the rest of the world if some common basic methodological fundamentals are followed.

Compatibility of output with existing national information systems. The utility of any approach to NFA is when it meets the direct sectoral needs and at the same time produces outputs comparable to existing information systems.

Harmonization to international standards. The workload caused by the countries' reporting obligations to the international processes became a major concern in many countries. The harmonization of the monitoring systems and of the information framework in the countries became a necessity.

Four countries² have conducted NFAs following the harmonized approach developed by FAO. Four other countries are starting NFAs³ or integrated land use assessment⁴. Proposals under consideration for funding have come from Cuba, Republic of Congo, Vietnam, 6 West African countries⁵ as one regional project and Nicaragua. Many other countries from all regions have placed official requests for FAO technical and financial assistance.

In January 2003, FAO organized a meeting of experts and national project coordinators in four NFA countries to: evaluate the progress made in the national forest assessment projects, examine national plans for data entry, storage & analysis and information management, follow up with actions based on project results, and discuss methodological issues related to the sampling

² Cameroon, Guatemala, Lebanon and the Philippines.

³ Bangladesh, Honduras

⁴ Kenya, Zambia

⁵ Cape Verde, the Gambia, Guinea Bissau, Guinea, Mali and Senegal

design. The main recommendation of the meeting to FAO was to convene an expert consultation to evaluate the general approach based on concrete results from the participating countries.

At its fifteenth session in March 2001, the FAO Committee on Forestry (COFO) was informed of FAO's effort to support member countries in developing national capacity and carrying out cost-effective national forest assessments. In this respect, the Committee:

“requested FAO to provide continued technical and financial assistance especially to developing countries and countries with economies in transition, for country capacity building in carrying out national-level assessments and monitoring, in order to improve the timely availability and quality of data.”

As a follow up to the 2003 Meeting and in line with the request of COFO, FAO called for a Technical Meeting in 2005 composed of a range of specialists including scientists in the areas of statistics/biometry, remote sensing, social science, biodiversity and forest inventory as well as decision makers in the forestry sector, specialists in NFA field implementation and experts contributing to the development of the approach and methodology. Altogether, 27 experts participated in the Meeting.

Four countries presented the results and findings from their NFAs. This allowed for assessment of the programme from different perspectives including the scope and quality of the information generated, the reliability of the design of the approach, the ability of the approach to respond to countries' needs, the countries perception and ownership of the inventories and FAO's assistance to the countries.

This report presents a summary of the progress in the four countries having completed their NFAs and the conclusions and recommendations of the Meetings.

1.3 Rationale for NFA

FAO's periodic assessment of the world forests was designed to monitor changes and trends of different parameters of the resources. Processes within the forests – degradation and/or improvement- and between forests and other land uses through afforestation, reforestation and deforestation are important aspects to monitor. With the implementation of the Kyoto protocol on climate change, accurate estimates of carbon stores in the forests and trees outside forest at the national level is becoming increasingly important. Monitoring criteria and indicators of sustainable forest management, biodiversity, etc. is becoming at the centre of interest to policy makers and managers of resources at all levels.

The role of forests and trees outside forests in food security is valuable and needs to be properly assessed through national forest inventories and global forest assessments. Forests and trees provide food, shelter, employment and other wood and non wood goods and a wide range of services that are vital to people in rural areas to sustain their livelihoods. National inventories should thus address these issues and assess such a role. It should also establish the role of people in resources management and use.

The need for a standardized collection of forest and forestry information that can be used for international analyzes or comparisons are unmistakable (e.g. Lanly 1996 and Lund 1996). The argument from the United Nations Conference on Environment and Development (UNICED) 1992 is often called upon. The United Nations conventions on biological diversity, climate change and desertification are other milestones. On a more general level, international economic analyzes and forecasting require reliable input concerning the forestry sector. The implementation of these international processes requires monitoring of the forest (and other) ecosystems, including the production of goods and services, as well as strengthening of the legal

and political frameworks for the management of land and natural resources. Furthermore, public consumption of environmental information is on the increase as sophisticated communication technologies increase accessibility to information.

International assessments of forests and forestry have developed from a timber oriented mode some decades ago, and now include broad environmental factors, as well as socio-economic aspects. The theoretical land use boundary between forests and agricultural land has become vague as trees are increasingly grown outside the forests, and the values of non-wood forest products are being progressively more accounted for. Several environmental parameters, such as carbon cycling and biodiversity, are not confined within the land use classifications. It is thus clear that international assessments of forests and forestry should increasingly be cross-sectoral and include interactions with agriculture and remote benefits from the forest.

The programme of support to NFAs aims at helping countries in developing or strengthening their capacities for continued national inventories. It also aims to broaden the knowledge base of the countries on forest and tree resources at the national level based on reliable field data collected at a moderate cost and on a wide range of uses. The NFA was designed as a compromise between the volume of data needed, the precision of results and the cost of the survey. Moderate investment in data collection is expected to stimulate and encourage recipient countries and donors alike to invest in forest resources monitoring through continuous inventories.

The approach is founded on collaborative partnerships between concerned governments and donors with FAO facilitating the cooperation. The Committee on Forestry in its fifteenth session in March 2001 was informed on the approach and supported, in principle, the idea. It recognized the potential for NFAs to improve the availability and quality of national level data and information and identified the programme as a useful complement to FAO's periodic global forest resources assessments.

2 Review of the progress in the four project countries

2.1 Guatemala

In November 2001 the Government of Guatemala (GOG) requested FAO assistance to plan and implement a first national forest assessment (NFA) in Guatemala, as the existing national forest statistics were based on partial inventories (mostly outdated and with different methodologies employed), which primarily focused on potential timber exploitation. More recent efforts to generate forest statistics have focused on remote sensing analyses, producing vegetative cover maps but lacking in qualitative and quantitative information on forest and tree resources. A project proposal was formulated for FAO to provide technical assistance to build national capacity in the design and establishment of a permanent monitoring system of Guatemala's forest and tree resources through field inventories, with the objective to support decision making at the national level. The NFA activities were co-funded by FAO \$250,000 and the GOG \$50,000 through a Letter of agreement (LoA).

The National Forest Institute in Guatemala (INAB) took the lead in NFA activities and signed the LoA with FAO. INAB collaborated with the National Assembly for Protected Forests (CONAP), the Valley University of Guatemala (UVG) and had support from the National Forest Action Plan (PAFG), which all were represented in the NFA Steering Committee.

The field data collection started in April 2002 and finished in September 2003 with preliminary NFA results and findings presented in December 2003. The final report of the NFA was published in November 2004.

The NFA in Guatemala followed the basic NFA methodology of FAO. It covered tree resources both inside and outside forests and a broad range of variables on the state of forests and trees and the benefits from these resources, including biodiversity as well as socioeconomic and production aspects. Information on additional variables was collected to satisfy national information requirements, such as the non-wood forest products (*xate*⁶, *bayal*⁷ and *mimbre*⁸) and information on different ethnic groups and their use of forest and tree resources in order to better understand the cultural diversity in the country. Based on the natural zones within Guatemala, the land area was divided into three strata for the sampling to better distribute the sample units.

The main outputs of the NFA in Guatemala:

- Capacity building: During the NFA implementation, in addition to the field crews, a high number of professionals and technicians from national institutes, forest companies, local governments together with university students and teachers were trained. Special training in data management and data analysis was given to professionals in the technical unit who generated the national statistics on forest and tree resources.
- A system of permanent plots on 108 tracts systematically distributed throughout the whole country were established and inventoried.
- A Database was established for managing NFA information.
- A Final report was published on NFA results and findings, covering all benefits from forests and trees.
- A Report was generated on the impacts of the NFA results on policy making and development.

⁶ Leaves from *Chamaedorea* palm species.

⁷ Flax, *linum usitatissimum*.

⁸ Twigs of *Salix* species used for basketry.

2.2 Cameroon

In December 2001, the Ministry of Environment and Forestry (MINEF) of Cameroon requested technical and financial support from FAO to plan and implement a national forest assessment (NFA). The necessity of updating and completing national information was recognized by all national forestry stakeholders, as existing data on forest was obsolete and incomplete, dating from the 1980s and covering only the southern part of the country.

Following this request, two consecutive LoAs were signed between MINEF and FAO to reinforce national capacity in designing and planning the national forest assessment, implement a national forest inventory and establish a monitoring system of forest and tree resources in Cameroon with FAO support.

The project, co-financed by FAO and the MINEF, was implemented in two phases, corresponding to the two LoAs. The first phase (May 2002 – November 2003) included refining methods, planning and designing the inventory, training activities, completion of about half of the data collection work in the field, database development and data entry.

During the second phase of the assessment (second LoA, signed in March 2004) field work and data entry were completed and a tree study was undertaken to establish volume equations in northern Cameroon. Data processing and analysis as well as reporting and dissemination of assessment results were also carried out.

Project activities were coordinated by the MINEF, in close collaboration with FAO. A national technical unit composed of officers from MINEF and ANAFOR/ONADEF working in various fields (forest inventory, forest management, wildlife, non wood forest products services) was formed to supervise the project.

The methodology applied in the national forest inventory in Cameroon follows the NFA approach developed by FAO. The inventory relies on 235 permanent tracts systematically distributed nationwide, with sampling intensity varying according to two strata (see map). Data was collected in the field through measurements, observations and interviews on a wide range of variables, to provide reliable information on the state of forests and trees outside forest as well as on their uses, users and management. The core list of variables was adapted to better serve national

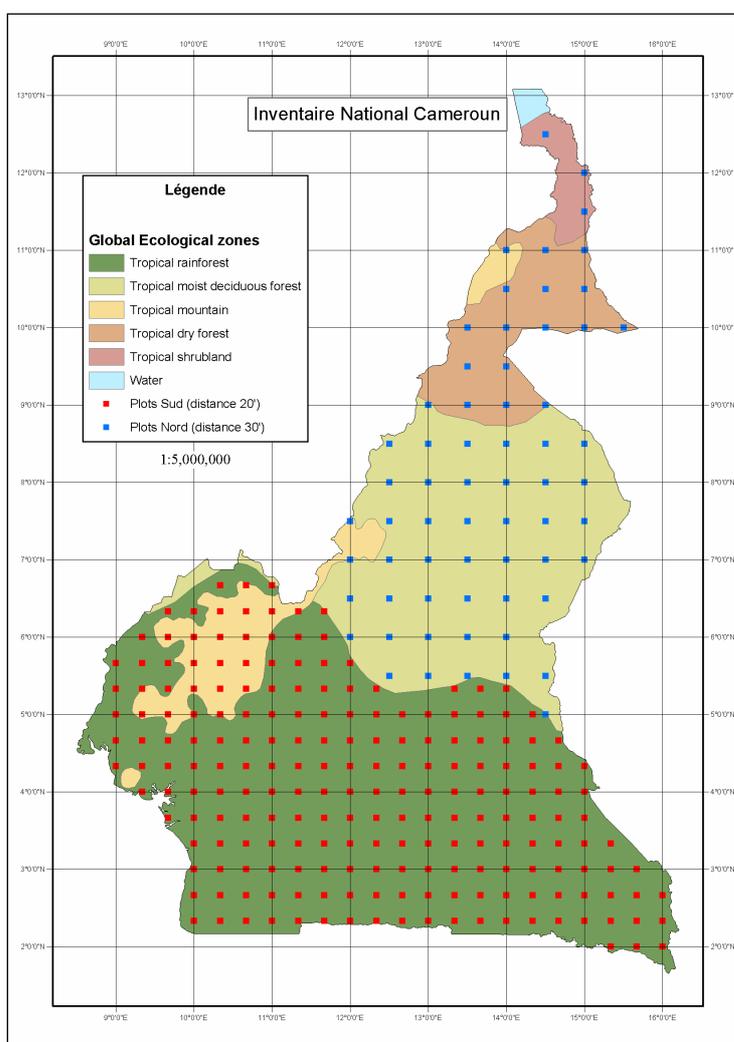


Figure 1 The permanent sample plots in Cameroon have been distributed according to two strata that are based on ecological zones. Sampling intensity is highest in the southern strata.

information needs, including additional information on wildlife and a land use/forest type classification system based on the existing national system and harmonized to the international classification scheme. Data entry and storage of collected field data was carried out through a database application developed by FAO. This database facilitates storage, use, maintenance and updating of the information.

The NFA project in Cameroon achieved the following outputs:

- Capacity building in designing and carrying out forest and tree resources assessments, field measurements and interview techniques, data management and processing. The lead technical unit and eight field crews were trained in the methodology. Training in data entry and processing was also provided.
- Information system on forests and trees was set up.
- Permanent plots were established in 235 tracts.
- A final report was made on the results and findings covering all benefits from forests and trees including land use areas, tree volume in and outside forests, commercial volumes, biomass and carbon stock, biodiversity aspects, analysis of products and services and the health status of forests.

An analysis of the impacts of the NFA results on policy making and development is planned to follow up the project.

2.3 The Philippines

Prior to the NFA, the existing information on forests in the Philippines was obsolete and conflicting as it was produced through different methods. It focused essentially on timber and forest cover. Knowledge on the various other products and services provided by forests and trees was generally lacking. The available information on the extent, location, volume and condition of Philippine forest resources was obtained in the second national forest inventory that was carried out between 1979 and 1988.

The long term objective of the NFA in the Philippines was to enhance the social, economic and environmental functions of forest and trees and to improve the contribution of the forestry sector to the national economy.

In the immediate future, the project aims to:

- Develop and reinforce the capacities of the Forest Management Bureau (FMB) in resource monitoring;
- Carry out a country wide forest and tree assessment;
- Provide support to the FMB in policy impact analysis with a focus on addressing cross-cutting issues of relevance to the Philippines.

The NFA project was funded by the SIDA programme and the FAO Forestry Department. Two LoAs were established between FAO and the FMB for a total amount of USD 204,000. FAO provided additional support to the project with three backstopping missions from its regular budget. The project was initiated in August 2002 and was implemented by the FMB through the supervision and coordination of a national Technical Unit established for the NFA, and the regional personnel from the regional offices of the Department of Environment and Natural Resources (DENR) for fieldwork activities. The Head of the FMB acts as National Project Coordinator. A Steering Committee (SC) was created by the FMB and helps the NPC in his overall supervision of project activities. The SC is composed of representatives from different national institutions within the forestry sector. The Director of FMB is the Chairman of the Steering Committee.

The NFA project is divided into three phases, namely:

- Preparation and training from August 2002 to October 2003
- Fieldwork and data entry from November 2003 to September 2004.
- Data processing, policy analysis and reporting from October 2004 to May 2005.

The preliminary findings of the project were presented at the current Technical Meeting on NFAs while final results will be made public in May 2005.

The sampling design adopted was systematic and without stratification. The selection of the sample site population was done on the basis of the latitude/longitude grid. A grid of 239 tracts measuring 1 km x 1 km was established at each 15 minutes latitude and longitude.

Each plot was divided into land use sections where data was collected. The plots were also mapped for future re-measurements for change assessment. Data was collected through measurements of tree biophysical properties, observations and interviews with key informants. Additional information was collected on bamboo, rattan, erect palms and NWFPs to satisfy the national needs for information.

The project provided a first national experience with NFA that covered the forests and trees outside the forests based on systematic field sampling. The main outputs of the project can be summarized as:

- Capacity of the FMB was strengthened in the areas of planning and implementation of forest inventories, resource monitoring and management of the related information, and advanced sustainable forest and tree management. This was done by facilitating an increased use of forestry knowledge in forest policy development and implementation.
- National staff was trained in inventory and assessment techniques and project management through on-the-job training, workshops and study tours.
- Information system was harmonized in relation to the existing information framework as well as with international reporting requirements. The project was based on forest type/land use classification systems decided upon by representatives of the stakeholders.
- A system of permanent sample sites was set up in the Philippines where the NFA base parameters are measured along with additional parameters of national importance.
- A database was established for managing and updating the information and its dissemination to users.
- The project findings were used to carry out a policy impact analysis with a focus on cross-cutting issues of poverty, resource degradation, gender, etc.

The project produced large amounts of information on areas of different land uses, gross and commercial wood volume in and outside forests, biomass, carbon, and a wide range of forest products and services provided by forests and trees. The results were produced with scope and quality.

The FMB decided that in the future, the NFA will be integrated in the regular activities of the FMB, as it will be repeated likely every five years to capture information concerning changes in the extent and state of forest resources. The NFA should not be seen as the end product in itself, but as a starting point for a tradition of conducting systematic inventories and using the gathered information to develop appropriate national policies and plans and subsequently implement them, i.e. a continual feedback process.

2.4 Lebanon

NFA Lebanon is based on systematic field sampling according to the methodology developed by FAO and is implemented as a project (TCP/LEB/2903) under the Technical Cooperation

Programme (TCP) of FAO. The main objective of the project is to reinforce the capacity of the Directorate of Rural Development and Natural Resources (DRDNR) of the Ministry of Agriculture (MoA) in collecting, compiling, analyzing and disseminating reliable up-to-date information on the forest and TOF resources of Lebanon through training of national staff in forest and tree inventory.

55. The civil war in Lebanon in the 1970s and 1980 disrupted most of the existing initiatives concerning the management of natural resources and caused a loss of institutional capacity. Rebuilding the capacity of MoA to monitor the forest and TOF resources and their wide range of benefits is imperative to securing a sustainable management of the resources and for providing a sound information base to support national policy development and decision making, e.g. for the development of a national forest policy.

The project document was approved in March 2003 and became active in July 2003. The preliminary findings were presented at a technical workshop in January 2005. The final results will be presented in May 2005. NFA Lebanon is divided into three phases:

Phase 1: July 2003 – November 2003, Preparation and training

Phase 2: November 2003 – September 2004, Fieldwork and data entry

Phase 3: September 2004 – May 2005, Data processing, analysis and reporting

NFA Lebanon is implemented by the DRDNR. The Director of DRDNR is the National Project Coordinator. The Project Steering Committee (SC) provides overall supervision of project activities. It facilitates inputs and ensures a wider dissemination of results. The SC is composed of representatives from the Directorate of Studies and Coordination, Ministry of Environment, National Centre of Remote Sensing, environmental NGOs and universities.

The fieldwork was undertaken by MoA field staff who, through the project activities, received training and continual supervision on NFA methodology. In addition to the base variables encompassed by FAO's NFA methodology, a number of additional variables were included in the field forms to capture important NWFPs. The field forms and inventory methodologies were adjusted to facilitate the measuring of shrub vegetation and to increase the information captured on TOF.

The project provides the first national experience with NFA based on systematic field sampling. The main outputs of the project can be summarized as:

- Improvement of national staff inventory and assessment techniques and project management through on-the-job training, workshops and study tours have improved the capacity at DRDNR to plan and implement forest inventories, monitor the resources and manage the related information, as well as to advance sustainable forest and tree management by enabling an increased use of forestry knowledge in forest policy development and implementation.
- Map of forest and tree cover of Lebanon based on the land classification system decided for the project, which is compatible with the global land-use classes used by FRA.
- System of permanent sample sites established in Lebanon where the FRA base parameters are measured along with additional parameters of national importance.
- Database established for managing the information and its dissemination to users.
- Final report drafted on NFA results and findings which will be used to develop a forestry action plan, reformulate forestry policy/strategies if needed, identify specific projects for detailed forest inventories, and to establish areas for further research.

In the future, NFA will be integrated in the regular activities of MoA, as it will be repeated every five years to capture information concerning changes in the extent and state of the woody

resources of Lebanon. The NFA undertaken during the TCP/LEB/2903 should not be seen as the end product in itself, but as a starting point for a tradition of conducting systematic.

3 Evaluation of NFA and recommendations

This chapter presents the outcome of the Technical Meeting and is structured in nine sections. The first presents the benefits that the basic NFA approach provides. The second deals with the cost-effectiveness of the approach. The third explains how the NFA approach can be modified according to national contexts, which is followed by an evaluation of information management in the fourth section. Cross-sectoral aspects are covered in the fifth section. Challenges for future development of the methodology and the use of results in policy processes are the topics for section six and seven respectively. Section eight presents what actions countries should take to ensure sustainable assessments and the final section presents what role the participants of the meeting thought FAO should take in providing technical assistance.

3.1 *Benefits of the basic NFA approach*

- The NFA approach is credible. It is simple and straightforward in its design and therefore simple to implement and process the estimations. It is methodologically and statistically sound and is built upon state of the art forest inventory research. The design elements are proven ones that are flexible enough to be adapted to all forest and “inventory-management” conditions.
- The NFA enables countries to produce reliable, transparent and defensible information in a relatively short time and at low cost through a nationwide network of permanent sample sites.
- NFA, being a progressive approach to collecting information on the forest and TOF resources, functions as a catalyst for further research and provides new information that challenges existing perceptions.
- The participants recommended carrying out local (country-wise) studies on sample size optimization to improve the cost/precision relationship.
- Care should be taken not to spread resources too thin in the quest for data (quality vs. quantity). Continued focus should be to produce timely, relevant, cost-effective data that is credible, defensible and transparent.

3.2 *Cost-effectiveness*

- The participants of the Technical Meeting consider the cost-effectiveness of the NFA approach as a considerable advantage in comparison to conventional inventories and is thus commendable.
- The perceived benefits of the NFA approach are numerous. Per invested dollar, the benefit is greater for the current NFA compared to the standard inventories with regards to
 - Time and money saved as a result of NFA findings (improved foundation for decision making and planning);
 - Capacity built among national staff;
 - Increased knowledge on forest and TOF resources.
- The “must knows”, the “need to knows”, the “feasible to gather” and “not-feasible to gather” must be identified at the start-up of the NFA and guide which parameters to

include in the NFA as well as for any national modifications and adaptations that are further needed.

- The design of the inventory is more expansive than earlier inventories that often focused on production issues. The ultimate value of the NFA will depend on how well the results are disseminated and used. In order to get the full return of the investment, a strategy for targeted dissemination of NFA findings needs to be developed by FAO and participating countries alike.
- The start-up cost is expected to decrease as the standard NFA manuals and computer applications reach a final format and as NFAs are regularly updated.
- The use of consultants under the TCDC arrangements improves the cost-effectiveness of the NFA. The exchange of staff offers a great deal of mutual benefits to countries and promotes the sharing of methodologies and systems that have already been developed elsewhere thus reducing start-up costs.
- The continued use of TCDC experts should be encouraged and supported by FAO. A network of potential candidates as TCDC consultants for NFAs should therefore be maintained by FAO.
- A prerequisite for future repetitions of the NFAs is that the programme gains a name for being easily understood, transparent, low cost and based on quality surveys that produce the basic facts.

3.3 National modifications and adaptations

- The current design of the NFA approach can easily be adapted to national contexts and is thus expected to respond to changing information needs in the future. The participants recommended maintaining the current design elements.
- NFA is an evolving programme and is likely to be able to satisfy the shifting future needs for forest /tree resource related information of the national and international policy makers.
- NFA provides important and relevant information to the planning of the forestry sector and to the policy processes. Countries must focus on defining demand-driven information needs – which allow for adapting the approach to the national setting and to gathering the most relevant additional data. However, it is also recommended that they at the same time maintain the fundamentals of the harmonized approach to keep comparability of successive assessments of information between countries.
- The importance of the information regarding the purpose of the NFA and fieldwork at both national and local levels was emphasized by the participants, as it is imperative to the success of the fieldwork and for the quality of the interview-based variables.

3.4 Information management and analysis

- The Meeting recognized the importance of comprehensive information generated by the NFA programme. The countries and FAO were both advised to work on the simplification of the data collection where needed and on dissemination of the results and findings.

- Where NFA findings differ substantially from the existing knowledge on forest and TOF, FAO and the countries are requested to provide the necessary clarifications about the approach and explain the observed differences.
- NFA provides broad focus on trends in forest and TOF resources. It requires additional efforts for improving the reporting format and for simplification of the results and findings to make them readily understood by non-technicians and decision-makers.
- The participants were satisfied with FAO assistance to countries in creating direct linkages between NFAs and the policy processes, but expressed a wish for increased FAO support in wrapping up the work and conveying the results to the politicians/decision makers. They recommended that:
 - FAO helps to integrate the NFAs into the work of streamlining and harmonization the international reporting carried out by the Collaborative Partnership on Forests.
 - FAO tracks the use of NFA results in countries to get feedback on the users, uses and new needs.
 - FAO reinforces data processing and analysis and database management as a standard part of an NFA project.
 - FAO elaborates more on the interviewing as well as on the paths of analysis, interpretation, and reporting of interview and biodiversity data.
 - Countries work to make the NFA data and findings widely known and readily accessible to all users (policy makers and the public) in a manner that is flexible enough to allow for shifting needs.
 - Series of policy briefs and leaflets based on the NFA findings should be produced as concrete outputs from the NFA, facilitating the use of the findings, e.g. country-specific one page briefs or leaflets on topics such as ‘*Forests and poverty*’, ‘*Forests and food security*’, ‘*Forests and environment*’, ‘*Trees are everywhere*’, etc.
 - A public relations component should be added to the design – which is deemed extremely important to the overall success of the NFA exercise.
- The workshop participants were satisfied with the support from FAO in starting up the NFA and analyzing the data. Continued focus should be to produce timely, relevant, cost effective data that is credible, defensible and transparent.

3.5 Cross-sectoral aspects of the approach

- In real scenarios, forest and tree resources are fully integrated into land-use systems. In order to be of highest relevance to policy, the NFA has to capture the influence of the different land uses on forests.
- The use of the systematic sampling scheme to capture data on other resources where integrated land use assessment is considered appropriate will add value to the NFA approach and will improve the use of the produced knowledge in policies. Considerations should be made to the implications for NFA planning, implementation and data analysis and management.
- The participants recommended that the presentation of how the forests and TOF in conjunction with other sectors are of use to rural populations should be strengthened. The

NFA should provide the knowledge on the resources produced by forests and trees and how these resources can support rural population activities.

- There is need for additional work on NFA to shed light on the ways in which forests and TOF contribute to food security through NWFPs and other goods and services as well as on the rights of indigenous people and various users groups.
- The appropriate scope of the NFA must be country-specific depending on the list of real needs, which must be identified at the beginning of the NFA and guide which parameters are included in the NFA or integrated land use assessment. Any national modifications and adaptations must also be identified in order to capture the needed information.
- The main core of biophysical and “socio-economic” variables developed by FAO should serve as the basis for the identification of countries’ needs. Caution must be taken not to overload the NFA process. Relevant new data should be captured only when it can be converted into credible and meaningful information in order not to undermine the credibility of the NFA.
- The NFA data can help illustrate the role of women and gender issues in the management, extraction and use of forest and tree resources.

3.6 Challenges for future development of the NFA methodology

- It is highly commended that FAO continues to help countries develop their knowledge on forests and trees and create the capacity to maintain and update such knowledge.
- The Participants underscored the achievements accomplished by the NFA programme in relatively short time and recommended that all parties (FAO, countries and donors) should work to consolidate this programme and continue developing it to benefit the maximum number of countries possible.
- The standard approach must be broad enough and satisfy all users’ needs and has to be further developed. The participants recommended that FAO:
 - Continues developing standardized methods for dealing with rare occurrences that are of high relevance to national decision making but are not adequately captured by the NFA.
 - Pursue methodology development for data collection on biodiversity, on “indicators” i.e. important habitat elements and for measuring ecosystem fragmentation with possible support by remote sensing.
 - Continue methodology development of the interview-based, socioeconomic component of NFA.
 - Further develop the FAO methodology and information-sharing platform for volume/biomass functions measurement techniques for TOF.
- Current focus should be on analysis issues (biodiversity, interviews, etc) and on spreading NFA awareness.
- The NFA created an important platform for research. Involvement of the research communities will allow for the use of the raw data and sample sites. This will broaden the utility of the NFA, establish baselines for quantifying trends, help disseminate the information and highlight the importance of NWFPs for rural livelihoods and how best the NFA data can be collected and analyzed.

- Outputs of the NFA can be improved if remote sensing is introduced into the NFA approach. FAO is requested to work on the integration of the field sampling and remote sensing in future NFAs.
- Being based on permanent sample sites, the NFA will increase in value with every re-measurement. This will allow capturing change information concerning land cover/land use, management and utilization of the forest and TOF resources and changes in trends over time.
- And in order to secure future repetitions of the NFAs, countries must be committed to:
 - Establishing a team of core staff for maintaining the NFA and the database, thus making the built capacity robust to secure continuity and make the NFA less vulnerable to staff changes.
 - Allocating regular budget funds for maintaining the institutional capacity of NFA operations and updating the database.
 - Making the use and the importance of the data from the NFA very clear to the decision makers.
 - Encouraging external counterparts in the NGO research communities and allowing them to use the sample sites in order to allow for broad dissemination and support.
 - Defining the time intervals and the expected range of changes making a strategic plan for the re-measurement of the sample sites and the maintenance/updating of the database and institutional capacity.

3.7 Use of NFA results in policy processes

- NFAs contribute to the developments of national policies and to macro-planning (national forest programmes). They have the potential to address cross-cutting issues of gender, poverty, environment degradation, etc., and to guide their implementation and assess their impacts.
- NFAs enable produce objective, transparent and defensible data on forests and TOF and helps identify information gaps for follow up studies where needed.
- NFA data provides information on the rights of indigenous people and the various user groups. It helps illustrate the role of women and gender issues in the use and extraction of forest resources.

3.8 Actions by countries to ensure sustainable assessment

- Countries having completed NFAs recognize the value of the results reached and appreciate the leading role of FAO in introducing the programme to the countries and in helping them to set the bases for long term monitoring.
- The countries are aware of the benefits of keeping the NFA alive and operational. Likewise, they are aware of the setbacks if the knowledge developed and system put in place disappear.
- The commitment of the countries shown during the execution of the NFA should continue to be able to produce updated information at all times.

- As monitoring of resources is a declared objective of the NFA programme, the countries should work closer with national partners, FAO and the donor community to create stable team of core staff. These should be adequately trained in NFA activities and issues related to NFAs, making the NFA programme less vulnerable to staff changes.
- It is commonly agreed that the value of the NFA will derive principally from the comparability of successive assessments and the information on trends they provide. Therefore, the next NFA needs to be planned explicitly at this stage so that necessary resources (financial and human) can be identified and obtained and key improvements taken into account.
- Countries should allocate a regular budget and other inputs necessary to maintain NFA and the corresponding database.
- Countries and FAO should work to involve the research community on NFA developments and allow them to use raw data and sample sites. This will contribute to broadening the utility of the NFA and disseminating the information.
- Countries, with the help of FAO, should identify time intervals and the expected range of changes and define strategic plans for the re-measurement of the sample sites and the maintenance/updating of the database and institutional capacity.
- Countries should work to improve integration of resources assessment to broaden, when needed and feasible, the scope of the NFA.
- Countries should develop and implement a strategy of awareness amongst information users, especially policy makers, about the NFA programme and disseminate the results.

3.9 Role of FAO technical assistance

- FAO has played an instrumental role in developing the new concept of broad NFAs and in introducing countries to it. By initiating the NFA programme, FAO has taken a strategic step towards sustainable forest management and valuation of all benefits (goods and services) from forests and trees outside the forests.
- FAO has, through this programme, helped foresters from all regions to change old concepts of large, costly and time consuming inventories focussing merely on the economic aspects of the resources.
- The NFA programme of FAO in its present design has the potential to fill the gaps of knowledge about forestry resources in many countries, build the national capacity to meet NFA needs and support the process of national decision making with comprehensive and reliable information.
- The participants' recommendation is that FAO should maintain the NFA programme, consolidate it and attract donors to it.
- FAO should work closer with the countries and the donor community to (i) cover more geographic areas; (ii) continue providing the technical assistance to countries having completed their NFAs when needed to sustain the achievements; (iii) continue developing the NFA methodology on aspects in relation to biodiversity, interview-based socio-economic components, data processing and information management.
- FAO should pursue developing a roster and using TCDC experts in NFA to promote the sharing of experiences, methodologies and systems between countries, thus reducing the start-up costs of NFAs.

- FAO should facilitate follow-up meetings every couple of years for key NFA staff, to be hosted by the countries conducting NFAs. This would allow for discussions and information sharing.
- FAO should work to improve the presentation of NFA outputs with both analyses that match nationally identified information needs and, especially, interpretation of the results. While it will be important to avoid crossing the line into advocacy, it is vital that basic objective interpretive text accompany the graphical presentation of the results.
- FAO and participating countries should enhance outreach to ensure maximum distribution and uptake of the results among users at the national level. The uptake and use of data should be tracked and feedback received on its utility to decision makers as a basis both for improving the NFA approach and for demonstrating its utility to other countries considering implementing it.
- There is general satisfaction of the participants with the support provided by FAO in starting up the NFA and analyzing the data, but they expressed a wish for increased FAO support in finalizing the work and conveying the results to politicians and decision makers.

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Appendices

i. Participants

Preliminary list of participants to the

Evaluation of National Forest Assessment Approach and Influence of Project Results on Policy Development Processes

Dates of the meetings: 09 –11 March 2005

Venue: FAO HQs, Rome

Pakistan Room

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ii. program & presentations

Agenda

Wednesday: 09/3/2005

1. Opening

09:00 -10:00: Opening welcome, José Antonio Prado, Director of FOR

- Objectives of Meeting, Peter Holmgren, Chief FORM
- Election of Chairperson
- Introduction of participants
- Adoption of the Agenda

2. General presentations on NFA and related issues

10:00 - 10:30: Overview of the NFA programme, **Mohamed Saket**

10:30 -10:50: Coffee break

10:50 - 11:20: Information storage and management, **Dan Aitrell**

11:20 - 11:40: Field Projects of NFAs, **Mohamed Saket**

11:40 - 11:20: Introduction to global FRA: **Lars Mark Lund**

12:20- 13:40: Lunch

3. NFAs in selected countries: Emphasis on results

13:40 - 14:10: Presentation of the results from the NFA project in Lebanon – **Gattas Akl**, Director.

14:10 – 14:40 Presentation of the results from the NFA project in the Philippines – **Romeo Acosta**, Director.

14:40 - 15:10: Presentation of the results from the NFA project in Guatemala – **Edwin Oliva Hurtarte**, INAB

15:10 - 15:40: Presentation of the results from the NFA project in Cameroon – **Joseph Abena**, Director.

15:40 - 16:00: Coffee break

4. Continuation of general presentations on NFA and related issues

16:00 – 16:30: Approach(es) to data processing – **John Fonweban**

16.30 - 17:00: Introduction to knowledge reference and how it can benefit into national forest assessments, **Ylva Melin**.

17:00 – 17:30: Requirements of international processes from NFAs, **Lars Marklund**

18.00 – 19.00: Informal welcome reception

Thursday: 10/3/2005

08.30 – 09.00: Requirements of NFPs from NFAs, **Eduardo Mansur**

5. Thematic Presentations: How the NFA responds to policy development needs

09:00 - 09:20: Lebanon, **Gattas Akl**, Director

09:20 - 09:40: The Philippines, **Romeo Acosta**, Director

09:40 - 10:00: Cameroon, **Joseph Joseph**, Director

10:00 - 10:20: Guatemala. **Edwin Oliva Hurtarte**, INAB / **Carla Ramirez** (Presentation of Report)

10:20 – 10:40: Terms of reference for group work and formation of working groups

10:40 - 11:00: Coffee break

6. Group Working:

Theme 1: NFA Approach (statistical design, data collection, data processing, data analysis and management, long term monitoring);

Theme 2: Relevance of NFA to policy developments

11:00 – 12:30: Group working

12:-30– 13:45: Lunch

13:45 - 15:30: Group working

15:30 - 15:50: Coffee break

15:50 – 17:30: Group working.

Friday 11/3/2005

09:00 - 09:45: Presentation Working Group 1 and discussion

09:45 - 10:30: Presentation Working Group 2 and discussion.

10:30 - 10:50: Coffee break

7. Formulation and adoption of the Outline of the Meeting Report

10:50 - 11:50: Outline of the Meeting Report and discussions

11:50 - 12:30: Any other matters, closing (plenary)