



**Forestry Department**

**Food and Agriculture Organization of the United Nations**

**GENERATING KNOWLEDGE  
THROUGH NATIONAL FOREST  
ASSESSMENTS**

**TOWARDS IMPROVED FOREST,  
LAND USE AND LIVELIHOOD  
POLICIES**

**Expert Consultation**

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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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# 1 Introduction

## 1.1 Background information

In late 2005, FAO published the findings of the global Forest Resources Assessment – FRA 2005 – which assembled an unprecedented volume of country-specific information on seven key thematic elements of sustainable forest management.

Earlier conclusions regarding poor information availability in FRA 2000 was reconfirmed in 2005. Most developing countries had difficulty reporting because their national monitoring systems are not adequate – neither for international reporting nor to meet domestic needs. Poor data quality remains an issue in many countries and for a large proportion of the world forests.

Generally, developing countries lack national norms for forest inventories. In most cases, information from subsequent inventories are not compared because of differences in methods and techniques. Comprehensive and representative information on forests and the management and uses of forest resources is therefore still missing in many countries. Information is frequently outdated, partial or subjective, and in most cases data precision and accuracy are unknown. Most countries also lack the capacity (financial and expertise) to carry out nationwide inventories of forests and trees.

## 1.2 Rationale

As a result of insufficient forest information and poor data quality, scenario development and planning regarding forest management may not be accurate. Consequently, forest policies are not in tune with real conditions and the needs of users, in particular the needs of rural populations.

Information improvement was also targeted by the Intergovernmental Panel of Forest (IPF), the Intergovernmental Forum of Forest (IFF) and the Committee on Forestry (COFO) as an area of significant importance towards better forest policy formation. All three have emphasized the need for policy frameworks and institutional arrangements that foster the participation of civil society in forest decision-making and improved cooperation across sectors based on enhanced data collection, assessment and reporting on forests.

The IPF/IFF proposals for action underscored the need to improve data collection of full range of goods and services of all types of forests and trees outside forest boundaries based on rapid, cost effective and policy oriented methods. Emphasis was made for integrated and holistic multidisciplinary approaches incorporating cross-cutting issues, technology transfer and capacity building.

COFO requested FAO to assist countries to strengthen capacity for conducting national forest assessments and building forest information systems.

FAO supports countries to close the existing knowledge gap by working in national partnerships in implementing systematic field inventories, establishing forest information services, and thus enabling enhanced analyses of the forest sector for the country as a whole. This provides a basis for analyses and planning at the national level, broadens the knowledge base on forests and forestry in the country, and helps enhance national capacities to monitor forest developments. The programme has been named Support to National Forest Assessments (NFA).

The assessments place local uses of forests and trees in the center, thus focussing on information related to real world management decisions and factors affecting these decisions. Statistical rigour makes it possible to aggregate findings to the national level. The approach creates new knowledge not only about overall national averages of important variables, but also on variations in these within the country. Furthermore, it will be possible to identify and quantify interactions and interdependencies in forest uses. In conclusion, the approach can help improve analyses of the national forest sector and provide a sound basis for policy development and monitoring.

According to the above, an Expert Consultation was held in Rome in November 2006 (see Annexes 1, 2, and 3), to identify strategies on how to better understand the role of national forest assessments (NFA) in the process of information and knowledge generation and to eventually better link forest information procurement with national policy processes, or integrate NFAs into these processes.

### 1.3 Objectives of the expert consultation

The main objective of the meeting is to seek and establish linkages between national forest assessments and policy development processes.

*Specifically, the Expert Consultation will focus on the following objectives:*

- **POLICY DEVELOPMENT:** Defining the requirements of national policies and other decision making processes to guide the evolution and adaptation of NFAs. (i.e. policy processes, information needs and gaps, follow up, etc)
- **NFA IMPROVEMENT:** Provide guidance on ways to improve the NFA approach to better link generated knowledge on forest, trees and land uses to policy development processes (see Annex 4A).
- **INFORMATION PACKAGING:** Provide guidance on how to present the information and results of the NFAs to make them accessible to policy and decision makers (see Annex 4B).
- **FAO ADVISORY ROLE:** Advise FAO on ways to improve its advisory role to countries for knowledge generation, information management and capacity building.

- GLOBAL KNOWLEDGE NETWORK: Advise on opportunities and needs for creating and maintaining a knowledge network on national forest assessments and inventories.

#### 1.4 Expected outputs

1. Improved understanding of forestry and land use policy requirements and linkages between policy processes and NFA
2. Identified information needs for livelihood and forestry policies
3. Enhanced understanding of the process of decision making at the national levels
4. Identified interface mechanisms of information flow from NFAs to different levels of decision makers for better NFA adaptation
5. Advice on an array of actions by the NFA to influence all levels of decision making and policy processes
6. Redefined FAO Role in introducing new approaches, technologies and advice to countries on how to improve NFA support to member countries
7. Establishment of a knowledge network of NFA experts
8. Advice on how to communicate NFA data according to different audiences

## 2 Summary of the Expert Consultation

FAO's support programme to national forest assessments convened an Expert Consultation (EC) on "Generating knowledge through National Forest Assessments - Towards improved forest, land use and livelihood policies" in Rome from 23 to 30 November 2006.

35 experts from 25 countries participated in the EC on national forest assessments (NFA). The participants represented countries with FAO supported NFAs, research institutions, donor organisations and international expertise in the area of NFA and its links to policy processes.

The overall objective of the EC was to identify strategies on how to better understand the role of NFAs in the process of information and knowledge generation and to strengthen the linkage between forest information procurement and national policy processes. The objective was also to further develop the strategies and methodologies of NFAs and broader assessments, and to identify the role that FAO may play in these processes.

The support to a new more holistic NFA approach started in 2000/2001 with a NFA in Costa Rica and there are now experiences from another four completed NFAs (Guatemala, Philippines, Cameroon, Lebanon), two are just in the process of finalization (Honduras and Bangladesh), three are ongoing (Zambia, Kenya, Congo Brazzaville) and around 15 more countries are in preparation and formulation requesting technical assistance from FAO.

Experiences from the finalized and ongoing studies together with the great interest of many more countries underline the success story of the new, more holistic, NFA approach. The novel elements of the NFAs – in comparison to earlier national forest assessments – have proven to meet the expectations and needs of policy and decision makers from the countries:

- Strong country ownership, with FAO in an advisory role.
- Clear focus on questions that result from ongoing policy processes; that is, the NFA approach is demand-driven and not mission or technique driven.
- Integration of other resources than the traditional forest resource only; in the NFA approach this is typically the tree resource outside the forest. But there is the option to expand the NFA by integrating more resources and more land uses.
- Focus on the uses and users of forestry resources and not only on counting the biophysical resource.

This approach illustrates clearly that a NFA needs actually to be an integral part of national policy processes, not only in the forestry sector, but also in related sectors.

The following are the main conclusions and recommendations of the expert consultation:

- NFAs should be more visibly integrated into national policy processes, in the forestry sector, but also beyond. A closer collaboration between the NFA support programme of FAO and the NFP facility is seen as a clear win-win move. It is expected that this integration facilitates adoption of NFA country ownership.
- NFAs should be country driven and country owned, if to succeed in gaining countries' acceptance. Direct linkage to global Forest Resources Assessment must be avoided to avoid seeing FAO support not responding to membership needs. However, NFA should be harmonised with the global FRA reporting format chiefly with the internationally accepted forest related terms and definitions.
- NFAs are complex undertakings but sufficiently flexible to integrate the generation of information on resources also other than forest and trees. This requires coordination with related sectors and the development of suitable strategies and methodologies. Such an integrated assessment process is expected to foster inter-sectoral communication and collaboration.
- Networking and capacity building are seen as important pillars in the NFA process.

With respect to networks: focus should be on *regional* networks, fostering exchange of knowledge, experiences, skills between country-NFA groups, funding opportunities, mechanism for international collaborative effort to NFA. FAO should maintain a facilitating role.

With respect to capacity building: focus should not only be on the traditional technical aspects like inventory design, but also very much on the general role that information plays in decision processes, on policy processes in general and on communication. FAO should facilitate capacity building (for example through its international networks) but also act directly.

- Communication is seen a major component of NFAs. NFAs do not stop when the final report is written. Strategies and formats of communicating the results need to be systematically developed. That could be a generic task of FAO.
- FAO should emphasize the importance of gaining the support of higher politicians and thereby also the importance of lobbying and encourage the different NFA stakeholders to influence the politicians to recognize the high value of NFA information.
- The experiences accumulated in the many NFA studies over the past 6 years should be systematically evaluated and analysed by FAO.

As a result of this analysis, a set of strategy and methodology options should be compiled in “guiding principles for a successful implementation of NFAs”. These guidelines should be reviewed by assessment experts from forestry and other sectors, but also by policy and decision makers; including those who have not yet participated in a NFA process.

- FAO should continue playing the role of facilitator. FAO's function should be strictly catalytic. NFAs should not be perceived as FAO projects, although in some cases seed funding and intensive technical advisory may be needed.
- Countries should invest in NFAs and long term monitoring. NFAs should be institutionalised and be stable structure within national forestry administration.
- Donors are called to rally FAO efforts in knowledge generation for improved forest, land use and livelihood policies and ultimately sustainable forest management.
- FAO should disseminate the progress made by the NFA programme and the results achieved and convene a donor meeting to define a global strategy for knowledge generation and support to national policies as set in the IPF 1997 Proposals for Action.

### 3 Key findings and recommendations

From the above discussions in the working groups and in the plenary, a number of key findings can be extracted which are in part suggestions for a long term strategy and in part recommendations for short-term actions:

#### 3.1 Integrating the National Forest Assessment into national processes

##### Discussion points and major findings:

The NFA is recognised as the prerequisite to national as well as to global policies and to national forestry programming. The expert consultation recognises the instrumental effort of FAO in improving awareness in the countries about the need for NFA<sup>1</sup> and the important role of the resulting information in policy developments.

It is one of the cross-cutting issues, addressed in various of the further discussion points below, that a NFA must not be implemented nor perceived in the country as an isolated exercise.

During the Expert Consultation, two presentations on the National Forest Programme (NFP) Facility were given. The close relation between NFPs and NFAs became evident: while the NFPs is supporting a long term forest policy development through communication, networking and workshop organization, the NFAs are continuously providing relevant information as input for national forest policy development and evaluation.

While NFAs have strong technical components (field inventory, remote sensing image analysis and data analysis) they need to develop and improve upon their strategy to assure that information becomes knowledge and that it is used in policy development processes in forestry and related fields, which is the role of NFPs, why it is recommended to develop stronger links between NFAs and NFPs.

Stronger linkages between NFAs and NFPs will provide several advantages for both processes, creating an excellent example of a win-win situation. Among the advantages are:

- NFPs are usually well embedded in the country within the institutional landscape of policy development. NFAs that integrate organically into this system and that derive its mission, also from the demands expressed by both these institutions and

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<sup>1</sup> Proposals for Action, IPF Fifth Session, 1997 called countries and international organizations to collaborate in national capacity building and institutional strengthening for NFAs where data collection is based on integrated, holistic, multidisciplinary, rapid, low-cost and policy oriented approach and methods of quantitative data on the full range of forest goods and services, including impacts of changes in forest use on the environment

the NFP, are likely to achieve more rapidly acceptance, country ownership and policy adoption.

- Inter-sectoral promotion: NFAs with the potential to expand to an information gathering tool also for other sectors depend on the cooperation with and the acceptance by the relevant actors in these sectors. It is likely that the NFPs will be very efficient in supporting NFAs in the identification of information needs of related institutions and in facilitating contacts to the corresponding key people.
- Point in time: information is not demanded at all times with the same urgency. It is expected that the policy analysis by the NFPs helps to more clearly recognize and define the point in time when the NFA is due.
- The NFPs may play a major role in assisting to formulate the “right questions” which can be responded to by NFAs.

#### Recommendations:

It is recommended to integrate NFAs into ongoing national policy processes. It may even become one element of the NFP. Synergies and mutual benefits are expected to be high.

It is recommended that countries should work to organically integrate NFA into the structure of the forestry services and make it permanent activity with stable specialised and well trained staff and continuous funding.

### 3.2 About the choice between National Forest Assessments (NFAs) and Integrated Land Use Assessments (ILUAs)

#### Discussion points and major findings:

NFAs with a holistic approach to generate information on forest and tree resources, their uses and users, are attractive also for other sectors, as forests and trees are renewable resources that play a highly relevant role for people in all areas.

The NFAs as they are currently promoted by FAO are actually yet *integrated* assessments in themselves as they focus not only on the tree resource on forest lands (which is the traditional and restricted focus of traditional forest inventories), but they have also included from the very beginning:

- collection of information on tree resources outside forests (TOF): that implies integrating all types of land uses (where trees are found), and

- collection of information on the use and management of forest and trees: that is, socio-economic aspects of forest and tree utilization and management have been integrated into the inventory of the biophysical resource.

Wherever it is the demand and expectation of a country to integrate more resources than forest into the assessment, the feasibility of this demand needs to be analysed, at the best through a SWOT analysis. Natural resources that are in some manner related to trees or forested landscapes can often be straightforwardly integrated into an expanded NFA, such as a livestock and household survey of households which have forest and livestock at the same time. However, other resources may be more difficult to integrate. It must then be decided, on a case by case basis, whether an expansion of the NFA towards an ILUA is efficient or whether other approaches need to be developed.

On one hand the integration of more specialized “target objects” (such as soil variables, biodiversity variables other woody plant species, ...) may require more expertise to be integrated into the assessment. On the other hand the support from many sectors would facilitate the funding of the expanded assessment.

It is actually recommended to think twice whether it is beneficial and reasonable to eliminate the term “forest” from the name of the assignment, as it may cause identification problems and inefficient discussions about who is going to take the lead and responsibility. At the end, what has been named ILUA develops by expansion of the NFA approach in terms of methodology and subject-matter orientation.

#### Recommendations:

It is recommended to derive the need for the type of assessment strictly from the national policy processes and discussions. An assessment focused on forest and tree resources (NFA) may be indicated in many cases, while in other cases additional resources and land uses need to be added and integrated.

In every case, it must be analysed whether integration is feasible and reasonable. This requires a prior evaluation of the compatibility of objectives and of the possibility to integrate and to harmonize the assessment methodology.

FAO may play an advisory role in these preparatory studies.

### 3.3 The role of networks in NFA processes and in promoting NFAs

#### Discussion points and major findings:

National Forest Assessments are complex tasks. Their planning, implementation, analysis and promotion require a broad range of expertise in the national NFA group. This expertise needs to be systematically built, promoted and maintained. Sharing

knowledge, experiences and technical skills is a key issue in this capacity building process.

While universities have the task to build this capacity in the education of young professionals, FAO has a crucial facilitating role in this process when it comes to further educate established professionals and facilitate knowledge sharing between countries. National, regional and international networks have been discussed and evaluated. All are definitively required to promote the NFA process.

Within the country, a network of experts and interested parties within the forestry sector and across to other sectors is required to reasonably focus, plan and implement the assessment. The distribution of work efforts within the assessment will be facilitated by such national networks.

International networks are of particular relevance for the strategic support planning through FAO. They facilitate contacts to international experts and are seen as an important element of NFA promotion. The Regional networks are of special importance because they serve as exchange platform between countries that are implementing or have implemented their NFAs. These networks will be of particular importance to get the NFAs smoothly running and to make them a long term undertaking. FAO is an important facilitator of international networking. This current expert consultation is evidence that this network is yet in place. While it is expected that regional networks will establish themselves without external facilitation, FAO may wish to more systematically support this process.

#### Recommendations:

FAO should facilitate and actively promote networking. Networks on regional level are seen particularly important, because regional contacts and exchange helps most efficiently supporting NFAs and the corresponding national capacity building.

### 3.4 The cost-benefit approach to NFAs

#### Discussion points and major findings:

The need to have more tangible criteria to scientifically prove the benefit of a large area integrated forest assessment has been expressed. In a common economic cost-benefit analysis it is straightforward to quantify the cost of an assessment, but the whole range of direct and indirect benefits is difficult assess and in particular difficult to quantify in monetary terms.

Despite of these problems, on the long run, however, it is important to clearly name the uses and benefits of the information provided by NFAs. These include:

- improved decisions on the legislation towards a sustainable utilization and management of forest and tree resources, including recreational uses, water protection, landscape scenic beauty, non-wood forest products, etc.;
- improved investment decisions for plantations and wood based industries;
- improved decisions on the declaration of conservation areas;
- improved decisions on programs to support the sustainable management of the forest resource or programs to support the establishment of tree plantations;
- fostering a public discussion about the state and development of forests, the country's natural resources, the environment; including giving evidence of the role that the country's natural resource play in international discussions, for example the climate change discussion;
- disproving myths about the state of the natural resource; some of these myths play a considerable role in public discussions and have an indirect impact on policy decisions: hard facts as provided by NFAs support a subject-matter oriented discussion;
- ...

Recommendations:

NFAs should not be seen exclusively under an economic cost-benefit view because the corresponding instruments to measure benefit are not in place.

However, the benefits should be systematically tracked and made visible, which should be an integral follow-up of any NFA inventory and analysis work.

FAO, in cooperation with research institutions, should take the lead to develop instruments to evaluate the benefit of NFA and the produced information in the context of national policy processes – but also in any other context where the information is being used.

### 3.5 Forest resources information as a public good

Discussion points and major findings:

NFA generates wide range of valuable information on the socio-economic and environmental benefits. In the context of the cost-benefit approach to justifying NFAs in economic terms, information on forest and natural resources should be seen as a

*public good*: in the same manner as the general public in a country has a right to be informed on a regular basis by its government regarding the state of the national finances, the public should also have the right to be informed about the state of the natural resources which are recognized a major national asset directly important for the livelihoods of many and indirectly important for all (through the long list of environmental functions that forests have).

Recommendations:

It is recommended that information generated by NFAs is made public by the countries to maximise the benefits.

By making information public, the number of users increase and the feedback on the methods, techniques, scope and quality of information will lead to improved NFAs.

### 3.6 How provided information is used in national policy and decision making

Discussion points and major findings:

In order to fully understand what impact national level information on forest and tree resource has on national and sub-national policies (in whatever sector!), focused follow-up studies are necessary.

It is recommended to develop a procedure on how to disseminate the NFA information to decision makers, directly or indirectly, and to evaluate the “flow of the information and knowledge” provided by NFAs.

It must be clear, above all to the forest inventory planners, that the assessment exercise does not end when the report is written and distributed. It is equally important to evaluate the use of the information and its impact on policy development.

Such follow-up studies require a generic cross-disciplinary approach, which hardly can be carried out by forest inventory specialists alone. Close collaboration with specialists in policy and communication analysis is essential.

Judged from the status of FAO supported NFAs, such studies can immediately be carried out to follow-up on NFAs in several countries; for example in Central America, where one NFA had been finished about 5 years ago (Costa Rica), one has been finished two years ago (Guatemala), one is just about being finished (Honduras) and one is likely to start soon (Nicaragua).

Recommendations:

This is in close relationship to discussion point 4: Follow-up studies that evaluate the impact of NFAs should be part of every NFA.

Existing NFA structure in the country should evaluate the use and impact of the information at the national level. Closer collaboration between NFPs and NFAs will be helpful in this respect.

### 3.7 Country ownership

#### Discussion points and major findings:

Country ownership of the national assessment project has been emphasized to be key to long-term success. It is not only the basis for successful technical implementation but also for the adoption of the results. The lack of country ownership has been identified as one of the major reasons for the lack of sustainability of the many forest inventory projects carried out in various developing countries in the 1960s and 1970s.

In the ideal case, the NFA becomes a completely national undertaking with national goals, national experts and national funding; being independent in principle from major external input. The role of FAO and regional and international networks would be focused on advising “on demand”. However, the situation in the countries is very different, and in some cases it is a long way to achieve total country responsibility for the NFA process.

Two major issues can be mentioned in this context:

- Priority: If the national government does not assign adequate and sufficiently high priority to the generation of information on the national forest resource (which obviously includes the willingness to assign a budget to the activities and institutionalise the assignment), then country expertise will have a hard time to practically execute the country ownership, to implement the activities and to eventually give evidence of its short- and long-term benefits.
- Expertise: adoption and national promotion of a NFA may also be hampered by insufficient national know-how on large area forest assessments.

In both cases, inadequate prioritization and lack of expertise, FAO may have a supporting role:

- It is contended that country ownership will be achieved best if the NFA is not perceived as an isolated and stand-alone exercise by the country stakeholders, but rather as integrated into at least one already ongoing country process. The NFP is but one example where the NFA would seem to fit perfectly (see above). Whether

this leads to higher priority of the NFA in the policy agenda, remains open, but it certainly helps identifying a suitable point in time to start NFA undertakings.

- The expertise on national forest assessments may be enhanced through advising and training activities or by facilitating closer contacts to experts from neighbouring countries. A big step has been taken by FAO in creating a web-based knowledge reference for national forest assessments ([www.fao.org/forestry/site/fra-knowledgeref/en](http://www.fao.org/forestry/site/fra-knowledgeref/en))

FAO should develop strategies to support national counterparts in the institutionalisation of NFAs. While it is acknowledged that these strategies are different from country to country and also vary within the countries it is essential to give recommendations on available alternatives to pursue an institutionalization and maybe also which pitfalls to avoid. One element of such a recommendation could be a direct support by FAO on ministerial level.

It should also be considered to build in *milestones* to be able to evaluate the process accordingly and to build in an “*emergency exit*” as a way out when it is recognized during the process that it is not suited to immediately proceed with a full blown National Forest Assessment. Strategies should also be developed to prepare the grounds for a later assignments. Elements of this strategy could be training activities, national experts visiting NFAs of neighbouring countries, workshops with decision makers presenting results of NFAs and their adoption in policy processes in other regions.

It is expected, however, that, If the NFA from the beginning is integrated into ongoing policy development processes, such as the NFP, it is expected that this emergency exit hardly ever is needed.

#### Recommendations:

True country ownership of the NFA process is crucial for in particular for the long term sustainability of the NFAs. Country ownership can only be achieved if the benefit of the NFA is clearly understood and visible. To achieve commitment, NFAs need to be integrated into national policy processes. This is a requirement that probably is new for many technical forest inventory experts and it is therefore recommended that FAO develops basic strategies to guide the national NFA teams on how to achieve general acceptance of the NFA process and thereby gaining political commitment at high level to get the NFA process institutionalised.

NFAs should be policy oriented, country driven and country owned to succeed in gaining countries’ acceptance. Direct linkage to global FRA must be avoided, otherwise FAO support could be seen as not responding to membership needs. However, NFA should be adapted to the global FRA reporting format and the internationally agreed forest related terms and definitions.

### 3.8 Enhancing expertise on and understanding of National Forest Assessments

#### Discussion points and major findings:

The value of national level information will be mostly appreciated by those who have a generic interest and at the same time an education background to fully understand this kind of information.

Expertise on and understanding of National Forest Assessments is also seen as a precondition for the NFA process to be adopted into country ownership and for the acceptance of the results into the policy and decision making processes.

While economists on a default basis deal with national data and national indices, in most forestry curricula (not only in developing countries), forest inventories are often restricted to small area studies like forest management inventories, which are focusing at the more technical aspects of planning, implementation and analysis.

This is recognized as one major reason why the role of national level forest resource data is not fully understood and appreciated, not even by some forestry experts, and also why frequently it is believed that national forest assessments provide data that is also immediately applicable for small area forest management; a misunderstanding that easily leads to frustration and under-appreciation of the NFA products.

It should be one of the tasks of the NFA country experts to get young professionals interested in this field and also to influence colleagues at the universities and technical forestry schools to put national forest assessments on the agenda of the curricula of the forest inventory courses, and above all, also onto the agenda of forest and environmental policy courses.

#### Recommendations:

National, regional and international networks should be used to foster exchange of experiences and knowledge.

Countries should include national forest assessments in the forest inventory courses and introduce new concepts of integrated, holistic, multidisciplinary, rapid, low-cost and policy oriented forest assessment approach in forestry education.

FAO should play a role as facilitator but also offer specific training courses related to the NFA process. Capacity building must not only cover the traditional forest inventory topics but should also focus very much on policy integration and on the role of information in the context of decision making. Also, communication strategies should be on the agenda of capacity building. Any capacity building should have instructors from countries where NFAs had been successfully implemented. It is their

experience in how to handle all the challenges that is particularly useful for new NFA teams.

### 3.9 Optimizing an adapting NFA methodology - developing a toolbox of methodological components of NFAs

#### Discussion points and major findings:

It became clear in Working Group 2 that NFAs are developing towards very complex projects in itself, and even more when they expand to integrate more land uses and resources than forests and trees.

It is hardly possible to design a NFA to respond to any possible situation of biophysical, socio-economic and political conditions. Many elements of the methodology were identified and discussed that refer to planning, implementation and dissemination of NFA findings.

Six NFAs with the new holistic approach have been completed so far with the technical support of FAO (Costa Rica, Guatemala, Cameroon, Lebanon, The Philippines, Honduras). Four NFAs are ongoing (Zambia, Kenya, Congo Brazzaville, Bangladesh) and FAO support to NFAs in another 22 countries<sup>2</sup> have been formulated and are awaiting for funding to be implemented.

NFAs with a holistic approach have been clear success stories, which have strengthened national capacities and institutions and further assisted the governments in placing their forest policy on firmer grounds and have also lead to improved public awareness of the state and development of the forestry resources.

The listed set of countries exhibits a wide range of biophysical conditions, forest types, and land uses, a wide range of organizational structures in the forestry administration, a wide range of immediate information demands as expressed by the governments, a wide range of availability of experts in natural resource assessments and exhibits also some variability in what refers to the readiness and willingness to adopt country ownership of the assignment including putting in own funds.

The expert consultation concluded that FAO, by fostering and supporting the NFA activities, has gathered such a wealth of experiences that it is now a due time to engage in an intermediate analysis/evaluation of these experiences, which are the country specific experiences and the experiences within the NFA Support Unit at FAO.

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<sup>2</sup> Brazil, Ecuador, Uruguay, Angola, Uganda, Burkina Faso, Cape Verde, Gambia, Guinea Bissau, Guinea, Mali, Niger, Senegal, Chad, Egypt, Iran, Jordan, Oman, Syria, Yemen, Vietnam and Kyrgyzstan.

The expected outcomes of this analysis are:

- a consolidated strategy on how to integrate NFAs into national processes (see above), possibly taking into account specific differences between regions;
- A consolidated set of recommendations on methodological aspects, maybe as a “Guidelines to NFAs” or “Principles of NFAs” or “To-do’s and not-to-do’s in NFAs”.

This analysis is ideally carried out by an inter-disciplinary team, also including experts that have not been involved in the process. Such analysis can obviously not be achieved in a 2 days expert consultation, but requires considerably time.

#### Recommendations:

NFAs are complex undertakings. A general methodology can hardly be recommended, while a general approach could be followed with necessary adaptation to meet specific country needs. Many methodological and strategic elements need to be considered, as concluded by Working Group 2.

FAO should engage in a comprehensive analysis and evaluation of experiences made so far and compile a list of “guiding principles for NFAs”. This should not only include the technical methodology like sampling design etc. but also principles on how to integrate other resources<sup>3</sup> in a NFA, principles on how to establish a NFA organizational unit within a country’s forestry directorate or corresponding ministry.

### 3.10 Communication as key element of NFAs

#### Discussion points and major findings:

Forest inventories are largely perceived as technical exercises of data collection where the major skills required are in the field of statistical sampling. However, it must be recognized and made clear in any NFA assignment, that these technical components, while important beyond doubt, are only one part of the exercise.

Many more skills are required and this does also refer to organization and communication. The institutionalization of the NFA as a long-term or even permanent undertaking is one of the major organizational challenges: it is important to always work towards the goal of making the NFA more than just a one-shot inventory. The due preparation and dissemination of the results and findings is one of the major communication challenges: it is important to recognize that the NFA does not end

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<sup>3</sup> Resources related to cropping, livestock, water, wildlife, minino, fishery, etc.

when the data are analysed and the report is written. The promotion and dissemination of the findings is an integral part of the exercise.

Several discussion points have stressed that strategies for communicating the NFA process and the results must be systematically developed.

Recommendations:

FAO should assist the country experts in developing efficient strategies in the fields of organization and communication. The collaboration with the NFP facility is expected to be very helpful in these contexts.

These communication strategies may be further issues in the “guiding principles for NFAs” study recommended in discussion point 9.

### 3.11 Cross-sectoral linkages

Discussion points and major findings:

The FAO supported NFAs have a holistic approach and are integrated assignments which do not exclusively focus on the traditional “taking stock of the resource”. The possibility to expand toward neighbouring sectors by integrating resources, that are not directly related to forests and trees, offers the unique possibility to build bridges between sectors and to make the interdependency of the sectors obvious.

Recommendations:

NFA planners in the countries should systematically approach key actors in related sectors and present the principle ideas of NFAs to them.

Thereafter it should be evaluated whether common grounds can be identified and an integration of further land uses / resources into the NFA seem right and are feasible, a process that is best put into place when the NFA is an integral component of the NFP.

### 3.12 The role of FAO

Discussion points and major findings:

FAO has taken the lead in developing holistic NFA approaches and has developed a base methodology for data collection that can be adapted to meet the needs in different countries.

- Country ownership of the NFA assignments is claimed to be important for the long-term success and sustainability of NFAs. However, external support is required in many countries, in particular in the starting phase when know-how needs to be transferred. A major role of FAO to support strategy development is the advisory role, that can be implemented by using FAO experts in combination with experts<sup>4</sup> from other countries which have already successfully installed NFAs, an approach that already is being successfully pursued and supported by FAO.
- In addition to general strategy development, technical support and advise is usually also required, in particular in the starting phase of a NFA. A document that summarizes the basic principles of a NFA will be helpful in this process.
- FAO, as NFA advisor and with a good overview of upcoming challenges and issues, should also systematically suggest and help formulating scientific projects toward an optimization of all aspects of the NFA process. These scientific projects could then be worked on by university students in countries where NFAs take place or by the NFA staff themselves.  
Of course, scholarships and funding needs to be found in a collaborative effort of the country experts and FAO. The global network of NFA experts that includes also university staff from various countries may also play a role in getting these scientific support studies on the way.

#### Recommendations:

Repeating what has been recommended under earlier discussion points:

FAO should continue their successful facilitating role toward regional and international networking.

FAO should continue promoting capacity building, wherever possible in a facilitating role employing also instructors from “NFA countries” forwarding their experiences and knowledge to new “NFA countries”.

FAO should continue developing and refining strategies and methodologies for NFA implementation (technical) and promotion (policy).

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<sup>4</sup> FAO is employing NFA experts from Guatemala to support NFA developments in Kenya and Honduras; a NFA expert from The Philippines is employed to support NFA developments in Lebanon and Bangladesh and a NFA expert from Lebanon is employed to support NFA developments in Zambia and Congo.

FAO should work with international partners including donors to expand its NFA support to more countries and ensure that NFA and the resources monitoring is a lasting exercise at national and international levels

### 3.13 Conclusions and follow-up actions to the Expert Consultation

#### Discussion points and major findings:

The expert consultation generated a consolidated picture of the current situation and challenges and gave substantial recommendations on how to focus NFAs to anchor them within the countries' policy processes.

Follow-up actions are recommended. These actions include:

Studies: (possibly in cooperation with a University with students in the respective NFA countries)

- Studies that analyse concrete cases of NFAs: How and for what was the produced information used? Where did the trained experts end up after the assignment? Is the NFA and its results visible as a long term process?
- Studies for concrete cases that analyse the policy and decision processes in the context of forestry and related sectors: which are the related sectors? What are the roles that information can play?

Discussion processes / fora / workshops / meetings: (possibly but not necessarily facilitated by FAO):

- focussed discussions and brainstorming with politicians from forestry and related sectors: identifying the optimal type of assessment and the optimal point in time for its implementation.
- focussed discussions and brainstorming with inventory / census experts in forestry and other fields (agriculture, conservation, aquaculture, tourism, ...): identifying the possibilities and limits of integration as a function of common needs of information.
- Focussed discussions and brainstorming with donors on long term national forestry resources assessment strategy.

#### Recommendations:

The expert consultation confirmed the successful development of FAO supported NFAs. The experiences from the countries are manifold and diverse; the overall utility of sound and solid information as provided by NFAs was clearly stated.

Additional focussed research studies are recommended to be carried out in cooperation with universities. This can actually be seen as part of a long term capacity building.

Methodologies and strategies of

- (1) integrating other resources into a NFA;
- (2) improved integration of NFAs into national policy processes
- (3) establishing a globally agreed approach to NFA and tools for its implementation

should be further developed. This may be promoted by a follow-up donor meetings / expert consultations with assessment experts also from other sectors and with policy makers that share their expectations toward the NFA process.

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## Annex 2 – Agenda

The agenda includes the following six items:

Item 1: Opening Session

Item 2: National Forest Assessment, uses, linkage with NFP and opportunity for cross-sectorial analysis.

Item 3: National Experiences in use of NFA generated knowledge in decision making

Item 4: Working Groups: Policy driven NFA and FAO role in global knowledge networking

Item 5: Presentations of Group Reports

Item 6: Statements and recommendations

<b>Monday 27 November</b> <b>Arrival day of the participants</b>
Registered participants can collect their building passes at the Turkish lodge during all day

<b>Tuesday 28 November</b>		
<b>Time</b>	<b>Agenda Item</b>	<b>Agenda Notes</b>
08:30 - 10:00	Item 1	<b>Opening ceremony (Austria room C237)</b> Jan Heino, ADG Forestry Department Ola Ullsten, Sweden Romeo Acosta, Philippines Peter Holmgren, Chief FORM
10:00 -10:30	<i>Coffee break and transfer to the Mexico room D211</i>	
10:30 -11:00	Item 2 NFA and uses	Progress of National Forest Assessment, Mohamed Saket (FORM)
11:00-11:20	Item 2	National Forest Programmes: linkages and synergies with national forest assessments , Eduardo Mansur (FONP)
11:20 – 11:40	Item 2	Benefits of ILUA in addressing cross-cutting issues, George Hubert (AGLL)
11:40 – 12:10	Item 2	Information management, Dan Altrell (FORM)
12:10 – 12:30	Item 3: National experiences	How NFA feeds into the national process of decision making, C. Consolacion (Philippines)
12:30 – 14:00	<i>Lunch break</i>	
14:30 – 15:00	Item 3:	How NFA feeds into the national process of decision making R. Rodas (Guatemala)
15:00– 15:30	<i>Coffee break</i>	
15:30 – 16:00	Item 3	To what extend NFA meets the demands of national policy in Bangladesh
16:00 – 16:30	Item 3	To what extend NFA meets the demands of national policy in Honduras
16:30 – 17:00	Item 3	Expectations from ILUA in Zambia
<b>Wednesday 29 November</b>		
08:30 – 09:00	Item 3	Future initiative: Uganda

<b>09:00-09:30</b>	<b>Item 3</b>	Future initiative: Ecuador
<b>09:30-10:00</b>	<b>Item 3</b>	Future initiative: Vietnam
<b>10:00-10:10</b>	<b>Item 3</b>	Working groups organization
<b>10:10-10:30</b>	<i>Coffee break</i>	
<b>Wednesday 29 November</b>		
<b>10:30-12:30</b>	<b>Item 4 working groups</b>	<ol style="list-style-type: none"> <li>1. <b>Working group 1:</b> Policy requirements from NFA and ILUA</li> <li>2. <b>Working group 2:</b> What needs to be improved in NFA to meet shifting policy demands including format and dissemination of information.</li> <li>3. <b>Working group 3:</b> Advisory role of FAO to countries including developing and maintaining a global knowledge network.</li> </ol>
<b>12:30 -14:00</b>	<i>Lunch break</i>	
<b>14:00- 17:00</b>	<b>Item 4</b>	Working groups
<b>Thursday 30 November</b>		
<b>8:30-10:00</b>	<b>Item 5 WG presentations</b>	Plenary and discussion session on the results of working groups
<b>10:00-10:30</b>	<i>Coffee break</i>	
<b>10:30-12:30</b>	<b>Item 6 Recommendations</b>	Statements and recommendations from the expert consultation
<b>12:30</b>	<b>Closure</b>	

## Annex 3 – Daily working groups

### 3A. Discussions and findings of Working Group 1: Policy requirements from NFA and ILUA

#### General considerations

National forest assessments (NFAs) are investments of human and financial resources that need to be founded on a clear mandate by national policy and decision makers just as any national expense needs to be justified.

NFAs generate a data base that is via analysis and interpretation converted into information for specific target groups. Among these target groups are national policy and decision makers in forestry and related fields but also research scientists, the interested public in general and interested parties are also beyond the national boundaries, for example the international processes.

However, the major direct addressee of the information generated by NFAs are national and sub-national policy makers who are expected to use that information to improve upon their natural resource related policy. The short-term and long-term demand of information needs, in the ideal case, be formulated and explicitly expressed in order for the inventory planners to be able to respond specifically to it. That is, what we may call a demand-driven NFA. In fact, a comprehensive list of expected outputs of an NFA, composed by the relevant policy makers themselves, is rarely the basis for NFA planning. Rather, a general, and some times diffuse demand is expressed that leaves the NFA planners to respond to that at their best knowledge and ability.

According to experts of the NFP facility, a successful policy process builds on three major elements

1. *Good information available* which means timely information that is focussed, reliable, comparable and easy to understand and defend;
2. *Efficient coordination* which means that it is visibly lead by the national government, implemented by the politicians and linked to related sectors; and
3. *Participatory mechanism* which means that all interested groups and stakeholders are duly involved.

In this context, it becomes obvious that NFAs and broader integrated assessments play a basic and relevant role

The working group's task was to analyse the policy making processes, and specify the information requested at the stage of planning, monitoring, evaluating and adjusting the forestry and livelihood policies, and the relation with national forestry programmes in countries. Objectives were to define the type of information requested at the different stages of policy development, to analyse which of this information can be collected through NFA and ILUA and eventually to identify mechanisms and strategies of an efficient communication and dissemination of information.

### **Type of data and information that can be collected / generated by an NFA or integrated assessment**

Inventories can, in principle, collect any data on forest and other resources. The limitations are defined by the concrete mission, the human, financial and time resources.

The following categories of data are typically collected

- Data on the biophysical resource itself, typically on the state of the resource and, where possible, also on the dynamics. In the case of a forest assessment, this includes, forest area by forest type, forest condition, species composition, commercial timber growing stock, aboveground biomass and carbon.  
These data are typically collected by typical forest inventory field measurements.
- Data on the human intervention to the biophysical resource. In the case of forest assessments that would typically include wood removals (legal and illegal), the state of tree plantations and secondary forests, non-wood forest products, and also indirect indicators of human intervention like infrastructure for logging operations.  
These data are collected in part by field measurements and in part by interviews.
- Data on the role that the resource plays for the livelihoods. In the case of forest assessments that of the forest users and forest owners.  
These data are mostly collected by interviews with those who live of the forest resource.
- Data on variables from neighbouring sectors that bear relevance for the resource under consideration. In the case of forest assessments it may be of interest to record also the land uses adjacent to the forest areas as this may exert a direct impact on the forest condition.  
These data are collected in part by field measurements and in part by interviews.

Collection of data that is not in immediate demand or of direct interest can hardly be justified in an ad hoc manner. However, such data may be interesting for future use when new issues are upcoming. To a certain extent, therefore, it can be justified to also collect data whose

utility is not immediately obvious. It is then a political (or research need based) decision whether such variables of “anticipated interest” are to be included into the assessment or not. A typical example for such observations is taking terrestrial photographs of the sample plots. In many cases, this is done for documentation purposes without a clear idea of how to analyse this data. It may, however, prove extremely useful at later points in time when, for example, the forest or landscape structure is to be analysed along variables that can be extracted from these photographs.

## **Responses to the Terms of Reference by Working Group 1:**

### *1. Who needs the forestry information (NFA and ILUA)*

The crucial question of all inventory and assessment work is “who needs what” (and “why”).

It is the national context which determines who the actual users are and how they can possibly benefit from an NFA. A context analysis needs to be undertaken in which it is being identified what the actual questions are and to which of them an NFA can reasonably provide answers. Naturally linked to these questions are then the “users of the information” who are in demand of those answers and who will use the answers as one element for the development of criteria in decision making.

Among the users are policy makers from the forestry and related sectors, but also NGOs, donor agencies, development partners, research and teaching institutions, and the general public. However, there is a different degree of need and demand. National level information is strategic in nature and it is mainly those users who think and plan in terms of large geographical units (the entire country or sub-regions thereof) who are in most direct demand of that information.

### *2. What is information needed for?*

Information is needed for general support of public discussions about the development of the forest and natural resource, and in concrete terms information is needed for the formulation of policies and strategies related to the forest resource. This is not restricted to forest policy alone, but may well extend into related sectors. In any case, forest policy is embedded in the general national policy and interlinked with other sectoral policies.

The very concrete need for the information is derived from the specific questions that result from the national policy processes.

As a generalized statement, the information as provided from NFAs is needed for land use policies, planning and strategy development across sectors for

- sustainable development,
- allocation of public funds,
- land tenure issues,

estimation of investment returns,  
economic development,  
livelihoods evaluation,  
monitoring policy impacts.

### *3. What are the specifications of the information?*

The information demanded from the assessment process needs to follow the thematic specifications that derive from the questions formulated by the respective policy processes.

This is specific for the particular situation in which the assessment is being undertaken.

Specifications take typically into account

- Describing the state but seeking to capture trends where possible;
- Present aspects of spatial distribution to the extent possible. This can be achieved usually only by an adequate utilization of remote sensing imagery. The relatively low intensity field sampling does not allow to provide spatially explicit analysis;
- Provide information on the actual and potential production of forest.

### *4. How information should be presented/ packaged/disseminated, e.g.: internet, project reports, CDs, newsletters, policy briefs, booklets, journals, tv, radio, etc.*

### *5. Forest information services: How should these services generate information? How to make sure that the generated information will create the intended impact?*

This is one of the probably most relevant points in a NFA. Usually, a forest inventory project ends by producing and submitting the report.

However, it must be perceived as an important and integral component of an inventory that the results are published and disseminated, discussed and promoted; if possible in a public and controversial manner. To be able to strongly defend the results, however, methodological soundness and a concise summarizing of the main findings is essential.

Dissemination and promotion of the results is typically not done by the forest inventory experts, but by professional communication experts. They should be integrated already in the preparation of the documents to be disseminated. Ideally, this task is being assumed by an officer who maintains the contacts to the press. If an “analysis unit” exists, the proper processing, formatting and framing of “messages” to be published will be a task of that unit.

The documents to be released must directly and in a brief concise manner respond to the major questions and concerns (policy briefs) that were expressed before the

inventory itself had been launched. These documents may include a ‘what if/so what’ analysis.

6. *Who should have access to the raw data set, e.g. for analyses purposes?*

8. *What should be the level of access to the processed/analysed data?*

Data and information produced by an NFA must not be treated as secret or confidential. It is actually a public good. Restrictions on the basis of national data protection laws, however, may apply when it comes to publishing geo-referenced information.

The countries need to define their own policy on data access. However, as a guiding principle, it should be in the interest of the country to make use of the data and information to a maximum; meaning that processed and aggregated data should be in the public domain. Geo-referenced raw data is usually critical because personal rights of land owners may be violated.

Research institutions should have access to the raw data upon application (and maybe upon presentation of a research plan) when committing themselves to respect the confidentiality of the data. It is deemed important that NFA data are being used for research purposes because that underlines the overall usefulness of the information for various purposes also outside direct policy making.

7. *Who has the responsibility for maintenance and updating of data (FD, FAO or others)?*

NFAs are country processes and projects. Consequently, data are in the ownership of the country and must be managed and maintained in the corresponding institutions. However, FAO being involved in the process should offer to serve as a backup as experience shows that data can disappear rapidly – mainly as a result of people being transferred to other positions and of the accompanying loss of institutional knowledge.

Pre-processed and aggregated data should, where possible, be integrated into the system of national statistics.

Updating of NFA information implies that the NFA process had been adopted to be a permanent process. It is in the country’s responsibility to pursue this update. FAO may play a facilitating role in that.

9. *What role should FAO play as a neutral partner?*

FAO’s role should be a combined role of advisor, backstopper and facilitator. It is acknowledged that the NFA process needs some input in the initial phase, in

particular when it comes to formulate the key questions, to identify the information requirements and to get the NFA process established within the country's institutional landscape.

In the initial phase FAO should also act, where necessary, as a source of seed funding and provide technical assistance. Also, infrastructure services (e.g. website facilities) may be offered.

However, the most relevant input from FAO into the NFA process should be that of facilitating experience and expertise by means of the existing networks.

*10. What means and tools are required to make information management a lasting exercise?*

Dedicated commitment of the national institutions and policy makers is the single most important prerequisite to make the NFA process a lasting exercise. This commitment is hardly reached by a technical inventory project only. It requires a much longer process of confidence building and joint efforts in developing national policies that do not only serve the forest and natural resource but simultaneously and above all the interest of the country, its citizens and its overall development.

Institutionalization of the NFA process is the organizational outcome of that commitment. However, that is usually a long and complex procedure. Institutionalization means that the NFA has a structure which is independent of the actual government and of single influential actors. And that means that there must be a general legal basis to establish a NFA unit within, for example, the forestry department.

*11. Why some NFAs have greater impact than others? Specify factors that drive the variation in outcomes*

The differences in impact of different NFA can not be conclusively analysed. Corresponding scientific studies are not there. Only hypothesis about it may be generate – while FAO is encouraged to pursue studying this aspect in more depth based on experiences from already completed NFAs.

- The impact will be greatest if the NFA does directly respond to clear questions formulated from national policy processes, i.e. if it is an explicitly demand driven exercise. On the contrary, a technique-driven or merely mission-driven assessment is expected to have only incidental impact.
- The impact will be greatest if the resulting policy briefs are really focused and handed in to the right actors at the right moment.
- The policy briefs should not only comprehensively respond to the questions asked, they should contain visionary and strategic elements.

### 3B. Discussions and findings of Working Group 2: What needs to be improved in NFA/ILUA methodology to meet shifting policy demands?

#### **General considerations**

National Forest Assessments (NFA) collect data to generate information and enhance knowledge on the forest resource on national scale. By doing so, NFAs respond to demands from various interested groups, such as policy and decision makers, researchers, NGOs and the interested public. While all interested groups have their generic interest in the information provided, NFAs do specifically aim at improving national forest related policies. This is being achieved directly by providing tailored information to policy and decision makers and indirectly by informing other stakeholders and interested groups such as NGOS, researchers and the general public.

The effect which improved information exerts on policy decision making is not easy to predict. Nor is it easy to define the exact quantity and quality of information that is required for optimal decision making on national level – whatever the definition of “optimal decision making” might be. The link between information quantity/quality and decision quality is largely unexplored and awaits coverage by scientific studies. Meanwhile, it is generally assumed and accepted that better information supports reaching better decisions. This is the general framework in which NFAs operate.

NFAs have, therefore, the challenging task to define their overall methodology in such a way that the specific demands of policy decision makers are sufficiently met - be they expressed explicitly or assumed implicitly - and that potential other expectations are also taken into respect.

Most planners of forest inventories have made the experience that it is difficult to clearly find out the data and information needs of decision makers before the inventory is being done. Frequently, the demand is most explicitly expressed only at the moment when the results are presented. As a consequence, at least to some extent, inventory planners do have the challenging task to anticipate potential expectations of decision makers. When attempting to find out about the data and information needs, it is helpful to have an example of another NFA report for illustration of what an NFA is able to achieve – and what not.

#### **Characterisation of the shifting policy demands**

When defining methodological elements of an NFA as a response to shifting policy demands, it is necessary to more specifically describe the assumed changes in policy demands. The following points have been identified where some of these „shifting policy demands” are actually ongoing processes.

- a. The scope of forest assessments is becoming wider and more complex in several respects:
- Focus on changes:  
Changes and trends are becoming more relevant than state assessments and descriptions. That makes permanent assessments becoming more and more important, which in turn imposes high expectations on the organization and institutionalization of the assessment: permanent assessment systems require long-term and uninterrupted commitment.
  - Integrating the “human dimension”:  
The subject-matter focus is not any more on the biophysical resource only, but including more and more aspects of services, use and management of the resource; that is, social, cultural and socio-economic variables come in and the relationship “people and forest” is in the centre of the studies.
  - Expanding to other resources:  
While forest and tree resources play an important role in NFAs, the forest resource is more and more seen in the context of other resources and land uses (economic view) and in the context of other ecosystems and land covers (ecological view). As a consequence, NFA projects expand into other land uses than forest and open, therefore, the possibility to also integrate the collection of specific information for and on these lands.
  - From inventory to assessment/evaluation:  
It is more and more seen that the mere generation of information - be it as good and useful as it be – is by far not sufficient to achieve that this information is used and taken up to a full extent. It must be a generic task of NFAs to further process the information towards an assessment.
- b. Cross cutting / overarching issues are gaining more and more relevance in the context of forest assessments. As forests are landscape elements that play a crucial role in practically all ecological and economic processes that deal with the utilization, management of renewable natural resources, forest information is crucial also in the context of biodiversity conservation, carbon sequestration and climate change, poverty alleviation, gender issues, desertification. Related international and national processes are increasingly interested in information about status and changes of the forest resource. This demand is currently in place and is expected to become even more important.
- c. It is to be expected that policy demands and information needs change and evolve rapidly and can be very specific. NFAs need to respond to that with a flexible methodology.
- d. It is some times expected that NFAs also provide useful information for smaller reporting units such as municipalities. While this is largely founded on a misinterpretation of what national forest assessments are aiming at, it is important to take these expectations and demands into consideration and develop methodological responses.

## **What are the “elements of methodology” to be considered?**

When addressing the methodology of national forest assessments, one usually tends to think immediately in terms of points like statistical sampling, field implementation and the integration of remote sensing and field data. However, as the description of the shifting policy demands has made clear, NFAs are complex undertakings that have many more methodological elements that need to be considered.

Working Group 2 has put together the following list and sees - among others but above all – the following elements in an NFA project the need attention when improvement and streamlining of the methodology and overall strategy is an issue.

Many, but not all, of these elements were addressed in the Terms of Reference of Working Group 2 and are dealt with in the following chapter in more detail; however, the results can not be exhaustive as the working group sessions were about 1 day only.

The requirement of potential improvement of methodology refers to the following methodological elements

- a. Methodology/strategy to identify data and information gaps and the corresponding data and information needs.
- b. Methodology/strategy to define objectives and expected outputs in a workable manner.
- c. Methodology/strategy to allocate the project budget in an efficient manner so that the project can be smoothly implemented.
- d. Methodology/strategy of institutionalization of the NFA process under different country conditions.
- e. Methodology of the survey, including sampling and response design, and identification of sources of information to be used.
- f. Methodology/strategy of organizational planning, including staff recruitment, training, field manual writing.
- g. Methodology/strategy of inventory implementation and data collection.
- h. Methodology of data analysis and scenario development.
- i. Methodology of reporting.
- j. Methodology/strategy of dissemination/communication.

- k. Methodology of analysis of adoption of the assessment results in policy decision making.

## **Responses to the Terms of Reference by Working Group 2:**

### *1. Scope of the NFA/ILUA:*

It is considered a considerable progress in the development of the NFAs that FAO does offer the option to advise the countries either how to set up an NFA or how to expand an NFA toward other resources and land uses.

It is expected that the interest of countries to adopt the assessment project is increased by the choice to have a focused NFA or a wider assessment.

The wider the scope, however, the more complex becomes the project and the broader the expertise that is required.

It is, therefore, recommended to invest sufficient time and efforts to clearly identify and spell out explicitly the information demand of the policy and decision makers. Be it an NFA or a broader assessment, the project needs in any case to be tailored and adapted to the national requirements and priorities. This is a process in which not only forest inventory expertise is required but above all a sound knowledge and sense of appreciation of the national policies in forestry and related fields.

A close linkage to the National Forest Program Facility or other national policy processes will facilitate a straightforward definition of scope and objectives. Where, of course, the result of these efforts may also be that it is found that the current situation or time is not good for the establishment of an NFA and that it should be postponed.

### *2. Implementation method e.g. participatory, national leadership, capacity building*

Country ownership of the NFA project is a precondition for sustainability of the project and long-term success. The NFA must rely on collaboration and partnership at national level. A comprehensive consultation process at each stage of the project is required, where the parties to be consulted depend on the defined scope of the project.

In most countries, a systematic expertise in large area assessments of natural resources needs to be built up. Capacity building and capacity maintenance plays a central role here, where “capacity” refers to all project stages like planning, sampling statistics, field survey, remote sensing image processing, data processing and analysis, reporting, dissemination, ... Capacity building needs to aim at those national experts that will have a longer professional perspective in the NFA; in the optimal case this is the staff of a specific organizational unit in which the NFA is anchored.

Also the universities and the technical forestry schools should play a prominent role in capacity building where these institutions may have twofold roles

(1) participate as resource persons in the immediate training

(2) integrate techniques of large area forest and natural resources assessments into the academic curricula, thus providing a long term capacity building among young professionals..

The government should assign a responsible party (for example within the forestry institutions) to lead and coordinate the NFA process. This coordination should be committed to the NFA as a long-term process and to collaborations with other partners as required by the specific objectives of the assessment.

### *3. Make NFA a lasting programme in the countries (institutionalisation):*

NFAs should not be a one-shot exercise but be part of a permanent policy process. Only few developing countries have an institutionalized permanent unit within the forestry department that deals with the monitoring and assessment of the forest resource on a regular basis.

To foster institutionalisation of the NFA requires to identify key actors with appropriate technical understanding and good political standing. In this context again, a linkage to the NFP facility or to other national policy processes is seen as a must.

Institutionalisation requires adequate human and financial resources, the involvement of all interested parties and at the end the legal basis for the establishment of a new technical unit or a regulation which makes the NFA part of the responsibilities of an existing technical unit. A major argument in favour of the institutionalisation is the right of the general public to be informed at a regular basis about the state and development of the natural resources of the country: in many countries the livelihood of many people depend directly on the forest resource, in other countries it is mainly the environmental and recreational services that are of interest.

In any case, institutionalisation requires to reach a national consensus on the relevance of the NFA; all important stakeholders need to be involved in that process.

### *4. Sampling design(s): tree variables, socio-economic, other natural resources e.g. crop, livestock, etc*

The assessment, be it NFA or expanded toward an ILUA, will be based on a set of data sources which vary from country to country according to availability, and according to the different set of goals and objectives. Evaluation of earlier inventories, remote sensing imagery and maps will be important data sources.

Field data is likely to be a major source of information in all projects and there is the need to develop efficient sampling strategies. It is not reasonable to attempt to develop an optimal sampling strategy for all possible situations. Only some general guiding principles can be touched upon here.

FAO should consider to compile these principles in a more comprehensive manner in a guidelines document which can also serve as background material for NFA capacity building.

Stratification is a powerful variance reduction strategy in large area forest assessments if strata can be identified that are sufficiently different with respect to their mean values of the major target variables. Stratification has been repeatedly discussed in the context of NFAs. The major arguments are briefly listed:

- Stratification should only be envisaged as an option, if stratification criteria are clear and obvious; a good example is Ecuador, where two strata are obvious: the Amazonian region and the rest of the country.
- The number of strata should be low, not more than 3 or 4, so that sample size per stratum does not become too small.
- Stratification criteria must be stable over time so that follow-up assessments may reasonably follow the same stratification (examples: ecological zones, physiographic zones; administrative boundaries can change more easily and should not be used)

The sampling and plot design as developed by FAO for the NFAs is a state-of-the-art sampling strategy for large area inventories of forest resources and has been proven in the finished and ongoing NFAs. It should continue to be the basic design from which modifications and adaptations to specific country situations are made (systematic square grid either on a topographic grid or the lat-loin grid, with cluster sample plots consisting of four elongated rectangular sub-plots with micro-plots for smaller trees and regeneration).

If the NFA is to be expanded and data on more resources to be collected the sampling should nevertheless base on the same grid of sample points. It would be very complicated to carry out different sampling studies (for example on different grids) for different target objects; then, it would not be an “integrated assessment” any more. It is recognized and acknowledged that it is a challenge to integrate the different target objects of an integrated assessment into one and the same sampling strategy. Nevertheless, all observations should be made on the same sample points of the one sample grid. Sub-sampling would be an option, though, where not all variables are observed at all sample points.

The major methodological development work is seen in the response design; that is in the definition how the measurements are going to be taken at the selected sample points. The sub-plots for tree observations are defined and proven in NFAs in various

countries. The integration of household surveys requires defining how, from a selected sample point, one or a set of households is determined to be part of the sample. The same considerations need to be done for any other additional target object.

Methodological rigour must always govern the definition of the sampling strategy; subjective elements need to be let out. They invalidate the statistical analysis and may put the credibility of the entire study at risk.

### *5. Remote sensing*

In most large area forest inventories, remote sensing imagery is employed in one or the other way. The most basic application is to use recent imagery for orientation in the field, for example in the absence of up-to-date topographic maps.

Then, remote sensing imagery may be used for a wall-to-wall mapping of the forest resource and land use pattern, which makes a valuable product for the marketing of a large area forest inventory.

One methodological option is to use remote sensing imagery also on a sampling basis: one could, for example, establish air photo sample plots of a defined size (say, 3km x 3km) centered around the field sample plots; this allows a context analysis and improvement of area estimations.

The methodologically most advanced application of remote sensing imagery involves modelling and small area estimation: in combination with the field observations on sample basis, the imagery is used to generate predictions of target variables for any region within the images where no field sample plots are. Various techniques are used for that, including geostatistical approaches and the *k*NN-technique. However, for these approaches to yield sufficiently reliable predictions, a denser sample grid is required than that which is usually planned for in an NFA under the currently proposed design.

However, an NFA may be able to identify sub-regions where more detailed studies need to take place (“hot-spots”). The NFA team will then have the experience and expertise to advise on the design of those specific studies.

Remote sensing imagery can be used as information source where tracts are not accessible. However, the information content is limited and most of the variables than are being observed in the field can not be retrieved from the imagery.

Remote sensing imagery should be used wherever possible (and available), to improve the area estimations of forest and land use classes. Area estimates can also be done from the field sample only, but remote sensing imagery based estimates are more precise; in addition, from remote sensing imagery additional products and

analyses can be derived, such as maps, detailed change analysis including change matrix analysis, and analysis of forest and landscape fragmentation.

Major practical points are the cost and availability of imagery and the availability of expertise and technical equipment. In some cases, recent imagery may be available at low or no cost from other projects. That is an optimal situation.

Currently, the failure of Landsat 7 ETM+ is a major limit for all vegetation and land use mapping. Many other products are available such as SPOT, Aster, IRS, and very high resolution imagery (Quickbird, Ikonos). The latter carry cost which is probably prohibitive for application in NFAs; also, there is always the risk that the imagery, though ordered in time and ahead, will not be delivered in due time.

And airborne products play an increasing role (digital cameras, LIDAR, standard aerial photography). In some countries, aerial photographs can be ordered at reasonable cost; that however, refers to sub-regions and certainly not to an entire country.

Users should be aware of strengths and limitations of remote sensing technology. Remote sensing is, for example, a generally valuable tool for mapping forest / non-forest. If it comes to distinguish different forest types, however, or different land use classes with tree cover (agroforestry), then it becomes a challenge and many possibilities for confusions exist.

Used in a proper way, remote sensing is a powerful and efficient tool for various purposes.

#### *6. Scope of field data (variables)*

NFAs have a fairly clearly defined set of variables of which observations are gathered. But even in NFAs there is still space for expansion: for the tree resource outside the forest (TOF), for example, it will be interesting not only to collect data on the growing stock, but also on its management.

If an expansion of the scope of NFAs toward more comprehensive integrated assessments such as ILUAs is planned, then this should be done in consultation with sectoral stakeholders. Existing and available information, information needs and gaps must to be identified as are policy priorities.

Broadening the scope to other land uses (ILUA) allows addressing cross-cutting issues and makes the results probably more interesting for a wider audience. An ILUA can possibly be more usable and relevant than only NFA information in the context, for example, of poverty alleviation.

However it should be strictly observed to focus on priority areas. There is always the risk that the data collection teams are overloaded with measurements and observations of variables which will never be analysed.

An expansion of the scope of NFAs and an increase in the number of “target objects” and variables has various implications:

- As addressed in the preceding point, the plot design needs to be adjusted in such a manner that the selection of all target objects can be done on statistical grounds and measurements / observations been taken.
- Depending on type and number of additional variables, it might be necessary to contract specialists to go out with the field teams. This can be a major challenge as such experts are not necessarily easily available – and can be costly.
- It should be taken into account from the outset that observing more variables causes also more analysis and more reporting work to be done. This is frequently not sufficiently observed and may lead to the situation that at the end there are no resources any more to do a proper assessment of those variables.

### *7. Information quality*

Large area forest and natural resource assessments provide data and information predominantly for national policy making. Reference and reporting unit is the entire country or maybe, larger sub-national units.

No wrong expectation should be raised regarding information quality and precision. It must be understood that target precision is defined for the national level and that this precision will go down considerably when estimations for smaller reporting units are calculated. Also, precision is different for different variables. Rare events will be estimated with lesser precision than abundant elements.

As guidance, one should strive for a relative standard error of the estimation of area and growing stock in NFAs of ideally 5% at the national level; in some cases, up to 10% is acceptable, but experience shows that standard errors of more than 10% generate doubts on the side of the decision makers, whether the study is trustworthy or not.

It is extremely difficult to define the right standard error / precision which should be the target. Usually, experiences from other countries will serve as a basis for that decision.

An interesting point in this context is that most decision makers are not clear about the concrete meaning and concept of statistical precision and that the relationship between precision and decision quality is all but clear. Nonetheless, a decent statistical precision (in the order of magnitude as indicated above) is an extremely important factor that helps generating credibility.

Methodological soundness is of utmost importance. An NFA is easily discredited in its completeness by malevolent experts if methodological errors are becoming obvious. This must be avoided.

Actually, FAO can play a role in the context of quality assurance by offering to the country NFA teams that the methodology applied can be scrutinized by a team of experts of FAO or a team facilitated by FAO.

#### *8. Information services: database, data processing, information packaging and dissemination*

In the ideal case, the table of contents is being developed as a guideline as early as possible in the NFA process, definitively before data processing and information packaging; actually the table of contents should reflect directly the objectives and expected outputs as defined in early stages of the process.

It is important that the information generated is being disseminated in appropriate format through appropriate channels. This is considered an extremely important task. The assessment does not end with the writing of the report.

Wherever possible and to the extent possible, the information should be made available to the public, and the raw data be made available to the research community. In that context, obviously, access rights need to be cleared for raw (georeferenced or not-georeferenced), aggregated, processed and analysed data/information.

Country ownership and long term commitment are considered important elements of an NFA process. Sustainability of data and information management is an important element of that. A powerful and stable database that can be easily queried supports this. It may be a role for FAO to provide a structure or template for such a database; although it is acknowledged that the technical options are so manifold and the situations in the countries so different that this is not in all cases helpful.

#### *9. Analysis options (topic added to the ToR by Working Group 2)*

Data analysis derives immediately from the definition of objectives and expected outputs as defined in accordance with the expectations of policy and decision makers.

An additional analysis option are longer-term scenarios.

They do immediately serve the NFP process and policy decision making in general and need to be defined in collaboration with these.

However, scenario modelling can hardly be derived from the results of one NFA only. Various more input factors are required such as models and assumptions about growth and development of variables under consideration.

Scenario modelling is a typical analysis exercise that may be carried out in cooperation with a forest research institute or university.

### 3C. Findings of Working Group 3: Advisory role of FAO to countries including developing and maintaining knowledge networks

#### **General considerations**

National forest assessments are national projects which are ideally adopted in national ownership as a whole within the context of developing national forest and related policies. That implies that the projects is being carried out independently, at least in principle.

However, to get started with complex projects such as NFAs some external input may be required on various stages of planning and implementation. In order to not contradict with the overarching philosophy of assigning NFAs into national ownership, this external input must be well focussed, limited in terms of resources (time and money) and restricted to a catalytic function.

#### **Responses to the Terms of Reference by Working Group 3:**

##### *1. Role of FAO in promoting NFI/NFA in countries lacking capacity and information*

General knowledge about NFAs and their potential products and usefulness is not necessarily present in all countries. A minimum of information is required to fulfill national and international information needs on the forest resource, other wooded land and the tree resource outside the forest. The information needs for international reporting originates from reporting commitments to international processes such as GFRA, C&I, ITTO and various others.

NFAs generate at least a part of the required information for national decision making and for international reporting commitments. This potential of NFAs can be illustrated by examples from other countries or by hypothetical examples from within the same country (if information X had been there, then decision Y might have been different), which would be a typical and basic advisory task.

It may be that NFAs are given a low priority only at national level either because of lack of knowledge about its potential or because of the lack of expertise to put it into place. There may also be a lack of ability or tradition to formulate information needs and data requirements.

A precondition to all external advising, however, is a corresponding political commitment at country level. If the basic understanding is not there that an NFA and the hard data and information that it produces is beneficial for policy and decision making, then any NFA process is put at risk from the very beginning. To find out about the right time to engage in an NFA may be a concerted analysis of NFA experts in the country and ongoing national policy processes and/or the NFP facility.

FAO's primary role should remain in the early phases of a NFP process, it should be catalytic and help generating capacity at national level that leads finally to an independent implementation of most phases of the NFA process.

NFAs must be in entirely national processes and in national responsibility (including funding) is. It should be avoided that the advisory role of FAO is misinterpreted such that FAO is being perceived as project leader and a funding source. It is, however, acknowledged that occasionally it may be necessary to launch and start out NFA processes as projects with a certain external budget.

The advisory role of FAO should not be limited to technical issues of planning and implementing an NFA, which is also relevant and needs to be addressed in corresponding training activities. It is probably even more important to advise in strategies how to achieve national ownership of the NFA process, how to establish an NFA as a long term institution in the country, and, in general, how to achieve lasting political commitment. This requires aiming high and convincing high level politicians. FAO with its existing networks and communication channels may play in many countries an important role in that context.

Based on the experience of the ongoing NFA processes, the FAO NFA team could make expert recommendations on minimum requirements to COFO / regional forestry commissions.

## *2. Promoting new approach to NFA/ILUA*

This discussion point is closely linked to discussion point 1: FAO may assist and advise in the process of formulating questions and expressing concrete data and information requirements. This is ideally done in cooperation and consultation with national processes in forest policy and related sectors.

Only as a result of this identification of key questions and information requirements can be decided whether a country should go for an NFA or a broader assessment; where the broader assessment usually embraces an NFA and additional targets or land uses.

It is recognized that this is lesser a technical issue of how to design an assessment, but it is an intensive discussion and decision process of stakeholders and interested parties from the forestry and related sectors. If decided to carry out a broader assessment or

an ILUA, the result will be a cross-sectoral approach that provides information on multiple resources to multiple users.

The role of FAO in this context may be that of a facilitator: facilitating workshops with NFA experts from other countries. FAO should not push the national counterparts in one or the other direction but provide the ground for developing own national criteria. Focus of FAOs advisory role should be (see discussion point 1) to strive to achieve national commitment and ownership - if it is found that an assessment is beneficial in the given policy context.

*3. Role of FAO in countries with NFI/NFA programs: harmonization of methods and information framework, etc.*

The NFA team at FAO has accumulated experience from various NFAs from various countries. As a consequence it is seen as a generic task of FAO to compile a set of principles for NFAs, which may include recommendations for standards, for example for data capture, data management, data analysis, quality control as well as reporting.

FAO should continue to be a forum for the exchange of experiences and for the further development of these standards in cooperation with country experts (networking). While standards are important as a starting point for the planning of NFS, it is obvious, however, that the actual NFA approach must be explicitly country-specific.

As a part of a harmonization process, FAO with their technical expertise should assist to develop approaches to identify differences and commonalities of NFAs and of agricultural censuses to prepare the ground for integrated assessments.

*4. Networks: Encouraging regional knowledge networks; and  
5. Networks: Developing and maintaining global knowledge network.*

National Forest Assessments are complex tasks, which are in many countries new even to forestry experts. This has also to do with the fact that concept, techniques and products of large area forest inventories are usually not or not comprehensively enough on the agenda of the curricula of forest mensuration and forest inventory courses at universities and technical schools.

The national focal points of NFA need a forum or network that support them to develop their technical expertise and to share and discuss their own experiences. FAO and its forestry technical units should play a role there in their capacity as technical advisors. The NFA process, however, will hardly develop towards a largely self-sustained process, if its advisory role is being continued in such a manner that it becomes a sort of default element in the national NFA. National, sub-regional and international network or communication fora are a means to foster exchange of ideas

and experiences and to also build a “safety net” for technical inquiries from national focal points.

*National networks* support the NFA idea on a national basis and help making the project known within the country also among sectors. It is one of the natural tasks of the country focal point to start building that network as one of the early activities in NFA planning. It is actually a direct outcome of contacting potentially interested experts in the forestry and other sectors.

*Regional and sub-regional networks* foster the exchange between NFA projects in neighbouring countries that share similar overall conditions and challenges of implementation. Sub-regional networks make use of synergies that lead to an improved planning, optimized implementation and more focussed reporting. Such sub-national networks are actually beginning to gradually establish: NFA experts from countries where the inventory has been carried out assist countries in the region in setting up their own NFA. This activity is supported by FAOs TCDC project (Technical Cooperation between Developing Countries). In addition regional could provide an excellent platform to exchange technical elements relevant for NFAs such as volume and biomass functions, methods to assess the tree resource outside the forest etc.

While a harmonization of methodology on international level is a major challenge, regional networks and regional exchange of experiences may lead to partial or complete harmonization on a sub-regional or regional level.

Knowledge exchange and joint capacity building / training courses are most easily feasible in regional and sub-regional networks.

It appears obvious that regional networks are the most important networks for a sustainable NFA process in the countries.

*International networks* facilitate contacts to international experts and are seen as an important element of NFA promotion. FAO is an important facilitator in that international networking. This current expert consultation is but one evidence that this network is yet in place.

However, it was stated that establishing regional and sub-regional networks is probably better supporting NFAs to become a lasting process.

An important question raised was related to the *format of the networks*. There are many different intensities of networks, from basic internet for a and information sharing via web-pages to fully administered networks with a coordination structure and some assigned or elected leadership. Formally established networks need professional administration and facilitation – and a budget. FAO may be requested to take a lead in this international networking but the country NFA-focal points should be encouraged to actively engage in it as well, for example through the search of sponsors for workshops with national, sub-regional, regional or international experts.

## 6. Suggestions on how to improve the relation in countries between NFP and NFA

The NFP facility is supporting national forest policy processes while the NFA process is generating up-to-date and relevant information that is one of the pillars on which rational policy making is founded; this refers to the decision making process, but also to the monitoring process. NFA information may, therefore, be important for periodical revision of the NFP.

In that sense, NFP and NFA are complementary. NFAs can be considered an integral element of NFPs. NFA/ILUA provide information to criteria and indicators and help to evaluating the success of the forest policy.

The NFP facility can support the NFA process in a highly efficient manner in various respects: the NFA depends on a clear formulation of the information requirements, it depends on an organizational and institutional structure that guarantees a smooth technical implementation, and it needs contacts to other sectors to find out whether an NFA or an ILUA or something in between is required. In all these points, the NFP facility with its national policy experience can efficiently support.

FAO should actively bring the NFP facility and the NFA process together and see it as one single exercise wherever the two are simultaneously planned or ongoing in a country.

It would be definitively counterproductive and damaging for both NFP and NFA if the perception in the country would be that the two are independent and un-coordinated undertakings.

#### *7. Do NFAs and ILUAs for cross sectoral policy harmonisation constitute a comparative advantage of FAO*

The potential contribution of information provision for a cross-sectoral policy harmonization is not clearly recognized.

It is certainly a comparative advantage of FAO to house expertise and manage networks of experts in various natural resources related fields when it comes to integrate assessments of the forest resource with the assessment of other resources. This integration requires joint planning and coordination of specific expectations and demands.

The necessary dialogue and discussion process may, indeed, lead to better mutual understanding of policy processes in related sectors

Continue to be a forum for harmonizing information and setting standards for data capture, data processing and analysis as well as reporting – based on national needs.  
Merge NFA and agricultural censuses

*8. Coordination with other actors and donors to improve country information about forestry resources and support national policy dialogue*

While the generation of a sound data base for policy development must be a generic interest of the countries, FAO may, through its existing networks and country contacts, play a major advisory role in facilitating contacts to these networks of experts, other interested parties and also to donors who may be willing to support that process.

With respect to the national policy dialogue, it is expected that the NFP will take on an important role. In this dialogue it is important that the main stakeholders and interested groups are involved at the earliest possible point in time in the process. This is important for the overall credibility of the process and the products and also to generate country ownership and commitment at high political levels.

FAO, in a joint effort of the NFP facility and the NFAs, should develop and promote routines and recommendations how to involve the main stakeholders at the right time throughout the NFA process; this includes potential collaborators, donors, universities (checklist of possible actors, workshop topics, etc.). This recommendation may include a suggestion how to establish a steering committee and assign a clear mandate to it.

## Annex 4 – List of background documents

### 4A. Developments in the National Forest Assessments Methodology

#### Introduction

All countries are aware of the importance of the multiple benefits of forest and tree resources, such as contributions to improved rural livelihoods, poverty alleviation and conservation of biodiversity. However, these benefits can be achieved only if there is a strong interest in promoting sustainable use, management and conservation of forests. National forest programmes should therefore not only be seen as relevant within the sector but certainly also as an important component in the design and implementation of cross-sectoral policies, as for example poverty reduction strategies.

A requirement for sustainable forest management (SFM) is the accessibility to information on forest resources. However, in many countries, only limited progress has been made in financing and building national capacity to develop comprehensive information on forests and trees. Conventional national forest inventories are narrow in scope as they are generally timber oriented and often based on costly approaches.

In order to enhance countries capacity in carrying out national assessments of forest resources, FAO initiated in 2000 a programme to support national forest resources assessments (NFA). NFA has been defined as: “*A national process to collect, manage, make available and analyze information on forest resources, their management and use covering the entire country, including also analyses, evaluations and scenario development for use, e.g., in policy processes.*”<sup>5</sup>. This scope was later expanded also to include other land use resources, such as agriculture and water, towards integrated land use assessments (ILUA).

FAO Support Programme to NFAs (for simplicity, the program will in this paper be referred to as NFA) provides technical assistance in data collection and processing as well as in policy analyses. During the design, planning and implementation of a NFA/ILUA, institutional, organisational and technical capacities of the country to carry out resources assessments are strengthened.

#### Approach to National Forest Assessment

Over the last six years the Forestry Department at FAO has had the main responsibility for developing a new approach to NFA, with a broader scope than traditional national forest inventories. This approach has been designed to meet the information needs requested by a diversity of users, at relatively low costs and within short period of time. To do this, the development of the NFA approach is fully participatory. International and national experts have participated actively in shaping the scope, the sampling design and format of the

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<sup>5</sup> Kotka IV, 2002

generated information as well as improving its reliability and relevance to various users at national level.

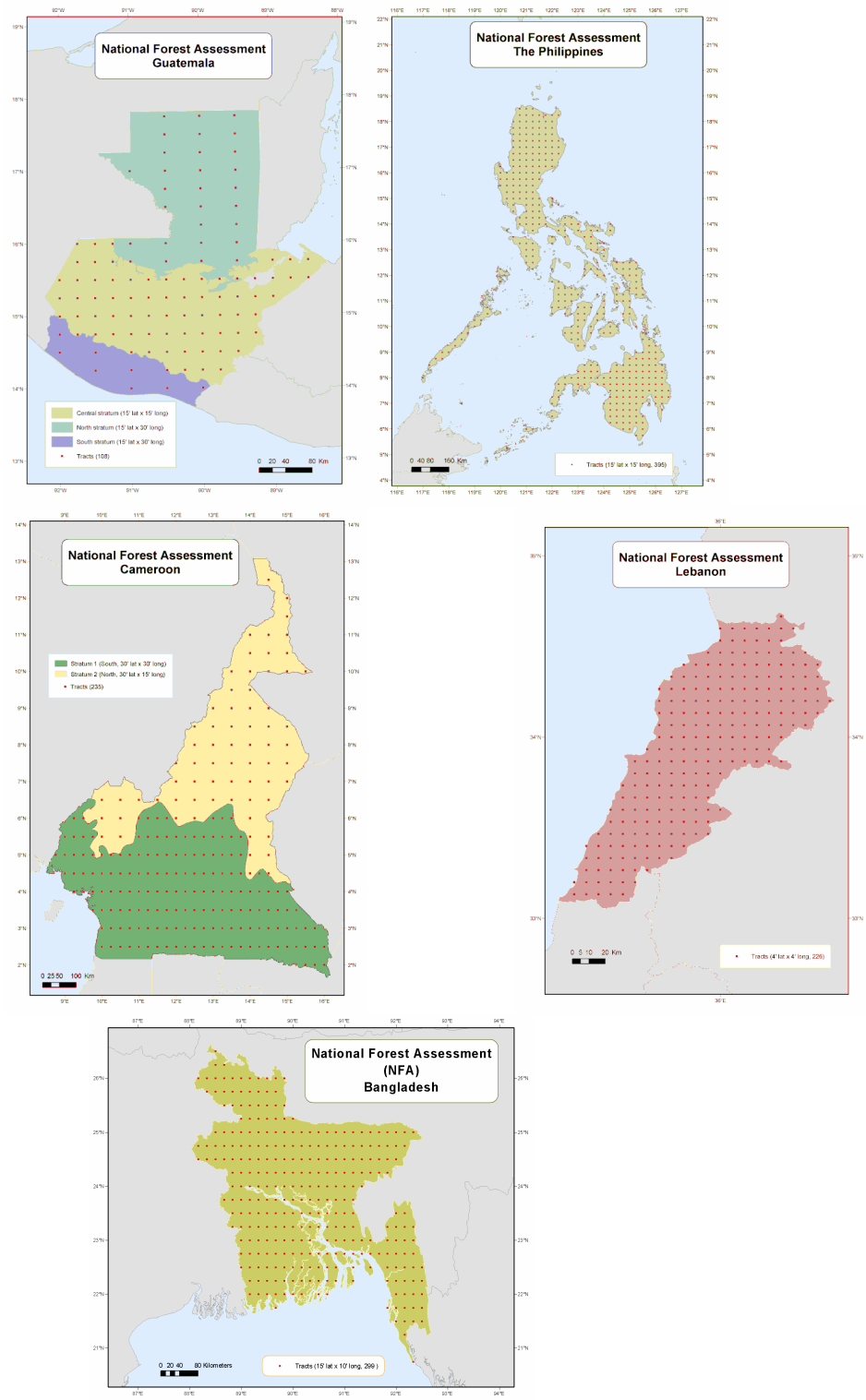
The approach is adapted to country's specific context and encourages national partnership as well as experience sharing among countries. It has so far been applied in nine countries and proved to be cost-effective relative to the amount of data collected in the field and the variety of information generated on social, economic and environmental benefits of forests and trees.

The approach also seeks to harmonise forest related terms and definitions, within and between the countries and with international information requirements (by adopting internationally agreed upon C&Is for SFM). While focusing on enabling countries to meet national policy demand, it thereby also facilitates country reporting obligations to international processes.

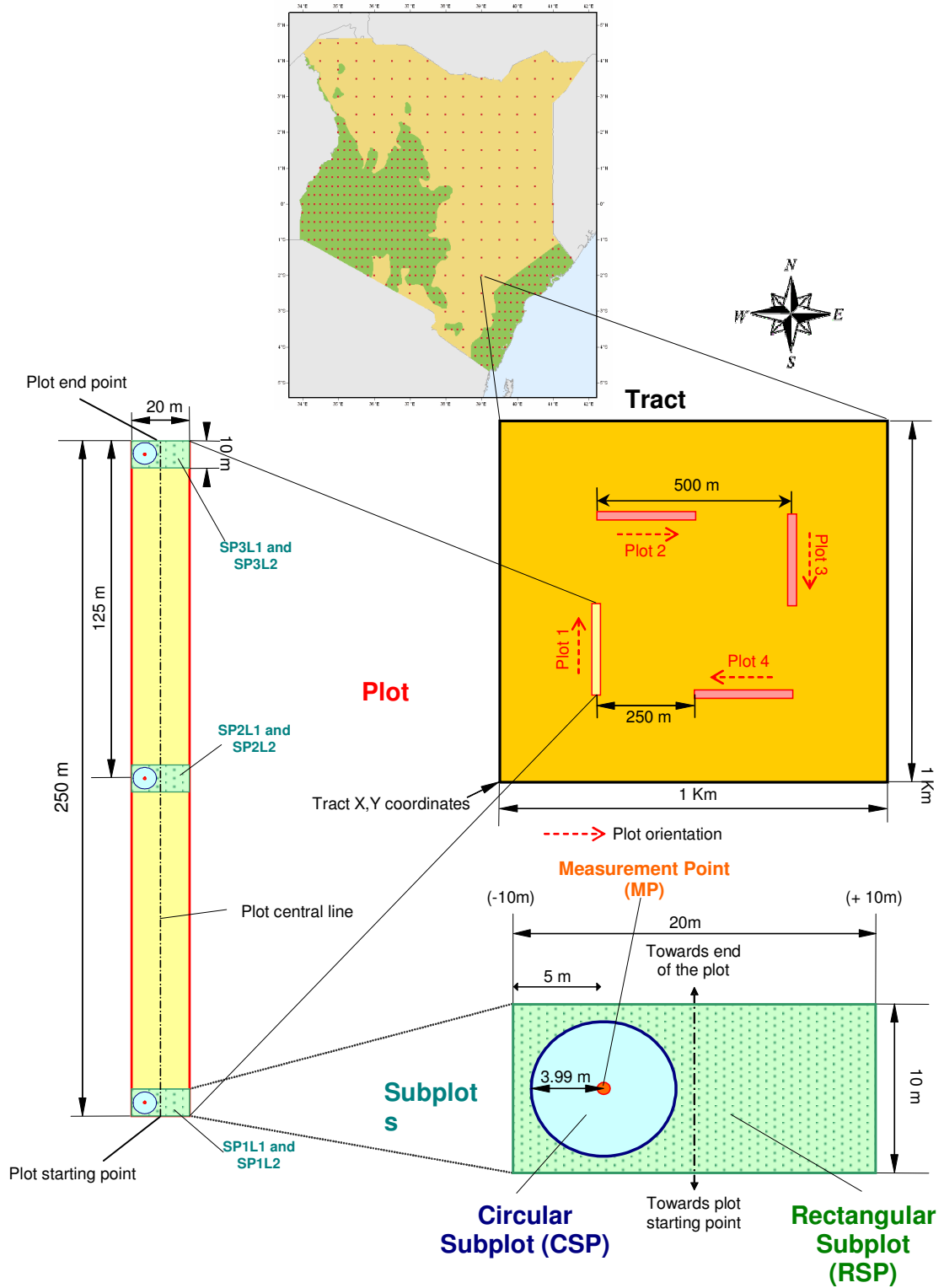
### **Basic design**

The NFA approach is based on a systematic sampling at a density that can generate relevant and reliable information for national level decision making. The sample sites are composed of clusters of four plots each. The sampling intensity varies within the range of 100 to 1000 clusters. The intensities applied so far in the countries supported by FAO do not exceed 400 clusters (Figure 1). The sampling may be stratified according to stable strata such as ecological zones to optimize sampling efficiency. The clusters are located in square tracts of 1 km<sup>2</sup> (Figure 2). The tracts and plots are used to collect biophysical data from measurements and observations of forest and tree properties and to gather socio-economic data through interviews with key informants and focus groups. The sampling is designed to cover both forest and non-forest lands in order to capture information on all tree resources in the country.

**Figure 1. Examples of NFA sampling design in some countries**



**Figure 2. Sampling design – Tract and plot configuration (the example of Kenya)**



The NFA approach is adapted to address national information requirements on forests and trees as well as on other natural resources. Current NFA/ILUA countries have further developed their NFA methodology to include special assessments of, for example, shrubs, coppices, bamboo, rattan, wildlife, epiphytes and non-timber forest products to satisfy their national needs.

The NFA projects are designed to meet the objective of long term monitoring of the forest and tree resources. All the countries have been supporting the set up of monitoring systems, as they are interested in getting information on trends. To achieve a long term monitoring some countries (Lebanon, Bangladesh and Zambia) have considered continuous inventories to maintain the developed capacity operational and the NFA/ILUA programme active and institutionalised. Other countries (Costa Rica, Guatemala, Cameroon, Algeria, and the Philippines) have considered implementing the NFA in intervals, e.g. 5 years.

Since the original design of the approach, several components have been added and elaborated. The following sections will briefly present these improvements.

### **From National Forest Assessment to Integrated Land Use Assessment**

In real scenario, natural resources are used in a totally integrated manner at farmer or community levels. National policies are more than ever becoming oriented towards integrated development, placing equal emphasis on the social, economic and environmental dimension of natural resources. Forests are elements in land use systems and are increasingly influenced by other forms of land uses.

Building on the NFA approach and at the request of the forestry authorities in Zambia, the Departments of Forestry and Agriculture at FAO have collaborated to design and implement an integrated land use assessment (ILUA). The project is the first of its type and has brought together several national institutions and a lot of enthusiasm, as it is the first time data is being collected by several national institutions<sup>6</sup> in collaboration.

In addition to the biophysical and socio-economic core variables identified for the NFA, the scope of the ILUA is broadened to cover crops and livestock resources. Additional variables for these resources were identified by FAO and discussed and redefined by the concerned national institutions in Zambia. Information on these variables is mainly collected through survey of households selected randomly within or close to the tract.

The scope of data collection in the field required mobilisation of multidisciplinary teams representing the involved institutions (Forestry Department, Agriculture, Central Statistical Office and NGOs). The fieldwork also necessitated important capacity building efforts within

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<sup>6</sup> Forestry Department in partnership with representatives from Central Statistics Office, Environment, Survey Department and Ministry of Agriculture

these disciplines in order to harmonise data collection techniques amongst the teams and to ensure homogeneous interpretation of the variables and their definitions.

A similar project was also developed in Kenya where an Integrated Natural Resources Assessment (INRA) is being implemented. Alike the ILUA, the INRA covers a number of natural resources including forests, crops and crop associated biodiversity, water, wildlife and livestock. To support the INRA in Kenya the Departments of Forestry, Agriculture, Fisheries and Sustainable Development of FAO are collaborating to develop the methodology and to backstop the activities. In the country, the INRA has created a lot of interest and has gathered a wide range of national stakeholders<sup>7</sup> to collaborate.

By addressing cross-cutting issues, these two projects aim at enhancing national inter-sectoral policy dialogue and harmonisation.



### **Improved socio-economic data**

The NFA interview component aspires to collect valid and reliable data on the management, uses and users of tree-related products and services. This component has been evolving and adjusting to lessons learned from previous experiences in order to increase the utility and reliability of the NFA and its relevance to policy makers. While the original assessment design contained approximately 100 biophysical and socio-economic variables, the most recent ILUA approach addresses more than 250 variables, of which approximately one third focus on the socio-economic issues. This increase is mainly a result of the introduction of a complementary household survey for the ILUAs, but partly also thanks to an increased emphasis on products and services derived from the different land uses.

### **Increased use of remote sensing**

Land use/ land cover mapping using high resolution remote sensing data has become a more frequently used component of the NFA approach. It was introduced to provide decision makers with more elaborate and highly relevant information on geographical aspects of land uses, such as:

- Distribution and extent of forests, crop land, rangeland, water bodies, etc.;

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<sup>7</sup> Ministry of Environment and Natural Resources; Ministry of Water and Irrigation; Ministry of Agriculture; Ministry of Regional Authorities; Ministry of Tourism & Wildlife; Ministry of State for National Heritage; Ministry of Livestock & Fisheries Development; Universities and NGOs.

- Level of fragmentation/contiguity of forest cover and biological resources (forest integrity and naturalness in relation to biodiversity)
- Landscape and spatial analyses;
- Thematic maps with extrapolated field measurements and observations ;
- Assessment of changes in land use dynamics and processes.

Monitoring of forest spatial integrity is done by analysing the relationship between landscape parameters and potential management actions. In particular, landscape analyses help characterise fragmentation of forests and simulate the likely impacts of land use changes or forest restoration. The fragmentation of forest ecosystems can be analysed based on spatial indexes such as patch size, interface with non-forest, edge effects, isolation from, or interconnection with other patches.

In some of countries (Zambia, Bangladesh, Congo and Lebanon) a wall-to-wall land use/land cover mapping was or will be carried out, while in others (Costa Rica and Brazil) the remote sensing component is/will be sample based.

### **Technology development potential**

The NFA approach is open to new concepts, and to apply various technical solutions to increase efficiency in reaching the objectives of the assessment. Investing in technologies is encouraged, as long as the robustness of the approach is not weakened and, of course, provided that funds are available.

Currently GPS receivers, analogue compasses, analogue dendrometers and clinometers (height and slope measurements), magnetic motion metal detectors and, in some countries, laser range finders are used during field measurements.

Initially the primary data were kept in spreadsheets (MS Excel), but are now stored in database applications (MS Access), which are also used for data processing. Processed data are subsequently analysed in spreadsheets (MS Excel) or in specialised statistical software.

FAO has been investigating different technical options for digital field data collection (field computers), but so far it has not been possible to implement them, due to lack of means.

### **Up-scaling from national to regional projects**

FAO is supporting the development of two regional NFA initiatives, at the request of the concerned countries. The first is designed for the Permanent Interstate Committee for Drought Control in the Sahel (CILSS)<sup>8</sup> region and Guinea while the second covers six countries<sup>9</sup> in the Near East.

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<sup>8</sup> *Comité Permanent Inter-Etats de Lutte Contre la Sécheresse* which includes: Burkina Faso, Cap-Vert, Gambie, Guinée-Bissau, Mali, Mauritanie, Niger, Sénégal, Tchad

<sup>9</sup> Egypt, Iran, Jordan, Oman, Syria and Yemen.

The support to the NFA project in the CILSS region and Guinea is titled "Combat deforestation, assessment and integrated management of forest and trees outside forest resources", and is being formulated through Global Environment Facility (GEF) funding.

In Near East, a project proposal for "Assessment of forests, trees and range resources to support policy harmonisation in six Near East Countries" is being prepared in collaboration with the concerned countries with the expectation that it will be financed by the countries themselves and by interested donors.

### **Enhanced FAO-advisory role (assisting countries with already established inventory systems)**

Besides introducing new approaches and methodologies for national forest resources assessments to countries requesting it, FAO also provides technical advice and guidance to countries (Vietnam, Algeria and Brazil) where national forest assessment systems are already established. In those countries FAO's support focuses on strengthening national capacity and on broadening assessment scope also to include, for instance, socio-economic and environmental characteristics or trees outside forest.

### **Funding**

The NFA approach was designed to be nationally executed with a strong national commitment in terms of funding and personnel. In most countries a substantial national contribution is provided to undertake the NFAs/ILUAs, while in a few countries governmental contribution to the NFA projects is negligible.

External funding of the NFA projects has essentially been provided by FAO. Initially NFA projects were supported through Trust Funds (Sweden) and later through the FAO TCP programme in combination with Trust Funds (Sweden and the Netherlands). In the future, it is expected that they will also be funded under GEF.

## 4B. Information Management

*Background Paper prepared for the NFA Expert Consultation  
“Generating knowledge through National Forest Assessments - towards improved forest, land use and livelihood policies”.*

### **Introduction**

Information management encompasses the entire process of handling of data from its acquisition to its uses. It involves various related activities such as defining, collecting and creating, organising, evaluating, safeguarding, maintaining and disseminating information. The goal of the discipline can be phrased as:

*“The goals of information management are getting the right information to the right person, at the right time, from the right source, in the right amount, in the right order, in the right form, in the right medium, with optimal accuracy – and, at the lowest reasonable cost”*

Distinction is made between data, information and knowledge: *data* are unprocessed facts or observations, which may or may not be meaningful in themselves; *information* consists of assemblages of data which, taken together, answers a specific need, and *knowledge* is a product of information and human interpretation, and encompasses the context in which observations were made, and their inter-relationship with other activities.

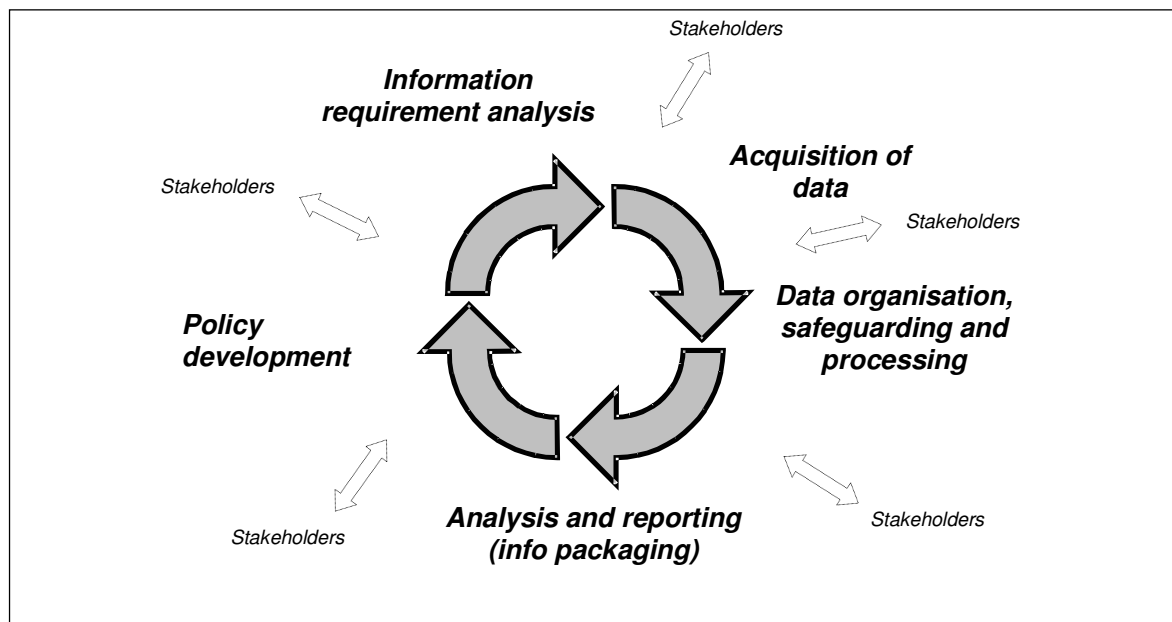
The needs for updated information and knowledge on natural resources, as a base for better decisions making, are continuously increasing and in response to particular demands data are collected and analysed. These demands have become much more complex in recent years since forest policies have become more holistic, from mainly being timber production oriented towards encompassing social, economic and environmental issues.

Countries vary widely in the availability of forest information and in their information management. Some difficulties often encountered are that even when data are available at national level they are often difficult to access and their reliability is often questionable. Different institutions involved may not always be aware of each other’s activities, resulting in considerable duplication of efforts and in many cases conflicting data are reported for the same topics. Consequently to these constraints, data are often ignored and not used in any meaningful way.

Improved information management in NFA/ILUA is consequently a highly relevant topic when addressing the issue of how knowledge generated through NFA/ILUA can support policy development.

## The flow of data/information in NFA/ILUA

Throughout the succession of NFA/ILUA, data are collected and information is generated in various forms and its management must be considered for each stage. Data/information generated during one stage enables additional information to be generated in the following stage. In order to adjust to new and emerging conditions and integrate specific requirements for information, a continuous communication and information sharing with stakeholders has to be established and maintained on permanent basis. Figure 3 illustrates how NFA/ILUA data and information for policy making flow and evolve throughout the cycle of a NFA/ILUA.



**Figure 3** Flow of information for policy making in NFA/ILUA.

### ***Information requirement analysis***

Awareness raising, information needs and technical workshops are usually held at national level prior to the actual launch of a NFA/ILUA to allow stakeholders to provide their inputs for the formulation of NFA/ILUA methodology and scope. During the workshops, participants are given the opportunity to identify what should be the output and outcomes of the NFA/ILUA, what policies the assessment should address and to identify existing knowledge gaps.

### ***Acquisition of data***

With NFA/ILUA, information facilities are established at national level with the primary task to generate information through continuous collection of primary data and compilation of auxiliary information from other national studies (e.g. economic studies, social studies, environmental studies, etc.) that can lead to improved information on state, use/users and management of the countries' natural resources. In response to the demands that were identified through the information requirement analysis, the assessment methodology is defined in terms of scale, degree of accuracy needed and data collection methods. The latter normally involves a combination of field inventories, interviews at different levels and remote sensing.

### ***Data organisation, safeguarding and processing***

Beside selection of appropriate software for data storage, processing and mapping exercises, the assurance of sound management and high quality of data relies on the establishment of standard methods for data quality control, validation and verification, backups and archiving. Processing of raw data is carried out simultaneously or subsequently to data entry and according to the type of requested information (e.g. if policy makers are requesting information on the contribution of forest products to household income, data should be processed with the household as unit instead of tabulating data according to land area).

### ***Access to data and information***

Once data are entered into the established information system and processed, some very raw data will become available. Although not yet processed, the raw data is a valuable asset and the very core of NFA/ILUA. Depending on user level, the access to the information varies. Generally, public access is provided to all published information while access to primary data and the data base is only given to those stakeholders who have signed a special MoA and actively contribute to the NFA/ILUA process.

### ***Safeguarding data/information***

To insure that management of data and information remains a lasting exercise in the countries, the primary prerequisite to be in place is a clear policy within and between the involved institutions on how to address the issue (e.g. frequency of updating, organisation, allocation of responsibilities, etc.). Secondly, the selected main responsible institution needs to have permanent resources (in terms of budget, staff, logistic and equipment) allocated to these responsibilities.

During the active support period to NFA/ILUA, FAO has taken the main responsibility for maintaining the data base structure, and as soon as FAO has finalised its active support, this responsibility has been reassigned to the lead institution in the country.

In case the requirements for safeguarding data and information are not met (e.g. in case changed political priorities or instabilities), FAO takes the role as the solid and neutral

partner providing knowledge and long term safekeeping of information through its national and regional presence and permanent programme for support to NFA/ILUA.

The long term maintenance and updating of information rely on institutional capacities at national level to carry on the NFA/ILUA activities in the future. While the main responsibility should lie at national level, FAO continuously communicates with the countries and is therefore able to provide additional assistance when requested.

### ***Analysis and reporting (info packaging)***

Processed and analysed data is, together with cartographic material, the primary output from NFA/ILUA that can be disseminated to potential users and interest groups. However, not all information is useful and/or suitable to all users and for all purposes. For each user group, the information they receive has to be relevant, adequate and presented in a comprehensible and useful way. Decisive elements in selection of format/packaging for presenting the results have therefore been to consider the intended effects of the presented information and who are the user groups to address. Depending on national settings, the diversity of interest groups varies, but in general encompasses the general public, policy makers, researchers, international organisations/processes, education institutions and NGOs. For researchers and specialised institutions (including international processes) that generally favour well documented and detailed information, NFA/ILUA results are presented with high precision and well documentation in for example scientific journals and as comprehensive reports and maps. For policy makers, who do not require same level of accuracy and amount of information, but prefer results presented in a form that is more conclusive and analytical, bulletins and booklets are prepared. Likewise, the general public, NGOs and educational institutions are approached through more digestible media, such as the press, Internet homepages and brochures or as broadcasts on television and in radio. Additional and more direct channels of communication are also applied to improve the visibility of NFA/ILUA and involvement from different user groups. Such initiatives includes: workshops, press conferences, school visits and appointment with policy makers.

### ***Policy development***

Based on NFA/ILUA information, policy makers at various levels are able to gain new knowledge upon which to base their decisions for natural resources or cross cutting issues (e.g. water management, poverty alleviation strategies, landscape planning, tenure, gender, etc.). To insure that the information that becomes available from NFA/ILUA creates the intended impact at policy level, the dissemination of information has to be communicated through the right media and in a suitable format. Most likely, the dissemination should be accompanied by additional means to raise awareness at policy level of the NFA/ILUA results. Lobbyism and use of the press are some of the tools that might be applied. To insure that the information gained through NFA/ILUA also reaches effect on the ground, managers and planning officers should be familiarized with the assessment results to be able to utilize them actively in the management decisions.

Presumably, policy makers at various levels (e.g. politicians and departmental executives at both national and provincial level) and other user groups will modify their need and

requirements for information over time (maybe even within a single NFA/ILUA cycle). Existence of information gaps or requirements for updated or additional information might also be discovered, and it should therefore be considered how to respond to such changing demands. The NFA/ILUA information service has therefore to take into account how to insure that constructive feedback is received and how this can be applied to prepare and adjust the approach and scope of subsequent assessments.

### **Stimuli for discussion**

- Information from NFA/ILUA should be presented in a way that makes it easier for decision makers and stakeholders to interpret the findings. This requires writing non-technical “stories” of how the observed trends in forests affect people, their lives and their communities. The reporting must go a step further from the simple presentation of findings to the ‘so what’ analysis.
- Information from NFA/ILUA should be ‘scalable’ in its presentation in order to meet the needs of a larger audience and to make it politically viable, i.e. findings should be presented with the perspective of multiple users at both national and sub-national level.
- We need to ask ourselves the question - to what extent will the produced output from the NFA/ILUA realistically be used in the intended way? The answer should be taken into consideration when planning the scope of NFA/ILUA and the information packaging/dissemination.

For more information on ‘Information Management’ please visit the Knowledge Reference at: [www.fao.org/forestry/site/fra-knowledgeref/en](http://www.fao.org/forestry/site/fra-knowledgeref/en)