**Information and analysis for sustainable forest management:
linking national and international efforts in
South and Southeast Asia**

EC-FAO PARTNERSHIP PROGRAMME (2000-2002)
Tropical Forestry Budget Line B7-6201/1B/98/0531
PROJECT GCP/RAS/173/EC

PROCEEDINGS OF THE PROGRAMME INCEPTION WORKSHOP: FORESTRY INFORMATION PROCESSES AND PLANNING

**BANGKOK, THAILAND
10-12 JULY 2000**

**Information and analysis for sustainable forest management:
linking national and international efforts in
South and Southeast Asia**

N.B. Country papers have been minimally edited for style and clarity.

Introduction and background

The inception workshop for the EC-FAO Partnership Programme: *Information and analysis for sustainable forest management: linking national and international efforts in South and Southeast Asia* was held at the FAO Regional Office for Asia and the Pacific, in Bangkok, Thailand on 10-12 July 2000. The workshop was titled *Forestry information processes and planning*.

The event was organized by FAO with financial support from the EC through the EC-FAO Partnership Programme.

This report provides the proceedings of the workshop, including an overview of the Partnership Programme, the workshop objectives and conditions, conclusions and lessons learned from this exercise.

Programme objectives

Overall Objective of the Programme: To promote sustainable management of trees and forests in the tropics of South and Southeast Asia founded on policies that integrate and balance relevant economic, environmental and social aspects of forestry.

The following countries have been identified as participants in the EC-FAO Partnership Programme activities:

—South Asia: Bangladesh, Bhutan, India, Neal, Pakistan, and Sri Lanka, (6 countries); and

—Southeast Asia: Cambodia, Indonesia, Laos, Malaysia, Philippines, Thailand, and Viet Nam (7 countries).

Immediate Objectives: To strengthen national capacities to collect, compile and disseminate reliable and up-to-date information on forestry in South Asia and Southeast Asia, to analyse the forest sector and to make information available to policy decision makers.

Programme implementation tasks

The workshop was designed to address the following components of the Partnership Programme:

1.Review of existing situation regarding data collection and use. Examine the role of local institutions in collecting and providing data on non-wood forest products. Examine possible guidelines for collecting data on land-use changes and assessing wood production outside of forests.

2.Build regional networks among national statistical correspondents to increase the exchange of data and information management methods.

3.Develop a framework to collect essential data, policy and institutional information that are not yet commonly available. Identify direct target beneficiaries in terms of countries and institutions and key individuals to be involved.

4.Conduct pilot studies to establish suitable arrangements to collect data that is essential for sustainable forest management (SFM), but not yet commonly available.

Workshop components

The Workshop focused on information systems and processes in the participating countries. A particular focus was identifying areas where the Partnership Programme could assist the process of strengthening national information systems by supporting the implementation of pilot studies.

The Workshop had four major components:
—briefing of workshop participants on the structure and objectives of the Programme;
—country presentations and analysis of national forestry information systems;
—development of a framework for a network of forestry statistical correspondents;
—discussion and development of a tentative workplan for the Programme.

In preparation for the workshop, participants were asked to focus on two major items.

1.Each participant was asked to prepare a paper describing national forestry information systems and processes. To align with the scope of the Programme, the paper was to include information on forest inventories (national and sub-national), methodologies for compiling wood supply data and statistics, and any particular surveys or studies of plantation forests, trees outside forests, wood energy, and non-wood forest products.

The second preparatory item was to identify subjects (within the scope of the Programme) of priority importance for pilot studies in participating countries.

Workshop participation

All participating countries were invited to send representatives to the workshop, with a recommended preference that the National Focal Point attend. Twelve countries accepted the invitation to attend, with Pakistan unable to provide a representative. Pakistan did, however, provide a national report on information processes. Last minute difficulties prevented the attendance of representatives from the Philippines and Sri Lanka. Twelve representatives from ten countries attended the workshop (see Appendix 1).

Representatives from major regional forestry institutions and the European Commission were invited to attend the workshop. Representatives from the World Conservation Union (IUCN), the FAO-based Forestry Research Support Programme for Asia and the Pacific (FORSPA) and Regional Wood Energy Development Programme in Asia (RWEDP), and FAO Regular Programme staff attended the workshop. A full list of participants is appended.

Workshop organization

The workshop was primarily designed as an introduction to the Partnership Programme. It was designed to obtain feedback from the participating countries on national priorities, to elicit interest in pilot studies and to facilitate the drafting of a preliminary workplan. Furthermore, it provided a platform for conducting a gap analysis on national and regional forestry information systems. The other major components of the Partnership Programme were also introduced to participants and various aspects and components discussed.

Arrangements for the workshop were coordinated by the FAO Regional Office for Asia and Pacific, in Bangkok, with assistance from the FAO Representatives to the participating countries.

The workshop itself was coordinated by four FAO staff (Durst, Ma, Brown, Enters). All FAO Bangkok forestry staff made presentations or participated in discussions. A number of other FAO staff attended the introductory session.

Introductory addresses[1]

The welcoming address was given by the FAO Assistant Director-General/Regional Representative for Asia and the Pacific, Mr R.B. Singh, with the Deputy Regional Representative, Mr Dong Qingsong also in attendance.

Mr Singh emphasized the importance of sustainable forest management (SFM) to the welfare of the region, and the crucial role of information and statistics in supporting SFM. Mr Singh made mention of regional initiatives tied to SFM including various FAO forestry activities in the region. He stressed the importance of the EC-FAO Partnership Programme to forestry in the region, and noted the responsibility of FAO and the participating countries to ensure that Programme activities are wisely and efficiently implemented.

The Senior Forestry Officer and Programme Manager, Mr Patrick Durst, made a presentation describing the linkages between the Partnership Programme and various other regional and global activities. He noted the parallel EC-FAO initiatives in Africa, Latin America and the Caribbean. He also described Asia's progress in developing authoritative regional forestry information processes, particularly noting the successful cooperation engendered in the Asia-Pacific Forestry Sector Outlook Study. The presentation also discussed how the Programme complements other FAO initiatives, including the development of the Code of Practice for Forest Harvesting in Asia-Pacific, efforts to develop a model forest network, and to promote reduced impact logging.

Mr Thomas Enters (Forestry Sector Analysis Specialist) provided an outline of the overall Programme scope and objectives. His presentation noted the Programme's overarching objective is to promote sustainable management of trees and forests, with the more immediate objectives of strengthening national capacities to collect, compile and disseminate reliable and up-to-date information on forestry; utilising this information to update analysis of the forestry sector; and making information and analysis available to policy-makers. The presentation also suggested the type of information deficiencies the Programme might work to overcome, and summarized its expected outcomes.

Mr Chris Brown (Forestry Sector Outlook Studies Specialist) gave a brief outline of the agenda and objectives of the workshop. The outline stressed that a large portion of the workshop would be an exercise in brainstorming, attempting to elicit participants' ideas and views, as well as to tap their specialist knowledge of national information systems.

This presentation was followed by general discussions on the overall Programme and distribution of the pilot study ranking exercise.

Pilot study ranking exercise

A pilot study ranking exercise was designed as a means of introducing countries to the concept of pilot studies and demarcating the types of studies relevant to the Programme objectives, as well as providing a useful tool for collecting information on national priorities. The exercise also gave participants an early opportunity to provide their own thoughts on relevant pilot study options.

Participants were given a list of 39 suggested pilot study options – a title, with a three or four sentence description of what the study might investigate - and were asked to assign scores from 1-4, according to how relevant these studies might be to their country. Options were categorized by

---

[1] Papers presented are given in Appendix 4

theme from A to G (see below). The options discussed and the results of the pilot study ranking exercise is appended (Appendix 2).

Forest Resource and Land-Use Change
Forest Plantations
Wood Supply Potential
Fuelwood Production and Consumption
Trees Outside Forests
Non-Wood Forest Products
Data Systems in Support of SFM

The participant from Nepal did not return the worksheet. Hence each pilot study received between 9 and 36 points. In general, pilot studies scoring 25 or more points were assessed by the group to be relatively important, though specific studies scoring lower (particularly in the woodfuels category) were also viewed as important by some countries (or subregions). Section 2.6 of the report provides information on the analysis of the ranking exercise results and the identification of particular pilot studies.

Presentations on forestry information systems

Ms Ma Qiang (Forestry Officer [Econometrics]) presented a regional overview on strengthening forestry information systems. This presentation drew attention to some key challenges in collecting and collating forestry information. The presentation noted that forestry statistics systems often suffer from a lack of identity and ownership. Frequently there is little coordination among agencies collecting forestry information, and little value-added to statistics through analysis. The presentation suggested several strategies for addressing deficiencies in information systems, including building analytical capacities, improving inter-agency coordination and forming regional networks. This presentation provided a lead-in to the national presentations.

The participants from each of the 10 countries presented a country brief on national forestry information systems according to a format distributed prior to the workshop. Mr Shamsudin Ibrahim (Forest Research Institute of Malaysia) was invited to chair this session.

The national report for Bangladesh noted the development of the Resources Information Management System (RIMS) under the Forest Resources Management Project (FRMP) financed by the World Bank. The RIMS system stores and processes forest management data at the stand-level, and generates management prescriptions for individual stands. The presentation noted that the FRMP is supporting the development and integration of GIS with the existing RIMS. The presentation also discussed the relevance of these systems to forest planning at the national level and pointed out that forest inventories are conducted through remote sensing. The serious weaknesses in the planning processes were listed. The report recommended enhanced human resource development, an increase in the number of computers and higher budget allocations. The presentation provoked a lively discussion on cases where data management capacities may outstrip the actual quality of data supplied.

The national report for Bhutan noted that the main types of data collected are on forest resources, socio-economic status of forest dwellers and those living on the forest fringes, and ecology. The centralised nature of Bhutan's forestry activities means that data collection is well co-ordinated, and appears to be relatively comprehensive. Efforts are made to collect reliable data from various stakeholders. National criteria and indicators are being monitored and an updated national inventory will be carried out as part of the World Bank Forestry Development Project.

The national report for Cambodia noted that national forest cover surveys have been conducted by satellite imagery, most recently in 1997 through the Mekong River Commission and the Gesellschaft für Technische Zusammenarbeit (MRC/GTZ). Forest resources data are being processed at the central level in the GIS Unit of the Department of Forestry and Wildlife and disseminated to ministries, the provinces and districts. Ground validation has only been carried out in one district. The presentation gave a brief description of efforts to collect information on the various information themes within the scope of the Partnership Programme. Forest plantation information relies on records of annual tree planting activities and data on NTFPs, including fuelwood, wood supply and trade are not collected systematically. No data on trees outside forests are collected. Lack of facilities, equipment and expertise constrain data gathering and analysis in Cambodia. Among the recommendations was human resource development and the establishment of a network among the Asia-Pacific Forestry Commission (APFC) member countries for the exchange of information and experiences.

The national report for Indonesia focused initially on the process and organization of the country's forestry information system. The reporting structure is relatively complex, and suffers from unnecessary bureaucratic procedures and the reliance on the postal service for data dissemination. Information on many relevant issues including NTFPs, plantations and wood consumption is weak, as data collection remains incomplete. Data collection and compilation is not rigorous and data processing is negatively affected by the lack of motivation by responsible officers. Private companies are not penalized for failing to transmit required data. The report made several suggestions to be addressed, including establishing a database on forest plantations.

The national report for India noted the national concern about the inadequacy of forest resource information. Although many data are collected and collated by various agencies, the absence of a centralized national forestry information system means forestry information collection, collation, analysis and dissemination are performed by independent and uncoordinated agencies. The presentation focused on the range of agencies collecting data, and the types of data they are collecting, and concluded by identifying a number of weaknesses and deficiencies in the current system. It also recommended the establishment of a national-level facility dedicated solely to collection, collation and dissemination of forestry information in India.

The national report for Lao PDR noted that as yet there is no centralized forestry information system and consequently data are difficult to access. The presentation briefly described efforts to collect information on the various information themes within the scope of the Partnership Programme. In numerous areas, data collection is very poor or is not performed at all. The presentation concluded that there are many obstacles facing information and planning sectors in Lao PDR, including inadequate staff capacities and lack of specialists, poor forest accessibility, short field season, outdated equipment, poor basic information, and shortages of financial resources.

The national report for Malaysia noted that comprehensive statistics are generated regularly. The forestry information system is largely well developed. The wood-based industries have to furnish data periodically, which in practice is a cumbersome process. There is a need to computerize data capture, analysis and retrieval to reduce personnel requirements and error in data entry and analysis. Within the Forestry Department Headquarters (Peninsular Malaysia), various units are involved in data collection. In Malaysia, forestry is a state matter and coordination of statistics among the three regions is an area that needs greater attention. There is considerable interest in improving procedures for the collection of data on non-timber forest products.

The national report for Nepal noted that data collection activities are carried out mainly in community forestry and national forest categories. The presentation noted a number of weaknesses in the forestry information system, particularly, the absence of skills (and interest) in collecting data among staff. Many baseline data are outdated (thematic maps are more than 15 years old), not comparable across forest management units and scales, poorly maintained, incorrect or unavailable. There is a major challenge in improving data coordination among organizations and development partners. Also, planning and monitoring have become ritual processes and often do not make use of information useful for decision-making. Therefore, the need of data collection, storage and retrieval is not felt widely among professionals. Recently the Department of Forest has started to automate its information storage and retrieval activities.

The national report for Thailand mainly discussed the national forest inventory and methodologies for implementing the inventory. The presentation noted that the main objective of the inventory is monitoring forest condition and collection of socio-economic and biodiversity information. The inventory uses a unit system, although the Royal Forest Department is investigating systems that are better tailored to Thailand's needs.

The national report for Viet Nam noted that the lack of a well-ordered information system is one important impediment to the country's progress toward sustainable forest management. There is no comprehensive centralized database; data collection networks are not well developed; and data collection among institutions is not well coordinated.

Based on the presentations several clear messages and themes were identified.

1.There is significant variability in the level of advancement of forestry information systems. Malaysia is most advanced, whereas countries such as India, Bhutan and Indonesia appear to have relatively good forestry information systems in place, compared with other countries in the region.

2.Coordination of data collection and exchange among national institutions, constituent states, and donor agencies is a major weakness in most countries. The situation varies among countries, with Bhutan, for example, having a relatively centralized forestry information system. By comparison, India has a very disparate system, with many states and many agencies collecting information. In Malaysia, forestry is a state matter, national forestry statistics do not exist and there does not appear to be a need for developing a national database. Notably, the Pakistan country report was accompanied by a request for assistance to develop a database networking system under the Programme.

3.There is much that forestry organizations can learn from each other regarding the operation of information systems. Much information exists in various forms in most countries, it requires organizing in many cases – and sometimes an incentive to publish in the public domain.

There is not always a clear objective for collecting and processing data. In many countries there is a lack of commitment from collecting data all the way to developing sound statistics. Generating relevant and useful information is often a low priority, in particular in situations, where skills are weak and there is a lack of human resources. Hence, at times, data are not analyzed to generate information for decision-making.

In some countries two sets of data appear to exist; unofficial and official data.

Most countries have started to make use of geographic information systems (see also results of pilot study ranking exercise), although the input data in many countries are of a questionable quality.

Data collection processes exercise

A data collection processes exercise was completed by all participants:
—to help standardize information collected on forestry information systems across countries;
—to assist in identifying gaps in national forestry information systems; and
—as a brainstorming exercise, to generate ideas on national data and information deficiencies.

A copy of the Data Collection Processes Workbook is available in Appendix 3 (The version in the appendix is an electronic copy that was slightly altered after the workshop to facilitate electronic inputs). The level of participants' knowledge was generally sufficient to complete most sections of the workbook and these consequently provide a useful overview of data collection activities in South and Southeast Asia. However, in most questionnaires some questions remained unanswered or participants answered 'I don't know'. For these reasons an electronic version of the questionnaire was generated after the inception workshop and sent to the focal points for completion and validation purposes. The questionnaires were also sent to those focal points unable to attend the workshop.

Pilot study planning

The latter part of the second day of the workshop, and most of the third day, were devoted to discussion and identification of pilot study options for potential implementation.

This process began with an open group discussion to discuss the overall results of the pilot survey. These results were presented as a group "score", which showed that, as a group the six most favored pilot study preliminary suggestions were:

1.Establishing a GIS-based referencing system for forest resource data (36 points)
2.Assessing sustainable harvest levels for NWFPs (30)
3.Inventory sampling techniques for measuring trees outside forests (29)
4.Rapid appraisal techniques on forest condition in tropical forests (29)
5.Monitoring forest regeneration in South and Southeast Asia (29)
6.Assessing the value of economic contributions by NWFPs (29)

There was some discussion on whether the structure of the survey, and the terminology, may have biased results in favor of the GIS option. It was not clear precisely what value many of the participants saw in establishing a GIS system.

Individual sessions on Forest Resources, Trees Outside Forests, NWFPs, Woodfuels, Plantations and Potential Wood Supply were held on the third day. Each segment was preceded by a brief introductory presentation by a specialist speaker.

The introductory presentation to the segment on Forest Resources and Land-Use Change was made by Mr Soren Dalsgaard (Associate Professional Officer, FAO). This presentation outlined the Forest Resource Assessment 2000 and discussed project fieldwork to validate Remote Sensing Survey (RSS) interpretations in a sample unit covering the mid-north of Thailand. The former provided an example of the breadth of data countries are being asked to provide as part of international reporting on forests. The latter provided a useful example of a type of pilot study that could be implemented under the Programme.

This comprehensive and visual presentation generated considerable discussion on the findings of the pilot study and on the implications of those findings for the FRA RSS.

Of particular relevance to pilot study suggestions, Mr Shamsudin (FRIM) noted that FRIM had worked in the area of appraising forest condition and degradation and that these methodologies might usefully be adapted and transferred to other countries in the region. There was general agreement that methodologies would differ across countries and forest types. It was noted that capacity building in this area was very important. There was general agreement that a pilot study based around this issue would be useful and of high priority.

Mr Prasad (India) noted the social component of Mr Dalsgaard's fieldwork and suggested this was an area that needed much work. He explained that in India and several other countries in the region, participatory forestry structures create special issues for SFM. He noted that criteria and indicators for SFM have been developed at national level, but there was a need to develop indicators or benchmarks at the forest level, particularly so that these could be implemented by community management groups. This view was endorsed by other countries with important community forest management schemes. It was agreed that a pilot study in this area would be rewarding.

Considerable interest was shown in implementing pilot studies to investigate forest regeneration in countries. Respondents agreed that a focus on measuring deforestation meant that often measuring regenerating areas was neglected. Other potential areas for pilot studies suggested were an investigation of land-use change due to anthropogenic processes. Several countries noted the need for their countries to improve basic forest resource data.

Mr Thomas Enters made a brief presentation on Trees outside Forests (TOF), which discussed the increasing focus FAO is placing on trees outside forests. Some discussion focused around definitions of trees outside forests and the roles played by agricultural institutions in compiling information on non-forest tree crops. There was significant interest from several countries in developing inventory and classification techniques for TOF. Mr Prasad (India) offered IIFM's expertise in developing a pilot study to investigate these aspects. Several participants noted the difficulties in reporting about trees outside forests in terms of spatial classification. Interest was expressed in Viet Nam's classification system (mentioned in the Vietnamese national presentation). The important roles played by TOFs were recognized by countries.

Mr Conrado Heruela (Regional Wood Energy Development Programme) made a presentation on wood energy issues. The presentation focused mainly on a number of case studies being carried out by RWEDP to assist in wood energy planning and investigating the flow of woodfuels from source to "market". The presentation drew attention to the similarity between the RWEDP case studies and the types of pilot studies that might be implemented under the Partnership Programme.

Wood energy topics scored relatively poorly in the Pilot Study exercise, though there was notable variation between respondents from South Asia and those from Southeast Asia. Discussion suggested that a woodfuels component could be built into a trees outside forests pilot study – or into a study establishing benchmarks for SFM in community forests.

Mr Sameer Karki (IUCN) made a presentation on non-wood forest products. This presentation noted IUCN work to implement Integrated Conservation and Development Projects and the current situation in relation to knowledge gaps relating to ecological characteristics and sustainability for NWFPs, socio-economic contributions of NWFPs, and market information. It also identified priority areas for research including need for NWFP classification system,

documentation of management systems for NWFPs and development of institutional monitoring and educational capacity.

Discussion on NWFPs elicited a number of interesting views. Most participants saw little value in carrying out single NWFP inventories, since there already appear to be sufficient inventory methodologies available for most NWFP classes. A major difficulty is the vast number of NWFPs to be inventoried, and whether the benefits would justify the costs. Most participants agreed there was a need to focus efforts on a limited number of NWFPs. Most interest focused on the pilot study exercise suggestions relating to assessments of sustainable harvest levels for NWFPs and assessments of the value of economic contributions by NWFPs.

Mr Chris Brown gave a brief presentation on forest plantations, focusing mainly on FAO's work to strengthen and update forest plantation data through the Forest Resource Assessment Programme, Global Fibre Supply Model and the Global Forest Products Outlook Study. The discussion focused mainly on the various pilot study options, with particular interest shown in the development of a rapid appraisal system for plantation forests, and in developing assessment procedures for the relative success of recently established plantations. Some discussion centred on whether there is a need for measuring biodiversity in plantations, and why it might be important in the future.

Ms Ma Qiang made a presentation on Wood Supply Potential. The presentation briefly discussed FAO efforts to improve information on this topic including the development of the Global Fibre Supply Model, the findings of the Asia-Pacific Forestry Sector Outlook Study, and the current study on the efficacy of removing natural forests from timber production as a strategy for conserving forests. Discussions centred mainly on wood residue studies, with transportation of logging wastes identified as being an area where research would be of value.

In general, there was broad interest in pilot studies, though only two firm proposals were advanced:

1. a pilot study to adapt methodologies for appraising forest condition and degradation and to provide training in assessment (offer from FRIM);

2. a study to further develop methodologies for assessing and classifying trees outside forests resources (offer from IIFM).

Networking proposals

Ms Ma Qiang presented a range of activities envisaged under the Programme for improving communications, capacity building and networking among participating countries in the region. These included:

— development of a Programme website;

— establishing an internet listserver;

— running regional workshops and reviews;

— holding training workshops and seminars.

These proposals were generally well received. Only one workshop participant does not have access to e-mail and the Programme will investigate options of obtaining a connection for the participant. The listserver was seen as an effective means of communication. Brief discussion occurred over the types of training workshops that were envisaged, where they might be held and how they would be facilitated.

Country studies and policy review

A brief session to discuss future activities, including the implementation of country studies and the policy review, rounded out the workshop proceedings. Several participants questioned the value of country studies and reports, noting that there was already a large amount of information available for many countries in the public domain. It was emphasized that the studies should target specific topics, and much of the work should be carried out by national consultants.

Conclusions and action items
Workshop evaluation

Overall the Workshop can be regarded as very successful. Participants generally found the workshop to have been a useful exercise, and expressed support for the Partnership Programme, which was viewed as very relevant to activities being carried out in the region. The expected outcomes of the workshop were achieved.

Items for action

The immediate need is to re-engage all workshop participants in dialogue, to maintain and build on interest developed during the workshop. The completed workshop data exercises have been returned and focal points have been requested to validate input and to provide additional information. Data exercise sheets were also sent to the countries unable to send a representative to the workshop – Pakistan, Philippines and Sri Lanka – and focal points in these countries have been requested to complete the exercises.

Programme staff have commenced work on information gap analysis, based on the completed questionnaires and national reports. Finalization of this analysis should indicate areas where the Partnership Programme can assist in strengthening information.

Two firm proposals for pilot studies were put forward at the meeting, by Malaysia (FRIM) and India. These will be followed up, and pilot study proposals will be prepared. Other areas where interest in pilot studies was expressed will also be pursued. It is anticipated that this will involve travel to countries by FAO staff coordinating the Programme.

Additional efforts may be needed to engage the countries that did not attend the workshop. It is planned that Programme staff will travel to those countries soon to brief key institutions and individuals on the Programme and to elicit pilot study proposals.

Establishment of formal networking mechanisms will be an early priority. This will include establishment of a listserver and a Programme website, as well as securing e-mail access for focal points currently without the facility.

APPENDIX 1: LIST OF PARTICIPANTS

BANGLADESH

A.Z.M. Shamsul Huda
Conservator of Forest
Ministry of Environment and Forests
Bano Bhaban, Mohakhali
Dhaka
Tel: (880-2) 9886361
Fax: (880-2) 8810704
E-mail: bforest@citechco.net

BHUTAN

Dhan Bahadur Dhital
Head, Forest Resources Development
Division
Department of Forestry Services
P.O. Box No. 751
Thimphu
Tel: (975-2) 325835, 322560
Fax: (975-2) 322395
E-mail: db_dhital@moa.gov.bt

CAMBODIA

Eang Savet
Deputy Chief of Forest Management Office
Department of Forestry and Wildlife
#40 Norodom Blvd.
Phnom Penh
Tel: (855-12) 915372
Fax: (855-23) 218739
E-mail: dfw.fcmr@bigpond.com.kh

INDIA

Ram Prasad
Director, Indian Institute of Forest
Management (IIFM)
Nehru Nagar
P.O. Box No. 357
Bhopal, Madhya Pradesh
Tel: (91-755) 775998
Fax: (91-755) 772878
E-mail: ramprasad@iifm.org
INDONESIA

Achmad Pribadi
Head of Evaluation and Reporting
Directorate General of Production Forest
Management
Gedung Manggala Wanabhakti Blok I Lantai 5
Bagian Evaluasi & Pelaporan
Jalan Gatot Subroto, Senayan
Jakarta
Tel: (62-21) 573-0239
E-mail: evaluasi.ph@dephut.cbn.net.id
attention: Achmad Pribadi

LAOS

Somchay Sanonty
Deputy Head of Planning Division
Department of Forestry
Ministry of Agriculture and Forestry
P.O. Box 2932
Vientiane
Tel: (856-21) 215000
Fax: (856-21) 215004

MALAYSIA

Na'aman Jaafar
Director of Forest Planning Unit
Forestry Department Headquarters
Peninsular Malaysia
Jalan Sultan Salahuddin
50660 Kuala Lumpur
Tel: (60-3) 296-2530
Fax: (60-3) 292-5657
E-mail: naaman@forestry.gov.my

Shamsuddin Ibrahim
Acting Head of the Natural Forest Division
Forest Research Institute Malaysia (FRIM)
Kepong 52109
Kuala Lumpur
Tel: (60-3) 630-2300
Fax: (60-3) 636-7753
E-mail: sham@frim.gov.my

NEPAL

Bal Krishna Khanal
Deputy Director General of Forest
HMG/Nepal
Department of Forest Planning Division
Babarmahal
Kathmandu
Tel: (977-1) 220303, 256271, 227574
Fax: (977-1) 227374
E-mail: dof@col.com.np

THAILAND

Kaewta Kongchuntuk
Statistician
Data Center, Information Office
Royal Forest Department
61 Phaholyothin Road
Jatuchak, Bangkok 10900
Tel: (66-2) 579-8901
Fax: (66-2) 579-8901
E-mail: stat@forest.go.th

VIET NAM

Ngo Sy Hoai
Senior Official
International Cooperation Department,
MARD
2 Ngoc Ha
Hanoi
Tel: (84-4) 733-6408, 843-7450
Fax: (84-4) 733-6408
E-mail: nshoai.prof@fpt.vn

Phan Trung Dien
Vice Director
Forestry Development Department, MARD
2 Ngoc Ha
Hanoi
Tel: (84-4) 843-8792, 733-4151
Fax: (84-4) 843-8793

FAO

R.B. Singh
Assistant Director-General/
Regional Representative for Asia and the
Pacific
39 Phra Atit Road
Bangkok 10200
Thailand
Tel: (66-2) 281-7928
Fax: (66-2) 280-0758
E-mail: Singh@fao.org

Patrick Durst
Senior Forestry Officer for Asia and the
Pacific
FAO Regional Office for Asia and the Pacific
39 Pra Atit Road
Bangkok 10200 THAILAND
Tel: (66-2) 281-7844 Ext. 139
Fax: (66-2) 280-0445
E-mail: Patrick.Durst@fao.org

M. Kashio
Forest Resources Officer
FAO Regional Office for Asia and the Pacific
39 Phra Atit Road
Bangkok 10200, THAILAND
Tel: (66-2) 281-7844 Ext.141
Fax: (66-2) 280-0445
E-mail: Masakazu.Kashio@fao.org

D. Suparmo
NFP Adviser (Asia-Pacific)
FAO Regional Office for Asia and the Pacific
39 Phra Atit Road
Bangkok 10200, THAILAND
Tel: (66-2) 281-7844 Ext. 142
Fax: (66-2) 280-0445
E-mail: Darmo.Suparmo@fao.org

Chris Brown
Consultant – Forestry Sector Outlook Studies
FAO Regional Office for Asia and the Pacific
39 Phra Atit Road
Bangkok 10200, THAILAND
Tel: (66-2) 281-7844 ext 151
Fax: (66-2) 280-0445
E-mail: Chris.Brown@fao.org

Thomas Enters
Forestry Sector Analysis Specialist
GCP/RAS/173/EC
FAO Regional Office for Asia and the Pacific
39 Phra Atit Road
Bangkok 10200, THAILAND
Tel: (66-2) 281-7844 Ext. 328
Fax: (66-2) 280-0445
E-mail: Thomas.Enters@fao.org

Soren Dalsgaard
Associate Professional Officer
Forest Resource Assessment
FAO Regional Office for Asia and the Pacific
39 Phra Atit Road
Bangkok 10200, THAILAND
Tel: (66-2) 281-7844 Ext. 130
Fax: (66-2) 280-0445
E-mail: Soren.Dalsgaard@fao.org

Ma Qiang
Forestry Officer (Econometrics)
Forestry Planning and Statistic Branch
Forestry Policy and Planning Division
Forestry Department
FAO
Viale delle Terme di Caracalla 00100
Rome, ITALY
Tel: (39-06) 57055011
Fax: (39-06) 57055137
E-mail: Ma.Qiang@fao.org

S. Appanah
Senior Programme Adviser
FORSPA
FAO Regional Office for Asia and the Pacific
39 Phra Atit Road
Bangkok 10200, THAILAND
Tel: (66-2) 281-7844 Ext 136
Fax: (66-2) 280-4565 (direct)
E-mail: Simmathiri.Appanah@fao.org

Conrado Heruela
Wood Energy Planning Officer
FAO/RWEDP
39 Maliwan Mansion
Phra Atit Road, Bangkok 10200,
THAILAND
Tel: (66-2) 280-2760
Fax: (66-2) 280-0760
E-mail: Conrado.Heruela@fao.org

Tara Bhattarai
Wood Energy Resources Specialist
FAO/RWEDP
39 Maliwan Mansion
Phra Atit Road, Bangkok 10200,
THAILAND
Tel: (66-2) 280-2760
Fax: (66-2)280-0760
E-mail: Tara.Bhattarai@fao.org

OTHER

Sameer Karki
Programme Officer
Regional Forest Programme
IUCN
Asia Regional Office
302 Outreach Building
AIT
P.O. Box 4
Klong Luang
Pathumthani 12120, THAILAND
Tel: (66-2) 524-6745 to 47
Fax: (66-2) 524-5392
E-mail: sameer@ait.ac.th or iucn@ait.ac.th

APPENDIX 2: PILOT STUDY OPTIONS AND RESULTS OF RANKING EXERCISE

Ratings: 4 = very important; 3 = important; 2 = limited importance; 1 = not important

FOREST RESOURCES LANDUSE CHANGE	Ranking
Review of management regimes in tropical forests: This study might examine the impacts on forests, and land-use changes that are promoted, by various specified forest management regimes. It could develop a methodology for periodic site surveys to examine changes in the forest and land uses.	24
Rapid appraisal techniques on forest condition in tropical forests: This study might develop methodologies to enable rapid appraisal of forest conditions and degradation across a large number of sites.	29
Monitoring forest regeneration in South and Southeast Asia: Much attention focuses on deforestation, however, there is often little or no measurement of regenerating forest areas. This study could develop methodologies for identification and measurement of regenerating forest areas.	29
Monitoring tropical forest ecosystem health and vitality: This is a common Indicator of sustainable forest management. This study would develop quantitative measures and methodologies to enable reporting against the indicator.	21
Assessing forests for diminished biological components indicative of ecosystem degradation: Again, this is a common Indicator of sustainable forest management. This study would develop quantitative measures and methodologies to enable reporting against the indicator.	23
Measuring and categorising erosion on forestland: Soil erosion is often associated with forest degradation or deforestation. This study could develop survey techniques to measure the incidence of erosion, and changes in the incidence over time.	17
Suggestions Changes in land use due to anthropogenic process. Resource security is the issue. Has been addressed and relevant information collected. **Look more closely at pilot studies – relevant methodologies.** N.B. Bangladesh. Surveys and data collection are very limited, inventories data collection and other surveys should be done periodically.	

FOREST PLANTATIONS	Ranking
Translating nursery production to plantation establishment: Nursery surveys provide an easy measure of plantation establishment rates. This study could develop a nursery survey methodology and system, as well as systems for estimating establishment rates from nursery production.	20
Measuring mortality rates in forest plantations: Often little data is collected at national levels on rates of success in plantation establishment. Often, if new planting dies, or has very low success rates, this is not incorporated in national statistics. This study could address this issue.	25
Developing a rapid appraisal system for national plantation forest: This study would develop methodologies for rapidly improving the accuracy of national plantation statistics. Could include surveys, GIS mapping, or improved institutional liaison.	28
Surveying management regimes in plantation forests: Little data is available at national levels regarding plans for plantation management by private sector e.g. planned rotations, expected and actual yields. This study would develop survey methodologies.	24
Predicting plantation forest wood flows: This study would develop modeling techniques to better predict future plantation production, based on national or sub-national datasets.	21
Measuring biological diversity in forest plantations: Biodiversity is a key Indicator for SFM. This study could develop methodologies to measure plantation biodiversity.	17
Suggestions Development of techniques to assess the success of failure of forest plantations.	
WOOD SUPPLY POTENTIAL	
Measuring harvesting residue volumes in tropical forests: Harvest residues provide an important potential source of additional wood. This study would examine availability of residue volumes and potential for making these available to potential users.	26
Utilisation and waste of wood processing residues: This, slightly different study could examine volumes, and rates of utilisation, of processing residues in countries, as well as how residues are being used.	23

Deriving national conversion efficiency ratios for processing facilities: Little information is available at national levels on the relative efficiency of processing facilities. Developing better estimators of conversion efficiency will enable better estimates of roundwood volumes actually being processed.	**19**
Measuring harvesting intensities in tropical forests: Harvesting intensity measures the volume actually removed from the forest (per hectare) within one cutting cycle. Developing national measures are an important aid to modeling wood supplies.	**27**
Surveying land ownership of log sources: Collecting data on where logs are sourced from assists in wood supply planning. This study could develop methodologies to identify log sources.	**25**
Estimating "unmeasured" household consumption of industrial logs and poles: In many countries there is significant, but unmeasured agricultural and household use of logs and poles. This study could develop surveys to quantify this use.	**24**
Surveying recycling systems (formal and informal) for forest products: Recycling provides an important source of supplementary fibre, though in many countries it is not measured, or large parts escape measurement systems. Methodologies could be developed to address this.	**17**
Specific inventory type work in natural forests: a variety of studies could assist in developing better inventory methodologies.	**25**
Examining impacts of changes in the nature of wood supplies (log sizes and species): The changing composition of forest harvests (e.g. shortages of large logs) have important consequences for the forest processing industry. Many studies could be developed around these issues.	**24**
Examining the impacts of new techniques, such as reduced impact logging, on wood supplies: The impacts of widespread implementation of new techniques, such as RIL, or even definitions of SFM have significant but poorly understood implications for wood supply patterns. A variety of studies could be implemented.	**25**
Suggestions Methods of transporting logging wastes in an efficient manner be examined. Efficient transportation is still the main problem, the utilisation of such waste is still small.	

FUELWOOD PRODUCTION AND CONSUMPTION	
Investigating local sources of woodfuel: Identifying local sources of woodfuel is important for wood energy planning. Methodologies could be developed or improved for this type of assessment.	**24**
Measuring the impact of woodfuel harvesting on forests and woodlands: This type of study could assess the implications for SFM of woodfuel harvesting in forests and woodlands.	**20**
Measuring the impact of woodfuel harvesting on trees outside forests: This type of study could assess the implications of woodfuel harvesting on agricultural trees.	**18**
Estimating annual woodfuel substitution by other energy sources: This type of study could investigate changes in woodfuel consumption patterns.	**14**
Assessment of recovered and recycled wood available for fuel: This study could assess the importance of residues and recycled wood as a fuel source.	**15**
Measuring the impact of woodfuel harvesting on protected areas and reserved forests: Protected areas are often not immune from household harvesting of wood for fuel. In some countries these impacts are significant and assessment of the impacts may be valuable.	**17**
Suggestions: Other sources of biomass (e.g. weeds, agricultural residues)	
TREES OUTSIDE FORESTS	
Developing an inventory classification for trees outside forests: In many countries, little work has been done to assess the Trees outside forests resource. Development of appropriate classification systems may be required.	**27**
Inventory sampling techniques for measuring trees outside forests: In many countries, little work has been done to assess the Trees outside forests resource. Development of appropriate assessment procedures may be required.	**29**
Reviewing the effectiveness of cartographic documents to assess ToF resources in Southeast and South Asia: Aerial photographs, and other mapping tools may offer means of assessing the magnitude of trees outside forests. This study could examine the viability of using these.	**24**
Identification of agro-ecological zones and classification of land management systems in zone: Little work has been done to assess the impacts of land uses on the trees outside forests resource. This study would investigate methods of ordering and classifying different land management systems**.**	**20**

Suggestions: What could be included in TOF (e.g. mangos, chard palm and other species)	
NON-WOOD FOREST PRODUCTS	
Local surveys of NWFP dependencies and consumption: This study would be an extension of varying efforts to monitor production and consumption of specific NWFPs.	**26**
Formal and informal markets for NWFPs: This study would investigate the importance of various systems for trading specific NWFPs.	**25**
Assessing sustainable harvest levels for NWFPs: Little work has been carried out on the sustainable management of many NWFP resources. This study could investigate issues of sustainability for specific NWFPs.	**30**
Assessing the value of economic contributions by NWFPs: For many NWFPs their value to local and national economies is poorly understood. This study would develop survey assessment techniques for this economic contribution.	**29**
Market pricing surveys for NWFPs: Where NWFPs are traded there is generally little price data available in the public domain. This study would develop methodologies for collecting price information.	**24**
Suggestions **Non-wood forest products inventory.**	
DATA SYSTEMS IN SUPPORT OF SFM	
Establishing a GIS-based referencing system for forest resource data: This study would examine prospects for combining map and forest attribute data (generally as a database) within a GIS and geo-referenced to (i.e. projected to) a national co-ordinate grid system.	**36**
Suggestions: We need to address this issue more vigorously. How are we going to manage this information? Integration of GIS with MIS. E.g. Forest cover and area change, fire. E.g. Bhutan habitat mapping. Matching C&I and data gaps to GIS Recording forest management decisions and actions at the stand level. Constrained by systems in place in countries.	

APPENDIX 3: DATA COLLECTION PROCESSES WORKBOOK

> **INFORMATION AND ANALYSIS FOR SUSTAINABLE FOREST MANAGEMENT:**
> **LINKING NATIONAL AND INTERNATIONAL EFFORTS**
> **IN SOUTH AND SOUTHEAST ASIA**

DATA COLLECTION PROCESSES

WORKBOOK

Country: ………………

Participant: ………………

Overview of National Statistics Collection Processes

Agency with primary responsibility for collecting/collating forestry statistics:

Data collection/collation responsibilities: (check topics as appropriate):

	Collect	Collate	not collected	don't know
National Forest Inventory	☐	☐	☐	☐
Separate Plantation Forest Inventory	☐	☐	☐	☐
Roundwood Removals	☐	☐	☐	☐
Production of Wood Products	☐	☐	☐	☐
Import/Export of Wood Products (volume)	☐	☐	☐	☐
Value statistics for imports/exports	☐	☐	☐	☐
Production/consumption of fuelwood/charcoal	☐	☐	☐	☐
Production of national wood supply forecasts	☐	☐	☐	☐
Forestry employment statistics	☐	☐	☐	☐
Forest Product Price statistics	☐	☐	☐	☐
Non-wood forest products	☐	☐	☐	☐

Others:

Remarks:

No. staff employed in collection/collation of statistics:

Other principal agencies involved in forestry statistics collection:

Agency(ies):	Collects:

Description of forest inventories/surveys

Country:	Reference year:

Title of inventory:	

Type of inventory:	

Field / aerial photos / satellite images / ...
Brief summary of methodologies used

Reporting level		Country coverage	

        National / sub-national   Complete / partial

Map output

        yes / no (also indicate format: analogue /digital)

Vegetation types included   yes/no   Additional information included yes/no

Natural forests	☐☐	Area by forest formation	☐☐
Plantations	☐☐	Volume	☐☐
All forests	☐☐	Biomass	☐☐
Other wooded land	☐☐	Forest naturalness	☐☐
Forest biodiversity	☐☐		
Forest ownership	☐☐		
Wood supply potential	☐☐		

Remarks:

Principal deficiencies and gaps in national forest inventory system:

Other forest resources and land-use data

	National	sub-natl.	not collected	don't know
Extent of forest type in protected area classification (e.g. IUCN)	☐	☐	☐	☐
Forest health surveys completed	☐	☐	☐	☐
Data compiled on annual forest fire damage	☐	☐	☐	☐
Data compiled on other annual forestland clearing	☐	☐	☐	☐

Remarks:

```



```

Principal deficiencies and gaps in forest resources and land-use change:

```



```

Trees outside forests

Data surveyed for trees outside forests:

	National	Sub- natl.	not collected	don't know
Inventory of trees outside forests	☐	☐	☐	☐
Wood production from trees outside forests	☐	☐	☐	☐
Studies of urban trees	☐	☐	☐	☐

Remarks:

Principal deficiencies and gaps in trees outside forests data collection:

Wood energy

Data available/surveyed for wood energy:

	National	Sub-natl.	not collected	don't know
Woodfuel consumption	☐	☐	☐	☐
Sources/availability of woodfuels				
Forests	☐	☐	☐	☐
Trees outside forests	☐	☐	☐	☐
Trees outside forests	☐	☐	☐	☐
Wood processing residues	☐	☐	☐	☐
Other (specify)	☐	☐	☐	☐
Charcoal Production	☐	☐	☐	☐

Agencies collecting woodfuels data:

Agency	Data

Methodologies for estimating national consumption:

Methodologies for estimating fuelwood availability:

Principal deficiencies and gaps in Wood Energy data collection:

Non-wood forest products

Please tick the most important product(s) of your country's activities and specify if data are collected.

PLANTS:		Data collected
Live /decorative plants:	☐	☐
Cut flower:	☐	☐
Fodder, forage:	☐	☐
Bamboo:	☐	☐
Rattan:	☐	☐
other vegetal fibres:	☐	☐
Cork:	☐	☐
Resins:	☐	☐
Latex:	☐	☐
Waxes:	☐	☐
Tannins:	☐	☐
Essential oils:	☐	☐
Medicinal plants:	☐	☐
Aromatic, non-edible plants:	☐	☐
Plants for extraction of insecticides, fungicides:	☐	☐
Other plant material:	☐	☐
	☐	☐
FOOD:		
Fruits, fresh, dried, preserved, prepared:	☐	☐
Edible seeds/nuts:	☐	☐
Culinary, aromatic herbs:	☐	☐
Spices:	☐	☐
Edible vegetable oils:	☐	☐
Vegetable colourants and dyestuffs:	☐	☐
gums:	☐	☐
Mushrooms (fresh or preserved):	☐	☐
	☐	☐
ANIMAL PRODUCTS:		
Live animals	☐	☐
Animal food products	☐	☐
Trophees	☐	☐
Bee wax and other insect wax	☐	☐
Silk and silk products	☐	☐
Lac and lac products	☐	☐
Animal fats/oils	☐	☐
Animal colourants	☐	☐
Animal-based medicinal preparation	☐	☐
Ecotourism	☐	☐
Others not elsewhere specified		
	☐	☐
	☐	☐
	☐	☐
	☐	☐

Forest plantations

Data available/surveyed for forest plantations:

	National	Sub-national	not collected	don't know
Total area of plantations	☐	☐	☐	☐
Total area by species	☐	☐	☐	☐
Total area by age-class	☐	☐	☐	☐
Total area by ownership	☐	☐	☐	☐
Annual new planting	☐	☐	☐	☐
Seedling production	☐	☐	☐	☐
Annual plantation harvest (volume)	☐	☐	☐	☐
Mortality rates	☐	☐	☐	☐
Survey of diseases and pests	☐	☐	☐	☐
Survey of aerial impacts of fire	☐	☐	☐	☐
Plantation woodflow forecasts	☐	☐	☐	☐
Woodflows predict sawlog/pulpwood diff.	☐	☐	☐	☐
Yield tables for major species	☐	☐	☐	☐
Surveys of non-forest species	☐	☐	☐	☐

Other plantation data collected:

☐   ☐
☐   ☐
☐   ☐

Principal deficiencies and gaps in plantation information systems:

Wood supply potential

Data available/surveyed necessary to assess wood supply:

	National	Sub-natl.	not collected	don't know
Natural forest area available for wood supply	☐	☐	☐	☐
legally protected areas	☐	☐	☐	☐
inaccessible areas (physical)	☐	☐	☐	☐
uneconomic areas (location or yields)	☐	☐	☐	☐
Information differentiated by forest type? YES/NO	☐	☐	☐	☐
Harvesting intensity by forest type	☐	☐	☐	☐
Cutting cycles by forest type	☐	☐	☐	☐
Recovered fibre production	☐	☐	☐	☐
Non-wood fibre production	☐	☐	☐	☐
Total annual harvest (volume)	☐	☐	☐	☐
Annual harvest by species (volume)	☐	☐	☐	☐
Forest impact assessments	☐	☐	☐	☐
Future wood supply modeling completed	☐	☐	☐	☐

Remarks:

Key deficiencies and gaps in assessing potential wood supplies:

Other data supporting sustainable forest management
(from Criteria & Indicators Processes)

Indicate whether data are collected in any form:

	National	Sub-natl.	not collected	don't know
Monitoring of population levels of rare or endangered forest-dependent species	☐	☐	☐	☐
Area of land with significant soil erosion	☐	☐	☐	☐
Area of forestland managed for protective functions	☐	☐	☐	☐
Monitoring of stream flow in forested catchments	☐	☐	☐	☐
Monitoring of levels of forest organic matter	☐	☐	☐	☐
Monitoring of water quality in forest areas (pH, dissolved oxygen, etc)	☐	☐	☐	☐
Preliminary work on estimating forest contribution to carbon budgets	☐	☐	☐	☐
Area of forestland managed for tourism	☐	☐	☐	☐
Area of forest land used for subsistence or by forest dwellers	☐	☐	☐	☐
Other data………………….	☐	☐		
Other data………………….	☐	☐		
Other data………………….	☐	☐		

Databases and referencing systems

Forestry data handling capacities: Yes/No
Formalised national Forest Information System   ☐☐
Centralised database for national forestry statistics   ☐☐
Integrated set of databases containing national forestry statistics   ☐☐
Discrete and unlinked set of databases   ☐☐
Other

```

```

GIS based forest-mapping system   ☐☐
Formal information sharing network between institutions   ☐☐
Data collection processes standardised between states/provinces   ☐☐

Means of information dissemination:	National Forestry Agency	Other Agencies
Publications	☐	☐
Website	☐	☐
Other_____	☐	☐
Other_____	☐	☐

Remarks:

```

```

Key deficiencies and gaps in databases and referencing systems:

```

```

APPENDIX 4: PAPERS PRESENTED

INFORMATION AND ANALYSIS FOR SUSTAINABLE FOREST MANAGEMENT:
LINKING NATIONAL AND INTERNATIONAL EFFORTS
IN SOUTH AND SOUTHEAST ASIA

WELCOME ADDRESS

R.B. SINGH, ASSISTANT DIRECTOR GENERAL AND REGIONAL REPRESENTATIVE
FAO REGIONAL OFFICE FOR ASIA AND THE PACIFIC

Ladies and Gentlemen…

I am very pleased to welcome you to Bangkok for this first Workshop of the programme, *Information and Analysis for Sustainable Forest Management: Linking National and International Efforts in South and Southeast Asia.* I trust you will have both a productive and enjoyable time during your stay.

This programme is of considerable significance to the forestry sector in the Asia-Pacific region. Pressures to manage forests sustainably are increasing, both nationally and internationally. Our societies have set challenges and goals for the forestry sector and we must be responsive to these challenges, as well as being able to demonstrate our progress to meeting these goals. Thus, not only must we work to improve our forest management, we must also be <u>seen</u> to be achieving improvement.

The programme has been developed in recognition of the many difficulties facing foresters in most countries, and in recognition that we don't yet have good solutions to all these challenges. In some instances it is difficult to prove that a particular problem exists – or conversely to prove that it doesn't. A very good example is deforestation. Almost everyone agrees that deforestation is a bad thing, but considerable debate exists as to how great the problem is, where it is occurring, and over the varying estimates of national rates of deforestation reported by different agencies in many countries. More difficult questions relating to, for example, forest degradation, the roles of trees outside forests, production of non-wood forest products, the use of wood for fuel, and the effects of plantation forests on wood supplies and natural forests in the region, remain far from being authoritatively answered.

The EC-FAO partnership programme affords us an opportunity to begin seeking answers to some of these questions. The central focus of the programme is to enable countries to get better information for policy formulation, so as to manage their forests in the direction of sustainable development.

You will have noticed that the programme documents refer to the programme as a partnership programme. It must be, in every sense, a partnership – between the European Commission and FAO on one hand – and you, the countries, on the other. From the individual country perspective, the programme is one where the more effort you put into it – the more you will get out of it. Each

country needs to play an active role in proposing, designing and implementing studies – and this includes studies that are implemented in other countries. FAO's role is to co-ordinate the programme, and to provide specialist advice on project design and implementation.

I specifically want to make mention of the other partner in this initiative - the European Commission. The Commission has generously provided the working funds for the programme - more than a million US dollars. It has entrusted us, FAO and the countries of the region, to plan the programme wisely, and to implement the plans, diligently. Thus we all have a major responsibility to the Commission, to ensure we deliver results commensurate with the trust they have placed in us.

I know that a very busy programme has been developed for the Workshop, and thus I will not prolong this address. I wish you every success in your deliberations, and look forward to your partnership during the implementation of this programme.

Thank you

INFORMATION AND ANALYSIS FOR SUSTAINABLE FOREST MANAGEMENT:
LINKING NATIONAL AND INTERNATIONAL EFFORTS IN SOUTH AND SOUTHEAST
ASIA

THE INFORMATION AND ANALYSIS FOR SUSTAINABLE FOREST MANAGEMENT
PROGRAMME - KEY LINKAGES

PATRICK DURST, SENIOR FORESTRY OFFICER,
FAO REGIONAL OFFICE FOR ASIA AND THE PACIFIC

As an introduction to the Information and Analysis for Sustainable Forest Management
Programme: Linking National and International Efforts in South and Southeast Asia it is useful to
note that the programme does not exist in isolation. Rather, it is part of a series of regional
initiatives being coordinated by FAO with the backing of the European Commission. Currently,
parallel initiatives are being carried out in Africa, Latin America and the Caribbean. Of these, the
most advanced programme is in Africa, which commenced activities more than two years ago, and
held its first Workshop in Nukuru, Kenya in October 1998.

It is interesting to emphasise, however, that in many ways all of these programmes have their roots
in the Asia-Pacific region - and that, in real terms, our South and Southeast Asian programme is
well ahead of the field. Because in reality, these programmes have all grown out of the success of
the Asia-Pacific Forestry Sector Outlook Study (APFSOS), which most of you will be familiar
with. This study, initiated by the Asia-Pacific Forestry Commission in 1996, was the first
regionally-focused, holistic forestry outlook study completed for almost twenty years. What the
APFSOS study very clearly showed was that there is a significant gap in information and analysis,
beyond the country level, but short of the global level. That information, analysis, and problem
solutions can often be developed and shared most effectively within a regional context, where
countries have many commonalities and a better understanding of one-another's challenges,
strengths and weaknesses. Thus, in both Africa and Latin America the programmes to strengthen
information systems are running in tandem with the preparation of outlook studies, while in Asia
the base study is already completed.

A key recommendation coming from the Asia-Pacific Forestry Commission's review of the
Outlook study was the need to improve the quality of information used by policymakers to take
decisions and to prepare the sector for the changes foreseen by the Study. In pursuit of this, the
APFC established a Working Group on Forestry Statistics and Information, and requested that
FAO provide support to strengthen forestry data collection and analysis capability. In response to
these calls, FAO sought financial support from the European Commission to enable this initiative
to be undertaken. The European Union has contributed US$1.03 million in working funds to
enable the Programme to be successfully implemented.

The Programme will complement a number of efforts being made in the Asia-Pacific region to
promote sustainable forest management, by countries, by other organisations, and by FAO.

Criteria and indicators for sustainable forest management have been developed by a number of organisations, forums and processes. For countries in Asia, the ITTO criteria and indicators have probably the highest profile, while other certification processes (FSC) have built on these at an individual forest level. Similarly, several countries have developed, or are in the process of developing, national-level criteria and indicators. In December 1999, representatives of nine Asian countries launched a *Regional Initiative for the Development and Implementation of Criteria and Indicators for Sustainable Management of Dry Forests in Asia*. The group agreed on a set of 8 national-level criteria and 49 indicators for the sustainable management of dry forests in Asia.

All of these criteria and indicators require that forests are more intensively monitored, and that data in support of sustainable forest management is provided. A key objective of the EC-FAO Programme is to support efforts to initiate these new data collection efforts.

Similarly, one of the hindrances to sustainable forest management has been destructive logging practices. The most common problem is that the majority of the people working in the forest are not aware of the requirements of good forest harvesting practices. As a follow-up to the recommendations made at the 16th and 17th Sessions of the APFC some countries in the region have formulated, or are formulating, national codes of practice for forest harvesting, using the APFC-FAO Code of Practice for Forest Harvesting in Asia-Pacific, 1999 as a reference. The EC-FAO Programme could assist the development of codes of practice by providing new data of forest harvesting impacts.

A generic term for a wide range of approaches used by countries in planning, programming, and implementing forest activities is national forest programme (nfp). In the Asia-Pacific region, 22 countries are implementing nfps. Eleven countries in South and Southeast Asia have completed a planning phase including Bhutan, India, Indonesia, Lao PDR, Malaysia, Nepal, Pakistan, the Philippines, Sri Lanka, Thailand, and Viet Nam. A number of countries are actively implementing, or are in the process of revising and updating, their nfps. For example, a National Forestry Action Programme (NFAP) document for India was completed in early 1999; a list of immediate and important projects is being prepared. The Government of India plans to organise a donor meeting to discuss implementation of its NFAP in the third quarter of 2000. Sri Lanka will launch a Forest Resource Management Project in the latter part of 2000. The Philippines and Indonesia are in the process of revising their nfps after 10 years of implementation. The EC-FAO Partnership Programme provides an excellent opportunity to support the implementation of these nfps, as well as providing an opportunity to review nfp programmes and supporting policies.

It is evident that the EC-FAO Partnership Programme is highly relevant to many of the major forestry initiatives being undertaken in the region. This should be no surprise since the Programme is designed to support Sustainable Forest Management, and given the importance of SFM to the forestry sector. Our task at this workshop is to ensure that we plan activities and develop priorities that will enable the Programme to maximise its contribution to ensuring the achievement of SFM. Given the calibre of the people nominated by the various Forestry agencies to attend this workshop I have no doubts that we will be highly successful.

Thank you

INFORMATION AND ANALYSIS FOR SUSTAINABLE FOREST MANAGEMENT: LINKING NATIONAL AND INTERNATIONAL EFFORTS IN SOUTH AND SOUTHEAST ASIA

THE INFORMATION AND ANALYSIS FOR SUSTAINABLE FOREST MANAGEMENT PROGRAMME - OUTLINE AND OBJECTIVES

THOMAS ENTERS, FORESTRY SECTOR ANALYSIS SPECIALIST, FAO REGIONAL OFFICE FOR ASIA AND THE PACIFIC

This presentation will provide an outline of the overall programme: Information and Analysis for Sustainable Forest Management: Linking National and International Efforts in South and Southeast Asia. The presentation will provide a brief overview of the scope and objectives of the programme, before providing a more detailed discussion of the manner in which the programme is structured.

Objectives

The objectives of the Programme are largely at two levels. The overarching objective is to promote sustainable management of trees and forests in the tropics of South Asia and Southeast Asia, founded on policies that integrate and balance relevant economic, environmental and social aspects of forestry. The overarching objective recognises that development of good forest policy requires good supporting data and information. If we don't know where we are now, how can we plan where we are going?

The more immediate objectives of the programme should naturally promote the overarching objective.

The programme has, effectively three immediate objectives:
to strengthen national capacities to collect, compile and disseminate reliable and up-to-date information on forestry;
to utilise this information to update analysis of the forestry sector; and
to make information and analysis available to policy-makers.

In this workshop our principle objective will be to develop a platform from which we can work, principally, towards addressing the first objective.

Scope

The programme covers six countries in South Asia (Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka); and seven countries in Southeast Asia (Cambodia, Indonesia, Laos, Malaysia, Philippines, Thailand and Viet Nam).
The Programme is also focused specifically on six forestry topics:
forest resources and land-use change;

forest plantations;
trees outside forests;
fuelwood;
wood supply potential;
non-wood forest products; as well as,
data systems to support these.

This list of specific topics is largely derived from the results of the Asia-Pacific Forestry Sector Outlook Study. These are areas that are seen as having considerable scope to improve and strengthen, particularly, quantitative data collection - while maintaining a primary Programme focus (and thereby keeping the scope within manageable limits), on physical tree and forest resources.

Structure

In terms of the structure of the Programme, there are three major components specified within the Programme of Work. That is, there are three main groups of tasks the Programme will carry out.

The first of these is to collect and update problem-oriented data. Of particular interest is to identify data currently collected, but not made generally available. This includes identifying various small-scale studies in countries, where the results or data generated, has not reached the public domain. It also includes developing linkages between various data collecting agencies to improve data consistency.

There is also a need, identified in the Asia-Pacific Forestry Sector Outlook Study, to clarify how data are collected or compiled, and to look at innovative means of generating new data. For example, in some countries there is a significant discrepancy between total roundwood production and the assessed sustainable supply potential of natural forests. In the past in has been assumed that natural forests have been being over-cut, unsustainably harvested - and, consequently we have had bleak forecasts of wood supply crises - resulting in possibly inappropriate policy measures such as excessive plantation programmes, harvesting restrictions, or consumption controls. More latterly, it appears that, in many countries, the wood supply role of trees outside forests has been neglected, and thus an important component of wood supply equations has been omitted. It becomes evident that we cannot merely look at statistics at face value. We also need to understand how they are collected and compiled. Which factors are included in a particular statistic and which factors are omitted? Thus, a significant part of this workshop will be spent in describing and discussing national information systems. How does your country collect information? How is it compiled? What pieces are missing?

As the Programme progresses it is intended that comprehensive national forestry data and information sets will be compiled, incorporating existing forestry information, new data generated during the Programme, and information and analysis from related sectors. In part, it is anticipated that focussed country studies, examining each of the six specified forestry topics, will be implemented in each country - and we will further discuss this implementation on the third day of the workshop.

A second core component in the Programme of Work is implementation of pilot studies designed to gather new information and data relating to areas where there are evident gaps in coverage and

methodologies. The pilot studies are expected to generate useful data and information, but a central purpose for many should be to develop and demonstrate successful methodologies for collecting information to support the development of robust policies that promote sustainable forest management. Thus, the idea behind the pilot studies is to develop tools and capabilities that can be shared across the region - rather than merely implementing a one-time study. Much of our discussion here, particularly on the third day of the workshop, will revolve around planning a series of pilot studies.

The third aspect of the Programme will be a Forest Policy Review. This phase will occur in the latter stages of the Programme and will build on information gathered throughout the course of other activities. The Policy Review will specifically include:
incorporating improved data into forecasting models;
reviewing national forestry policies in the light of new information on supply and demand situations, evolving country aspirations, and requirements for sustainable forest management; and, building national capacities to conduct detailed forest policy analysis.

Conclusions

The Programme specifies outcomes for five separate groups.
For all target countries, an improved and more in-depth coverage of forestry data and better reliable problem-oriented data which is needed for sustainable forest management;
For the selected pilot countries, a proven, cost-effective methodology to collect and analyse forestry data for sustainable forest management which is essential but not yet commonly available at national level, and to carry out policy/institutional analysis for each of the selected countries;
For the Forestry Departments, local staff and Forestry Officers, improved institutional and technical capacity obtained through the project's activities (workshops, international and national consultants, on the job training, pilot studies and analysis);
For the highest levels of policy makers, improved analytical tools to review and formulate appropriate forestry policies for sustainable forest management; and
For EC, FAO, International Community and general public, access to the data, information and analysis of the forestry sectors in the target countries.

It is apparent from these that an overall theme of the Programme is capacity building. The Programme is designed to provide opportunities to gather and organise data, both on regional and national levels. It also has a strong learning-by-doing component - particularly associated with the pilot studies. It is, as has already been emphasised, a partnership between the European Commission, FAO and you - the countries. Thus a funding framework is in place, but the types of studies that will be implemented within the Programme are largely down to you. What topics and studies will deliver the best outcomes for your country, for the region, and thus for the European Commission and FAO?

Thank you

INFORMATION AND ANALYSIS FOR SUSTAINABLE FOREST MANAGEMENT:
LINKING NATIONAL AND INTERNATIONAL EFFORTS IN SOUTH AND SOUTHEAST
ASIA

PURPOSE, OBJECTIVES AND OUTLINE OF THE WORKSHOP

CHRIS BROWN, FORESTRY SECTOR OUTLOOK STUDIES SPECIALIST
FAO REGIONAL OFFICE FOR ASIA AND THE PACIFIC

We would like to begin this next segment of the workshop by briefly outlining the agenda for the next three days, as well as describing the overall objectives and the key outcomes we are hoping to achieve. It is worthwhile to keep in mind that, to a large extent, the workshop is an exercise in brainstorming. While in the initial phases FAO and the European Commission worked together to develop an overall framework for the Programme - the detail has been left for you, the countries, to color in according to your priorities and interests. The various activities carried out under the programme must be relevant and useful to you. Thus, much of the workshop agenda has been developed to encourage your participation in developing a detailed workplan that matches your priorities.

There are effectively four major objectives for the Workshop:

The first objective is to inform and discuss with you, the country representatives and National Focal Points, the background, objectives, structure and expected outcomes of the programme. Already, this morning, you have heard overview presentations on the overall Programme, and along with your study of the preliminary workplan you should now have a good grasp of how the overall Programme is structured, and the types of activities that are envisaged. At the conclusion of this brief talk we will have time for questions and discussion to clarify points of interest.

A second objective is to establish a basis for planning specific programme activities. If we are to identify gaps and weaknesses within national information systems then we need to discuss what information is currently being collected, how it is being collected and, by comparing experiences by different countries, examine ways in which the programme may be able to help strengthen information systems. Thus, you have each been asked to prepare brief presentations on forestry information collection and collation processes in your countries and these are planned to be made later this morning and this afternoon. Following on from today's presentations, we plan to move into small breakout groups with two purposes in mind. The first is to work through a Workbook exercise designed to help standardise, and build on, the information contained in the presentations.

The breakout groups will also begin work on the third objective for the Workshop, that is they will begin the process of planning actual pilot studies that may be carried out in countries. In these groups we will particularly be looking for suggestions from countries on specific studies they are interested in having implemented within the programme, and particularly studies or areas of interest that you would like to have carried out within your country. We will also be looking to sketch out how specific pilot studies may be implemented.

For those of you uncertain as to exactly what we mean by pilot studies, later this morning we will be distributing a list of examples and suggestions, which we will ask you to work through during the day and rank in order of importance to your country, and this process should give you an good idea of exactly what we have in mind. In essence, we are looking to implement trial data collection projects on a limited geographic scale, to develop and refine methodologies that could then be implemented at larger state or national scales.

At the end of tomorrow's discussions we will regather in a plenary session to discuss the fourth element of the programme objectives - means for working together, as well as incorporating inputs and advice from other institutions, and particularly the merits and means for establishing an on-going network of statistical correspondents within the region.

On the final day of the workshop we will carry forward the pilot study planning process from small groups, when we will rejoin together in a plenary session to develop an overall plan for taking the programme forward, including firming up proposals for pilot studies, and refining methods of implementation for pilot studies. We will endeavor to work systematically through the seven topics identified for potential pilot studies, and these will each be introduced by a brief presentation.

The concluding session of the workshop, will discuss the way forward for the Partnership Programme during the three years of its implementation - summarising the immediate steps to act on the plans developed here - and looking forward to specific activities further down the track.

As you can see we have a very busy agenda, and consequently, I will finish this brief outline here, and open the floor for comments and questions on both the overall Partnership Programme and on the Workshop.

Thank you

INFORMATION AND ANALYSIS FOR SUSTAINABLE FOREST MANAGEMENT: LINKING NATIONAL AND INTERNATIONAL EFFORTS IN SOUTH AND SOUTHEAST ASIA

REGIONAL OVERVIEW ON STRENGTHENING NATIONAL FORESTRY INFORMATION SYSTEMS

MA QIANG, FORESTRY OFFICER (ECONOMETRICS),
FAO HEADQUARTERS, ROME

Current state for forestry information systems in South and Southeast Asia

The availability of forestry information in Asia varies from country to country and is highly correlated with a country's level of development. Even within any given country, the various components of the forestry information system are typically at different levels of development.

Despite the increasing awareness of the importance of information in planning for sustainable forestry development, most countries in Asia still do not have an adequate system of statistics pertaining to the forestry sector. The current information are below the requirements to support sustainable forest management and the available forestry data are often out-of-date and incomplete in terms of (a) the range of commodities covered (b) the range of variables or data sets covered, and (c) geographical coverage. Furthermore, even when data are available they are often difficult to access and their reliability is often questionable. The data is thus often ignored and not used in any meaningful way. e.g. in some countries, useful information on forest resources may exist but it is not readily available to national decision-makers or forest industries as they make strategic decisions regarding the forestry sector.

National forestry data come from many sources including censuses and surveys as well as from administrative records. As the different institutions involved are not always aware of each other's activities, there is often considerable duplication of effort and, in many cases, conflicting data are reported for the same items. When it comes to data relating to the depletion of land resources and their environmental effects the situation is worse. Finally, even when data relating to the forestry sector are generally available, it has seldom been recognised that the different data components often have different coverage and time frames thus requiring special processing, tabulations, adjustments, etc., prior to their usage in an integrated manner or for the purpose of a particular study or analysis.

Timely, easily available and accurate information on forest resources and their utilisation is a precondition for sustainable forest management (SFM) based on economically, environmentally and socially balanced forest policies. Therefore, a special effort on data collection in required to provide information on a national, regional and global scale. That information, together with other statistics can be used as indicators of sustainable forest management and provide information for opportunities for investments and adjustments in practices and policies.

Key constraints

Institutional arrangements

The national Forestry Statistics System typically suffers from a lack of clear identity and ownership. While National Statistics Offices (NSOs) are generally mandated with the responsibility for all official statistics, responsibility for forestry statistics is, in many instances, delegated to the Ministry of Forestry (MOF) which is often technically ill equipped to assume this responsibility. The establishment of appropriate and functional institutional arrangements in each participating country is considered a key element of the programme with well-defined linkages established between the NSOs and the MOFs as well as a clear delineation of responsibilities. The capacity to manage the system and the technical capacity to ensure the integrity and quality of the statistics produced, must both be ensured through the institutional arrangements.

Co-ordination

Forest censuses, surveys and other statistical inquiries are often undertaken in isolation and there is a general lack of understanding and co-ordination between statistical agencies producing the data (data producers) and offices undertaking economic analysis, planning and decision-making (data users). Co-ordination of activities is also essential both between the various producers of forestry statistics and also between the forestry statistics system, other sectoral statistical systems and within the overall national statistics system. This co-ordination is best achieved through the establishment of a 'high-level' steering group and technical working groups. Not only co-ordination among data producers, but also co-ordination between producers and users of statistics is an essential key to ensure the relevance and the sustainability of the forestry information system.

Data collection, validation and dissemination

Poor data integration from various sources and a lack of 'value added' through poor access and use of available data is another weak area of information. Some Asian countries suffer from poor data management characterised by poor data access, a multiplicity of data sources and conflicting data sets, a general lack of analysis and data use and difficulties in integrating data from different sources. The overall effect of this poor data management is that available data have little or no intrinsic value. On the other hand, for many of the countries of South Asia and Southeast Asia, a weak national institutional capacity to collect problem-oriented data, to analyse and to disseminate required information; lack of transparency and accessibility of collected and needed information; lack of tested procedures for collecting essential but missing data for sustainable forest management; and failure in forest policy (strategy) implementation.

Opportunities and challenges

New methodologies and technologies

Advantage should be taken of new methodologies and technologies. While much research has been carried out on developing new and appropriate methodologies for collecting forestry statistics, the results have rarely been put into practise. These research findings need to be consolidated and documented and practical manuals developed so that countries can use these new

methods for collecting forestry data. There have also been very rapid advances in technology associated with data collection, processing and dissemination and these new technologies should be introduced where considered appropriate and cost effective.

<u>Skills and human resources at regional level</u>

While the national skills and human resource base in a single country may be weak, a considerable skill and human resource base exists within the region. This regional resource base should be used to its full advantage through the promotion of technical co-operation and networking among participating countries and the sharing of experiences.

<u>New information areas</u>

Any national or international intervention in the forestry sector should be considered in the context of an agreed policy framework. The assessment of national forestry policies must be based on a sufficiently good database and analysis. The need for a database expanded beyond forest cover, production and trade to a broader base of information, has been assessed in connection with intergovernmental efforts to define the criteria and indicators of sustainable forest management. Examples include data on sustainable wood supply potentials, information on trees outside forests and plantation forests; more in-depth analysis of fuelwood consumption and production; non-wood forest products; and social contributions of forests.

Key strengthening processes in forestry information system

<u>Institutional strengthening</u>

Appropriate institutional arrangements will be set-up in support of the system of forestry statistics. Functions, duties and responsibilities will be defined at all levels of the system and linkages established. Coordinating mechanisms will be put in place. Skill levels will be enhanced to ensure adequate managerial and technical capacity exists to enable the system to operate efficiently.

<u>Data collection process</u>

An integrated data collection system is a key component of the Forestry Information System. Data collection exercises (surveys) should be integrated, to the extent possible, to enable the widest possible use of the data. Master sample frames, panel surveys and extended household surveys will all be considered. Appropriate methodologies will be developed to provide cost efficient and reliable data at various levels of disaggregation.

<u>Data processing process</u>

An efficient data processing system is an essential component of the forestry information system. In order to promote ownership of the data at the sub-national level, decentralized data capture, editing and validation will be encouraged where facilities and resources permit. Likewise vertical information flows will be designed as two-way with information flowing from the sub-national authorities to the national authorities and the processed data flowing back for use by the sub-national administrations for analysis and policy formulation.

Data storage and dissemination process

Data storage and dissemination are key factors in providing access to the data. Advantage will be taken of recent technological developments in data transmission, to the extent that facilities allow and resources are available. An optimal model is to establish a data bank (one-stop-centre) to provide a single source of forestry statistics and designed as a sectoral data bank within the larger national statistical information system. Focus will be placed on the widest possible dissemination of information within the country as well as establishing external data flows.

Data analysis and data use process

The use of the data is the point at which value is attached to the data. If the data is not used it has no value and should, therefore, not have been collected. In order to maximize the value of the data, emphasis will be placed on data analysis for a wide variety of purposes. As well as providing a direct input to decision making and a better understanding of development issues, the analysis of the data can be expected to highlight weaknesses in the present system and lead to improvements in the future systems thus creating a continuous analysis and improvement cycle.

Strategies on enhancing the forestry information system

Ideally, strategies will be based on a partnership approach between the various producers of forestry statistics, the producers and users of these statistics and between the national governments and the international community.

National systems of forestry statistics should be conceived within a comprehensive long-term development framework and adopt an integrated approach both within the sectoral statistical system and within the broader national statistical system to minimize duplication of effort and to maximise the usefulness (value) of the data.

Co-ordination is essential for a successful programme. Co-ordination should take place both between the statistical activities within the country and between the Government and, where applicable, the donor community supporting statistical development. Coordination between donors is also essential and external interventions should be conceived to support the established national statistical programme.

One useful means of promoting stronger national systems is to build regional networks among national statistical correspondents to increase the exchange of data and information management methods; this can be accomplished through meetings in conjunction with the regional workshops. During the workshops the participants can review the particular challenges faced in each country and to share experienced solutions to common problems. This is the approach that has brought us together today.

We trust you have found these overview thoughts of interest and look forward to hearing your own experiences in your national presentations on these issues.

INFORMATION AND ANALYSIS FOR SUSTAINABLE FOREST MANAGEMENT: LINKING NATIONAL AND INTERNATIONAL EFFORTS IN SOUTH AND SOUTHEAST ASIA

ESTABLISHING A NETWORK OF NATIONAL CORRESPONDENTS

MA QIANG, FORESTRY OFFICER (ECONOMETRICS),
FAO HEADQUARTERS, ROME

1.   *Network objective*

To increase the exchange of data and information management methods among national correspondents;
To work together on common issues among national correspondents.
To review, based on the critique, the findings and remarked of the national correspondents and other participants.
To review also the effectiveness and appropriateness of the workshops and re-orient, if needed the Programme objectives and tasks.

2.   *Network members*

National correspondents of Programme member countries.
Representatives of major regional forestry institutions.
Other interested parties.

3.   *Network co-ordinator*

Programme Co-ordinator (Thomas Enters)

4.   *Network Activities*

E-mail connection
Every network member has access to the Internet and has an e-mail address to enable connections among network members and Programme officers of FAO. This will be the main way of daily communications for implementing the Programme and its activities.

Web site on the Internet
Creation of a virtual site or home-page on the Internet for a limited time to allow all target countries and stakeholders to express their view and provide information on specific topics (electronic conferences and chat-lines); and to publish Programme outputs and to report Programme activities.

It is proposed that a Programme listserver be established to assist communications and to publicise Programme activities and progress.

Thematic studies
Multi-country workgroups could be established to share information and advice in relation to the major Programme work areas:
Wood supply potential
Trees outside forests
Land-use changes
Non-wood forest products
Woodfuels
Plantation forestry
Data systems
Policy reviews

Regional workshops/reviews
These are expected to be held to review the particular challenges faced in each country and to share experiences and solutions to common problems, as well as to develop methodologies and examine possible guidelines in regional or sub-regional level.

For example, regional workshops are planned for the latter phases of the Programme, to review and assess the availability, accuracy and completeness of current statistics; to examine the role of local institutions in collecting and providing forestry data; to examine possible guidelines for collecting data on land use changes and assessing wood production outside of the forests.

Training seminars/workshops
        Training seminars for key regional staff are proposed to provide exposure to the statistical tools, concepts and frameworks for sustainable forest management.

INFORMATION AND ANALYSIS FOR SUSTAINABLE FOREST MANAGEMENT: LINKING NATIONAL AND INTERNATIONAL EFFORTS IN SOUTH AND SOUTHEAST ASIA

FOREST RESOURCES AND LAND-USE CHANGE

SOREN DALSGAARD, ASSOCIATE PROFESSIONAL OFFICER,
FAO REGIONAL OFFICE FOR ASIA AND THE PACIFIC

Introduction

Forest resources and land-use change are at the center of all discussion on sustainable forest management. Without comprehensive information on the status, dynamics and responses of the forest ecosystem, it is impossible to evaluate management strategies, or to clearly identify and quantify changes in forest resources, including forest areas, and the composition and quality of forests. This is true not only at the local, operational level, but across broader expanses as well, since consequences of forest practices often extend beyond national boundaries and thus become global concerns.

Forestry information requirements are multi-dimensional and include parameters relevant to productive, environmental and socio-economic benefits from and in the forest. The challenge is to improve the management of forests by providing decision makers and stakeholders with the best possible, most relevant and cost-effective information for their purpose at the local, national and international levels.

The forest resource assessment

The heart of FAO efforts on collection of data on forest resources and land-use change affecting forests is the Forest Resources Assessment Programme. Its next report, the Global Forest Resources Assessment 2000 (FRA 2000), will review the state of the world's forests at the end of the millennium. The objective of FRA 2000 is to provide a source of information and knowledge on the world's forest resources. FRA 2000 is expected to stimulate discussion at all levels as well as decision-making on the management and protection of forests on a global scale.

FRA 2000 is divided into three main areas:
Assessment based on existing information: Based on existing forest inventory data, information on the extent and condition of forests is being compiled for the entire world. This compilation and analysis is carried out in close cooperation and consultation with concerned countries.
Remote Sensing Survey: In cooperation with regional institutions, FAO is applying satellite remote sensing to study changes in forest cover. By interpreting a multi-date global sample of about 10,000 satellite images, it will be possible to draw conclusions as to the type and degree of changes in the world's forest cover over the last two decades. These change studies will constitute the primary source of information on the rate of deforestation, forest fragmentation and land degradation. The studies will also provide an insight into the causes of forest loss.
Special studies: Various aspects of the interaction between people and forests are being studied and new global maps on forest cover ecological zones and deforestation risks are being produced.

Special studies on plantation forests, non-wood forest products, woodfuel, fellings and removals and other topics of particular interest will complement the quantitative surveys of forest cover and change processes, focusing on forestry issues that require immediate attention by the international community.

Linkages and commonalities between Forest Resources Assessment Programme and the EC-FAO Partnership Programme

The central commonality between the FRA Programme and the EC-FAO Partnership Programme is data. As the demands on forests and forest management increase, so too will the demands for data to support strategy development. Thus, the FRA Programme has evolved through the past 20 years, from discrete publications in 1980 and 1990, to an ongoing information programme in 2000. The next stage of FRA will be the undertaking of a World Forest Survey, which will utilise many of the components of the EC-FAO Partnership Programme. Thus, by endeavouring to improve data collection processes now, the Asian region will be one step ahead in meeting new data demands.

Example of a pilot study

One component of FRA 2000 is a survey of forest cover changes using satellite remote sensing. The survey is based on a pan-tropical sample of 117 Landsat TM images from three points in time during the period 1980-2000. The images are interpreted as to observable changes in the forest cover, and will provide objective estimates on a regional level. 30 of the sample units are located in Asia and 5 of these are located in Thailand.

I, along with several colleagues, undertook fieldwork to validate the Remote Sensing Survey (RSS) interpretations in a sample unit covering the mid-north of Thailand and part of Lao PDR. The fieldwork was carried out at 3 sites that had been pre-selected by FRA2000 HQ as sites where a vegetation change had been registered by the RSS. The fieldwork was executed in collaboration with the Royal Forest Department of Thailand (RFD) and the Regional Community Forestry Training Centre (RECOFTC). The key objectives of the fieldwork were:
to verify the satellite image interpretation on the ground;
to document the state and management of the forest, and other land, at each site, and to identify local socio-economic conditions affecting land management;
investigate the causes of recent changes and outlook for the future;
to provide an in-depth case study section to the report from the remote sensing survey.
The fieldwork also included developing and testing methodologies for future systematic field sampling.

Our major findings from the field survey were:
The interpretations of the RSS forest cover classes were not correct in all cases. It could, however, be confirmed that a change in the forest cover of all sites had occurred during the last 10 years. All three sites were under significant human influence. The sites were similar in that agriculture played a large role in the observed vegetation changes. At two sites the dominant agricultural practice was still shifting cultivation, while the other site hosted more permanent agricultural practices and had a more stable land use pattern.

Important factors affecting the management of the land were identified as: Tenure/user rights, level of official control and interference, access to agricultural inputs (physical and economic), ethnic/cultural aspects as well as topography and availability of forest products from other sources.

Pilot study options examining land-use change

The pilot study described above gives an excellent example of the type of forest land-use change pilot studies that are envisaged being carried out under the Partnership programme. A key aspect is that the study should enable the development of a methodology that can be used at the broader national or regional level. Already in the workshop there has been discussion on a range of potential pilot studies examining forest land-use change including subjects such as:
review of management regimes in tropical forests;
rapid appraisal techniques on forest degradation in tropical forests;
monitoring forest and woodland regeneration in South and Southeast Asia;
monitoring tropical forest ecosystem health and vitality; and
assessing forests for diminished biological components indicative of ecosystem degradation; and
systems for categorising forest land by its primary function (production/ protection forest).

In recalling these topics to mind, I will close this brief presentation and we will look forward to hearing your thoughts and ideas on pilot studies addressing land-use change.

Thank you

INFORMATION AND ANALYSIS FOR SUSTAINABLE FOREST MANAGEMENT:
LINKING NATIONAL AND INTERNATIONAL EFFORTS IN SOUTH AND SOUTHEAST
ASIA

TREES OUTSIDE FOREST RESOURCES: VALUATION AND THE EVALUATION OF TREE
RESOURCES OUTSIDE FORESTWITH SPECIAL REFERENCE TO SOUTH AND
SOUTHEAST ASIA

PREPARED BY
FAO CONSERVATION, RESEARCH AND EDUCATION SERVICE (FORC)
PRESENTED BY THOMAS ENTERS, FORESTRY SECTOR ANALYSIS SPECIALIST,
FAO REGIONAL OFFICE FOR ASIA AND THE PACIFIC

In the framework of its programme on trees-outside-forest (TOF)[2], the FAO Forestry Department
has been undertaking a series of activities to take stock of the knowledge on TOF assessment
issues. For example, in collaboration with the EC-project in ACP countries, the Forest Resource
Assessment (FRA) programme and the Conservation, Research and Education Service (FORC)
programme, a general study on the topic is being undertaken by *Institut de Recherche pour le
Développement* - IDR (ex-ORSTOM) (France); studies have also been initiated in 15 countries in
Africa[3], as well as 3 studies in Asia[4] and 7 studies in Latin America and Caribbean[5]. The studies
aim to improve our understanding of the resources, their classification, the limits and opportunities
of existing methodologies of assessment, and the actors involved in data collection and analysis.
Specifically, the studies look at:

related legal and/or technical definitions and terminology adopted in the countries;
the list of the principal resources and their importance according to their economic, social and
environmental functions;
data sources and quality;
assessment methodologies and parameters and their quality used; and
institutional responsibilities for the assessment of these resources and actors' involvement in data
analyses for sustainable land management planning.

A report on TOF is being prepared in collaboration with CIRAD-Forêt to be presented in the
framework of the Forest Resource Assessment 2000 Report (December 2000). The report will also
include 10 case studies of national experiences around the world, including India and Indonesia. A
source book (annotated bibliography) is also being prepared on the subject.

In the case of Asia, an example of TOF resource assessment in India is shown in Box 1. As for
most other studies, one important lesson learned is that the promotion of tree management on

---

[2] See Annex 1 for definitions
[3] Studies in Africa: Benin, Burundi, Chad, Côte d'Ivoire, Guinea, Mali, Mauritania, Mozambique, Niger, Nigeria,
Senegal, South Africa and Uganda (including some information on Djibouti, Eritrea, Ethiopia, Kenya, Somalia, Sudan,
Tanzania, Zimbabwe).
[4] Asia: Bangladesh, India, Sri Lanka.
[5] Latin America and Caribbean: Brazil, Colombia, Costa Rica, Guatemala, Haiti, Honduras and Peru.

farmland is strongly influenced by the agricultural sector. In general terms, the studies provide the qualitative information regarding the resource but overlook the information available in other institutions (e.g. agriculture, urban institutions).

Box 1

Survey of non-forest areas in India

The 1997 report on the state of forests in India devotes a section to non-forest areas. From 1991-92 the Forest Survey of India (FSI) took up inventory of trees growing outside conventional forest areas in the country. The main objective of the inventory is to assess the extent of plantations raised under various social forestry schemes by different agencies. The sampling design, field formats, data processing methodology have been developed at the FSI. Planted trees are classified in eight categories: Farm forestry, Village woodlot, Block plantation, Road, Pond, Rail and Canal side plantations and others. The inventory of the non-forest area of Haryana has been completed in 1997. The result reveal that farm forestry contributes about 41% of the total standing volume of wood in non forest areas in Haryana, followed by village woodlot (23%), Roadside plantations (13%) and Block plantations (11%).

Sampling Design – Non Forest Area: The sampling design adopted for this inventory is a two stage stratified sampling. Sampling unit in the first stage is a district and in the second stage a village. While taking up the survey of a state, optimum number of villages to be surveyed is determined on the basis of data obtained from a pilot survey. The number of villages to be inventoried in a district is decided according to proportional allocation. Trees standing n the selected villages are enumerated and measured by the field parties. Compilation and data processing is done district-wise.

Source: Ministry of Environment and Forests. 1997. State of Forests Report 1997. Dehra Dun, India, Forest Survey

The development of assessment and planning tools poses major methodological problems. It is necessary to develop, test and standardize a methodology (methodologies) that will be applicable on a broad scale and is relevant to diverse locations and countries. The methodologies should be:

able to provide a reasonable estimate of the stock, production and economic and other benefits from TOF and provide insights into changes;
cost-effective, adaptable and implementable with the limited human resources available; and widely applicable.

In Uganda and Zimbabwe, as well as in other pilot studies for the development of methodologies of assessment of TOF, the aim is to: i) prioritize the resources to be assessed according to the national issues; ii) develop and validate appropriate methodologies to assess these resources; and iii) assess the needs for institutional capacity building. The approach will build on a collaborative effort between forestry agencies and other concerned actors to take account of the different roles and responsibilities in sustainable forest management and a multifunctional agricultural and land management.

The pilot studies will provide an opportunity, as an initial step, to:
Identify and discuss with various stakeholders in particular policy makers the main economic, social and technical issues relevant to policy making and planning relating to cultivation, management and utilization of TOF resources;
Identify the data/information requirements to facilitate decision-making processes;
Undertake a detailed literature review relating to methodologies for data collection and analysis in relation to the information needs identified earlier;
Assess the relevance/application of the methodologies in the context of the national situation, especially taking into account the need for decentralised planning; and
Propose preliminary methodologies that are technically appropriate and operationally feasible to deal with the different issues identified earlier.

Another interesting issue is the valuation of TOF. Valuation methodologies need to support the development of options and demonstrate that integration of trees on farmlands can be economically viable. To achieve a better integration of TOF and to slow down or reverse the spread of the agricultural frontier (on forest lands), the end-users of the data (on forest and TOF) include managers, policy and decision makers concerned by other sectors (in particular, agricultural sector), as well as the users of TOF resources (e.g. farmers, herders, traders).

TOF are also found in urban and peri-urban environments. Due to population growth and rapid and uncontrolled urbanization in many parts of the developing world, the issue of urban development is likely to gain in importance over the next several years. Urban forestry can play an important role in meeting the needs of the urban population and in addressing the social and environmental urban problems. Planning, coordination, management and people's participation for an appropriate integration of tree-based systems into urban environments shall be addressed along with the issues of rural areas.

The planning, evaluation and monitoring process passes through several steps :
1)   identifying issues and setting priorities;
2)   assessment methodology development, test and validation;
3)   data gathering;
4)   data analysis and planning;
5)   providing options of best practices and supporting integration of trees for sustainable rural and urban development; and
6)   impact assessment and monitoring.

The GCP/RAP/173/EC project concentrates specifically on steps 1 and 2. I invite the teams and institutions involved in thematic/country studies on TOF, as well as pilot studies on methodology development, to encourage multi-sectoral collaboration to plan and monitor the process through an "integrated" advisory group. This should set the right conditions for the subsequent use of the data on TOF in support of our efforts in sustainable rural development in general, and sustainable forest management in particular.

TREES OUTSIDE FOREST: RELATED DEFINITION AND TERMINOLOGY
FAO definitions (Source: Kotka III, Finland, 1996, p. 107)

Class	Definition
Total area[1]	Total area (of country) , including area under inland water bodies, but excluding offshore territorial waters.
Forest	Land with tree crown cover (or equivalent stocking level) of more than 10 percent and area of more than 0.5 hectares (ha). The trees should be able to reach a minimum height of 5 meters (m) at maturity *in situ*. May consist <u>either</u> of closed forest formations where trees of various stories and undergrowth cover a high proportion of the ground; <u>or</u> open forest formations with a continuous vegetation cover in which tree crown cover exceeds 10 percent. Young natural stands and all plantations established for forestry purposes which have yet to reach a crown density of 10 percent or tree height of 5 m are included under forest, as are areas normally forming part of the forest area which are temporarily non stocked as a result of human intervention or natural causes but which are expected to revert to forest. <u>Includes:</u> forest nurseries and seed orchards that constitute an integral part of the forest; forest roads, cleared tracts, firebreaks and other small open areas; forest in national parks, nature reserves and other protected areas such as those of specific scientific, historical, cultural or spiritual interest; windbreaks and shelterbelts of trees with an area of more than 0.5 ha and width of more than 20 m; plantations primarily used for forestry purposes, including rubberwood plantations and cork oak stands. <u>Excludes:</u> Land predominantly used for agricultural practices
Other wooded land	Land either with a crown cover (or equivalent stocking level) of 5-10 percent of trees able to reach a height of 5 m at maturity *in situ*; or a crown cover (or equivalent stocking level) of more than 10 percent of trees not able to reach a height of 5 m at maturity *in situ* (e.g. dwarf or stunted trees) ; or with shrub or bush cover of more than 10 percent.
Other land	Land not classified as forest or other wooded land as defined above. Includes agricultural land, meadows and pastures, built-on areas, barren land, etc.
Inland water	Area occupied by major rivers, lakes and reservoirs.
Trees outside forest	Trees on land not defined as forest and other wooded land. Includes: Trees on land that fulfils the requirements of forest and other wooded land except that the area is less than 0.5 ha; trees able to reach a height of at least 5 m at maturity *in situ* where the stocking level is below 5 percent; trees not able to reach a height of 5 m at maturity *in situ* where the stocking level is below 20 percent; scattered trees in permanent meadows and pastures; permanent tree crops such as fruit trees and coconuts; trees in parks and gardens, around buildings and in lines along streets, roads, railways, rivers, streams and canals; (vii) trees in shelterbelts of less than 20 m width and 0.5 ha area.
Tree	A woody perennial with a single main stem, or in the case of coppice with several stems, having a more or less definite crown. <u>Includes:</u> bamboos, palms and other woody plants meeting the above criterion.

The left margin of the table (spanning the Forest, Other wooded land, Other land, and Inland water rows) reads vertically: *These classes sum up to Total Area*

Note: It will be necessary to examine carefully whether the above definitions provide sufficiently clear and workable distinctions (i) between forestland and other wooded land, and (ii) between forest and other wooded land and other land. Regarding (i), the main criteria are the percentage (more or less than 10%) of trees able to reach a height of at least 5 m at maturity in situ and an area (more or less than 0.5 ha). Whether the distinction in (ii) is clear depends on whether the term "trees outside forests" needs to be more precisely defined. In particular, it needs to be decided whether forest land and other wooded land of less than 0.5 ha should be excluded from forest and other wooded land, as is proposed here, as was the case in FRA(TZ)-90 (described as "small woodlots of less than 0.5 ha").

INFORMATION AND ANALYSIS FOR SUSTAINABLE FOREST MANAGEMENT:
LINKING NATIONAL AND INTERNATIONAL EFFORTS IN SOUTH AND SOUTHEAST
ASIA

WOOD ENERGY

CONRADO HERUELA, WOOD ENERGY PLANNING OFFICER,
REGIONAL WOOD ENERGY DEVELOPMENT PROGRAMME

Introduction

Wood energy (fuelwood and charcoal) is, and will remain, an important source of energy in South
and Southeast Asia. In most countries between 20 percent and 80 percent of energy demand is met
by wood. The use of woodfuels is still increasing, though not as fast as the use of fossil fuels. Most
woodfuel originates from non-forest land and is managed sustainably. The main uses are in the
domestic, commercial and industrial sectors. Applications can be traditional or modern, or an
intermediate type.

Although woodfuels are often considered 'non-commercial', they are widely traded. Particularly in
urban areas, where woodfuels are most relevant, markets for fuelwood and charcoal are thriving.
Many people, both in urban and rural areas, earn their main income from the woodfuel business.
This can involve growing, harvesting, processing, trading, transporting or retailing.

In most countries, although the percentage share in the total energy consumption decreasing (as
rate of consumption of fossil fuels increases faster), the absolute amount of woodfuels
consumption is increasing. Wood energy will remain to be an important energy source in most
countries of this region in foreseeable future.

Regional Wood Energy Development Programme in Asia (RWEDP)

The Regional Wood Energy Development Programme in Asia (RWEDP) aims to assist 16
developing countries in South and Southeast Asia in establishing and strengthening their
capabilities to:
assess wood energy situations;
plan wood energy development strategies; and
implement wood energy supply and utilization programmes.

The programme promotes the integration of wood energy in the planning and implementation of
national energy and forestry programs. It is implemented by the Food and Agriculture
Organization of the United Nations and funded by the Government of the Netherlands.

Types of case studies implemented by RWEDP

There are two types of studies involving data collection activities that RWEDP is currently
undertaking in our member countries:

Case Studies in Wood Energy Planning (studies in 8 districts with in member countries)
Woodfuels Flow Studies (studies in 5 districts in member countries)

These studies involved either or both primary and secondary data collection techniques. They are targeted to be completed this year.

Case studies in wood energy planning

The case studies in wood energy planning are designed to promote the incorporation of wood energy issues into overall energy planning activities at national, provincial and local levels. The case studies have the following key objectives:
generate actual experiences in wood energy planning activities in the country;
provide on-the-job training in wood energy planning;
develop local wood energy planning expertise; and
define follow-up activities to strengthen wood energy planning capabilities in the country.

The case studies have a primary focus on training and capacity building, but will also stress the need for increased data collection to support planning needs. The studies use the *Long Range Energy Alternative Planning (LEAP) model*, a computer-based planning model, as tool for analysis, projections and evaluation studies.

Woodfuels flow studies

Woodfuels flow refers to the processing, transport and marketing of commercial woodfuels. The amount of "commercial" woodfuels is still small compared to the volume that is "freely" collected and harvested for own-consumption. Nevertheless, the production, *flow* and use of commercial woodfuels can be significant enough to affect energy, forestry, agriculture, environment and macro-economic situations, policies and programs.

Supplying the woodfuels market has created a "woodfuels business" in and around many towns and cities. Generally, the operations start with the cutting or "harvesting" of wood and/or collection of wood from dead or fallen branches. The cut or harvested wood is then "processed". These may involve debarking, splitting, sizing and bundling of fuelwood, and/or *"thermochemical processing"* such as charcoal making. The products, pass through various types of traders as the woodfuels are transported, packaged, repackaged, and sold to final users. The series of activities from processing to transportation and the selling and buying of woodfuels - until it reaches the final users - constitute a *"woodfuels flow system"*.

Example of case study: woodfuels flow study: Dali City in Yunnan Province, China.

The woodfuels flow study examines the various elements of woodfuels flow starting from the harvesting, processing, transportation and marketing of woodfuels. It has a number of sub-components.
Retailer Study - This study examines traders retailing fuelwood and charcoal to final customers and conducts an *estimate* of the amount of woodfuels being traded. Information is collected on the

business operation and practices of the retailers such as acquisition of woodfuels, pricing and profit margins, sale patterns, number of workers and types of customers are collected.

Wholesaler Study - This study examines traders involved in the wholesale buying and selling of fuelwood and charcoal and conducts also an estimate of the volume of woodfuels being traded. The wholesalers study can be used to identify who are the transporters and large buyers/users of woodfuels. It can also be used to identify the woodfuels transporters, the locations of woodfuels supply areas and the means of woodfuels transportation.

Transporter Study - The study looks at traders who move woodfuels from production and processing areas (generally in rural areas) to urban markets and other commercial wood energy demand centers (like large industrial users). This study examines the woodfuels procurement methods and transportation means, and the general business operations and practices of transporters.

Producer Study - This study examines the operations and practices of woodfuels producers. Woodfuels producers grow and "harvest" trees, produced "bundled fuelwood", and process wood to produce charcoal.

Wood Resources Study - This study characterizes the areas from which commercial woodfuels are coming from. The areas can be classified into two types. The first is the "wood catchment area" – this refers to wood resource and tree production areas surrounding the urban center. The other type can wood resource areas can be described as "wood exporting areas". This are areas separated from the urban center and are in far off locations.

The Wood Flow Studies also incorporate energy consumption studies. The objective of these studies are to estimate the amount (range of values) of traded woodfuels consumed by each type of user, and to identify for what type of end-uses and type of woodfuels they are used. These studies include:

Household wood energy consumption;
Industries and enterprise wood energy consumption study; and
Informal sector wood energy consumption study.

Areas where studies might be usefully implemented

The types of case studies currently being implement by RWEDP are very similar to the types of pilot studies envisaged for the EC-FAO Partnership Programme. They generally incorporate strong elements of methodology development, data gathering, and national capacity building. An expected recommendation of the RWEDP studies is the need to strengthen primary data collection efforts for supply side data. Two particular efforts relate to calculating total biomass availability, and assessing the extent and role of trees outside forests. Thus, there may be good opportunities to link the efforts of the two programmes.

The workshop has already discussed a range of pilot study options for the woodfuels subject area. These include:

Investigating local sources of woodfuels;
Measuring the impact of woodfuels harvesting on forests and woodlands;
Measuring the impact of woodfuels harvesting on trees outside forests;
Surveying woodfuels burning efficiencies at local levels;
Estimating woodfuels consumption by types of end users;
Assessment of recovered and recycled wood available for fuel; and
Measuring the impact of woodfuels harvesting on protected areas and reserved forests.

This presentation has hopefully stimulated some other ideas and we look forward to discussing these.

Thank you

INFORMATION AND ANALYSIS FOR SUSTAINABLE FOREST MANAGEMENT:
LINKING NATIONAL AND INTERNATIONAL EFFORTS IN SOUTH AND SOUTHEAST
ASIA

FOREST PLANTATIONS

CHRIS BROWN, FORESTRY SECTOR OUTLOOK STUDIES SPECIALIST,
FAO REGIONAL OFFICE FOR ASIA AND THE PACIFIC

Over the past several years FAO has intensified its efforts to quantify the potential extent of future
wood supplies from forest plantations. Considerable effort has been applied to collating and
refining data on forest plantation areas, species, age-classes and yields. Nonetheless, the ideal of
global plantation woodflow modelling being done with real precision remains elusive.

There have been three principal efforts to collect forest plantation data, by FAO:
through the Forest Resource Assessment
through the Global Fibre Supply Model
through a specialised plantation study as part of the Global Forest Products Outlook Study

Plantations and the forest resource assessment

The assessment of the forest plantation resource is an integral component of the Global Forest
Resources Assessment 2000 Programme of the FAO. The FRA 2000 plans to produce a separate
volume on the forest plantations for the developing countries. With the start of this work on 23
August 1999, a standard format "output table" for presenting the plantation data of each country
was designed and later finalised. The main feature of the output table is breaking down of the total
plantation area by the main species/ species group, and breaking down of species area further by
purpose and ownership.

Despite the relative simplicity of the data sought, compiling a report for all developing countries
has been a mammoth effort.

Plantations and the Global Fibre Supply Model

The Global Fibre Supply Model (which will be described by the following presenter) also sought
plantation data as a means of estimating potential wood and fibre supplies. In the event, due to
data scarcity and difficulties in standardising data, only a very simple plantation model was built.

Plantations and the Global Forest Products Outlook Study

In addition to providing the modelling capability of the GFSM, FAO has also sought to conduct its
own more detailed studies to refine predictions of wood supply from global plantations. These
coalesced into the GFPOS Thematic study on plantations. At the centre of the GFPOS effort was
an attempt to construct representative national plantation age-class distributions. Efforts were also
made to improve species yield data, national mortality rates, and to make assessments of likely

species rotations in individual countries. The data gathered was used to model estimates of current plantation wood production as well as future rates based on new planting scenarios.

The following two graphs present some of the results of the data gathering and modelling.

Figure 1. Derived industrial plantation age-class structure by country - Asia 1995
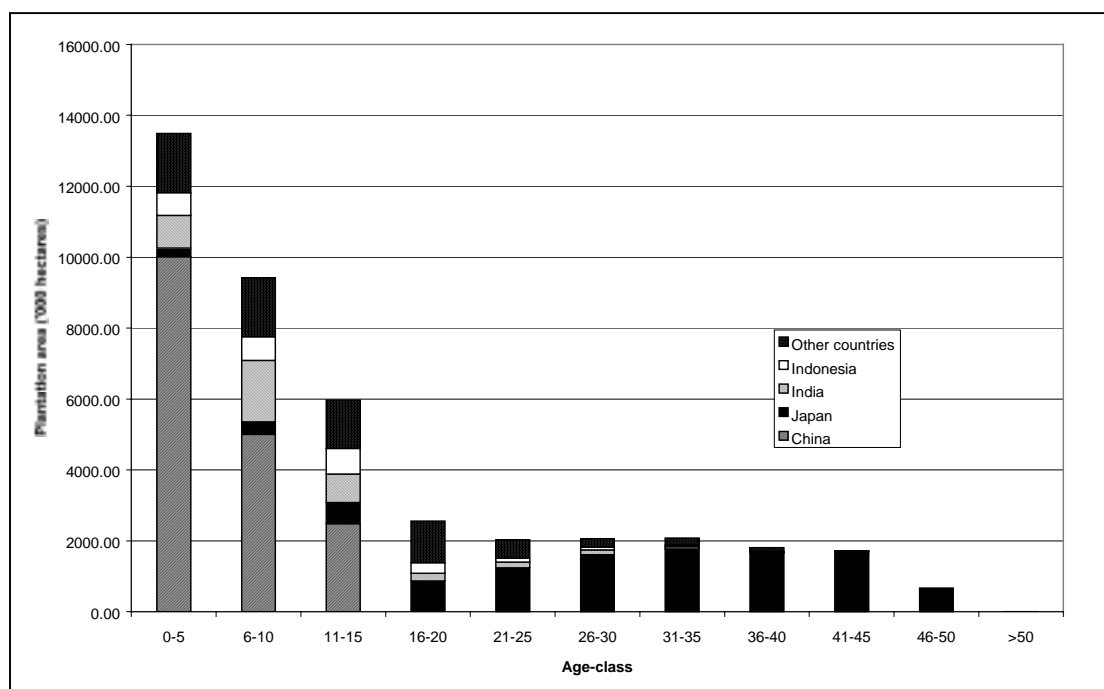
This first graph shows the derived age-class description for Asian plantations. An examination of the Figure shows that the majority of Asia's industrial plantations are aged less than 15 years. This is largely due to a very rapid acceleration in plantation establishment in China, and due to the short rotations generally used in that country. Japanese plantations predominate in the older age-classes.

The second graph shows an estimate of current industrial and non-industrial plantation harvests as a percentage of the total harvest of natural forest and plantation-grown industrial roundwood, fuelwood and total roundwood. A number of interesting features are evident from the graph. The "bottom-line" shows that current plantation production could[6] be supplying around 12 percent of the world's total roundwood harvest. The harvest from plantations designated "industrial" constitutes, however, a far greater proportion of reported industrial roundwood production, than does the proportion of non-industrial plantation relative to fuelwood production. Industrial plantations are estimated to contribute 22.2 percent of global industrial roundwood production, compared with non-industrial plantations' 4.4 percent share of fuelwood production.

---

[6] That is, the global plantation age-class structure under the assumed national harvesting profiles would yield 417 million cubic metres of plantation grown roundwood in 1995 (refer Appendix 2).

Figure 2. Estimated plantation wood supply as percent of total roundwood harvest - 1995
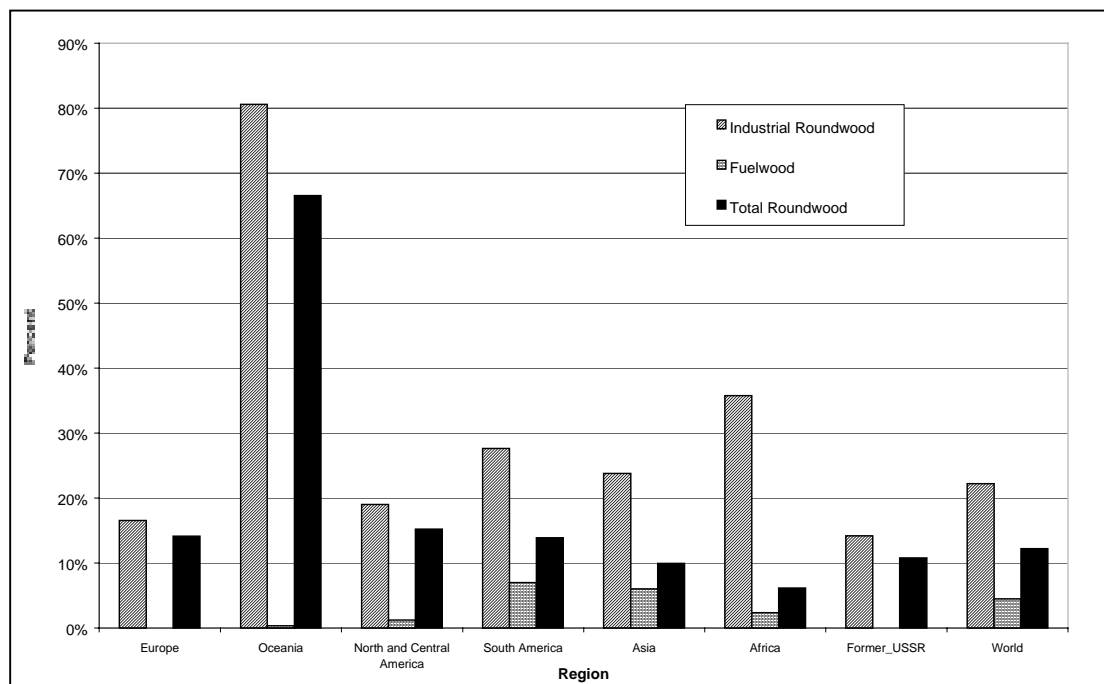
Plantation data weaknesses

The overall experience in each of these three exercises is that plantation data is weak in most countries. Very few countries carry out a separate plantation inventory, and often national data vary wildly across time. Little account is made for plantation mortality rates, and it is difficult to ascertain whether planting rates include areas of plantations that have already been harvested.

Pilot study options

There are many options for improving plantation data. The discussions we have had to date have thrown up a number of options for pilot studies, including:

Translating nursery production to new plantation establishment
Measuring mortality rates in forest plantations
Developing a rapid appraisal system for national plantation resources
Surveying management regimes in plantation forests
Predicting plantation forest wood flows
Measuring biological diversity in forest plantations

On this point I'll now hand back to the Chairman to open up discussions.

Thank you

INFORMATION AND ANALYSIS FOR SUSTAINABLE FOREST MANAGEMENT:
LINKING NATIONAL AND INTERNATIONAL EFFORTS IN SOUTH AND SOUTHEAST
ASIA

WOOD SUPPLY POTENTIAL

Ma Qiang, Forestry Officer (Econometrics),
FAO Headquarters, Rome

Introduction

Globally, the dominant trends for forest products are an increasing demand for wood (resulting
from increased populations and incomes) from a diminishing, or more restricted, forest supply
base. As forests are cleared, degraded, or withdrawn from production for conservation purposes or
other reasons, the burden placed on the remaining production forest increases commensurately.
Questions consequently arise as to the capacity of forests to continue to meet consumption
demands, and these can only be answered by increasingly detailed analyses of sources of supply.

The most important questions include:
How much wood will be available in the future?
What will be the impacts of sustainable forest management on wood supplies?
Where will future supplies of wood and fibre come from?

These challenging questions have important biological, economic, social, cultural and political
aspects. During the past 5 years, FAO has made significant efforts to address these issues and
begin to find answers to these questions. In all effort, they overwhelming constraint has been the
absence of national level data - in almost all countries. Despite the interest in future wood
supplies, information is scarce and forestry policymakers, particularly in the international sphere,
are forced to set policy in what is largely a quantitative vacuum. Not only is much of the basic
national forest inventory data (e.g. areas, species and growth increments) incomplete, inaccurate,
obsolete or otherwise unreliable in many countries, but many of the other key variables (e.g. the
impacts on roundwood production of intensified management regimes, and technological or
methodological improvements) remain unmeasured or unreported. In particular, information about
qualitative changes in forest resources remains highly elusive.

The Global Fibre Supply Model

In 1995, FAO initiated the Global Fibre Supply Model (GFSM) as a "first step" in more extensive
and ongoing efforts to address fibre supply issues, particularly through regional and global outlook
studies. The GFSM specifically endeavoured to provide some quantification of national and global
wood supply potential. By wood supply potential we mean, the overall amount of wood and fibre
that will be available to meet physical needs for wood products in the foreseeable future including
wood for fuel, pulp and paper and solid wood products such as sawn timber and panels. This is
normally done by developing scenarios of future annual wood production, making a variety of
assumptions about key factors.

Along with a simple forecasting model that allows these assumptions to be modeled, the GFSM study includes a compilation of the most recent forest inventory statistics as well as recovered and non-wood fibre data. The focus is primarily on the sources of industrial fibre as raw material for the sawmilling, wood-based panels, and pulp and paper industries. Thus, the GFSM provides a repository for available statistics on forest resources that are relevant to wood supply modeling, as well as providing a simple wood supply modeling capacity.

In more general terms, the GFSM contributes to forest policy development by highlighting and underscoring the pressing need for reliable data, information and analysis on industrial fibre sources and their utilization, which will in turn support efforts to achieve sustainable forest management. FAO's work with the GFSM produces a range of alternative futures to 2050, which show there is significant potential to increase global wood production. In Asia, the modeling suggest the most significant increases are likely to come from maturing plantation resources.

Asia-Pacific Forestry Sector Outlook Study

Developing estimates of wood supply potential in the Asian region was one of the tasks undertaken by the Asia-Pacific Forestry Sector Outlook Study. Once again, uncertainties and difficulties with data obscured the results. In general, the message emerging from analysis of APFSOS results is that *potentially* there will easily be sufficient fibre available in the Asia-Pacific region overall to meet demand in 2010. The Study stressed, however, that scenarios were based on estimates of *potential supply,* and it is virtually certain that the full extent of the potential supplies will not be obtainable in many countries.

The Study proposed a need to improve utilisation of residues from processing and harvesting and significantly develop collection and utilisation of recovered material (mainly wastepaper) in many countries. In addition, a number of factors of uncertainty were identified, that may undermine the conclusion that potential supplies of wood and fibre will be adequate:

considerable uncertainty exists about the sustainability of the harvesting intensities currently used in the region. There is a high probability that in the future effective wood harvests will be markedly lower than those used in compiling the supply estimates for this study;

significant uncertainty persists over the extent of plantation resources. Much of this doubt stems from data compilation methods that often fail to account for mortality rates or are incomplete with regard to age profiles and intended management regimes. Consequently, both plantation areas and stocking ratios may be significantly lower than official statistics indicate for a number of countries in the region;

accurate statistics on trees outside forests are almost non-existent. Since these resources play a crucial role in meeting the proportionately dominant woodfuel needs, there remains scope for major errors in estimating the ability of non-forest lands to satisfy demands.

Once again the absence of crucial data leaves it difficult to draw solid conclusions, and contributes to the difficulties policy-makers have in making good decisions regarding forests.

Global Forest Sector Outlook Study: the potential wood supply and possible future market developments

In the future, there are likely to be different sources of wood and other fibres for production. In most countries, there will probably be a general move away from the use of forest resources for wood and fibre production towards other land-based sources and non-land-based sources of supply. The greatest change will be the increased use of wood processing residues and recycled fibres in the product input mix. Such secondary sources will probably be increasingly used in the more developed parts of Asia, while the decline in forest resources may mean trees outside forests will play a more important role in some of the world's less developed regions.

Future supply patterns are also likely to change within forests. Large areas of commercial short-rotation plantations will come on stream in the Southern Hemisphere. These plantations will provide the largest share of expected future growth in forest production potential.

Larger areas of natural forest will probably be placed into legally protected areas.

FAO Study on efficacy of removing natural forests from timber production as a strategy for conserving forests

The seventeenth session Asia-Pacific Forestry Commission (APFC) requested FAO to implement a "Study of the Efficacy of Removing Natural Forests from Timber Production as a Strategy for Conserving Forests" with objectives to:
investigate past and current experiences of Asia-Pacific countries in removing natural forests from timber production as a strategy for conserving forests;
assess the policy, economic, environmental, and social implications of implementing logging bans and timber harvesting restrictions; and
identify conditions necessary for the successful implementation of logging bans or likely to enhance successful implementation.

National consultants from China, New Zealand, Philippines, Sri Lanka, Thailand and Viet Nam have carried out country case studies. These show that the experience of the countries of the region in implementing logging bans and harvesting restrictions has been mixed. While limited successful achievement of some natural forest conservation objectives is evident, disappointment and lack of effective protection continues widely within the region. Adverse economic and social consequences and impacts have occurred, further undermining the incentives for sustainable management, conservation and protection of non-timber values. Removal of natural forests from timber production has had significant impacts on the forest products sector (production, trade and consumption) and important and sometimes disruptive effects on neighbouring countries through both legal and illegal trade, timber smuggling, and market disruptions.

Pilot Study options examining wood supply potential

There are a broad range of pilot studies that might assist in improving information and data relating to future wood and fibre supplies. Pilot studies might focus on measuring simple growth capacities in either disturbed or undisturbed forests. For example, attempting to develop better growth and production models for particular forest types. They might also look at measuring

changes in forest production capacities in response to policy and regulatory change. For example, FAO has been implementing a major study in a handful of countries examining the efficacy of implementing logging bans, or other harvest restrictions, and studies might usefully follow up work in this area.

Other studies might focus on measuring the potential for improving roundwood recovery at harvest, or measuring harvest residues. Residues and waste at processing facilities might also be studied, as well as supply potential studies relating to plantations, trees outside forests, and non-forest tree species. Some of the possible pilot study topics we have already talked about include:
measuring harvesting residue volumes in tropical forests;
measuring residue volumes in forestry processing facilities;
utilisation and waste of wood processing residues;
deriving national conversion efficiency ratios for processing facilities;
estimating national wood processing capacities;
measuring harvesting intensities in tropical forests;
surveying land ownership of log sources;
estimating "unmeasured" household consumption of industrial logs and poles;
reconciling roundwood production with production of wood products;
a survey system for forest products price data;
surveying recycling systems (formal and informal) for forest products;
specific inventory type work in natural forests;
measuring various aspects that determine plantation wood production;
examining impacts of changes in the nature of wood supplies (log sizes and species); and
examining the impacts of new techniques, such as reduced impact logging, on wood supplies.

We have already developed a good range of proposed topics and we look forward to hearing your further suggestions and views on these.

Thank you

Country Paper on National Information and PLANNING PROCESS IN FORESTRY Sector in Bangladesh

A.Z.M. Shamsul Huda
Conservator of Forests
Forest Department
Ministry of Environment and Forest

INTRODUCTION

Bangladesh Forest Department is responsible for the management of 1.52 million hectares of forest area out of a total 2.52 million hectares. Forests and trees are the source of a number of essential products like timber, fuel-wood etc. The forestry activities contribute nearly 3 percent to the GDP. Moreover forests are important in protecting watersheds, in reclaiming land from the sea and in the protection of coastal areas from cyclone and tidal surge. Forests have important influence on the environment and can influence water availability in soil, reduce soil erosion, conserve wildlife, provide flood control etc. Keeping in view, the economic and ecological importance of forests, considering the depletion of forest under population pressure, and recognizing the land use and socio-economic constraints being faced, forest resource development planning trends has changed in Bangladesh.

Forestry planning is the responsibility of the Forest Department. This has been done in full consideration of, and with a view to supporting, the national goals of socio-economic development. The major objectives of forestry planning include conservation of natural forests and wildlife resources, establishment of large-scale forest plantations, promotion of people's participation in forestry activities and support to homestead forestry, efficient utilization of forest products to meet domestic needs, promotion of non-wood forest products for providing off-farm employment and income to the rural communities, provision of forestry extension services, and development of in-country capacity for forestry development in terms of skills and technology.

The planning capability of the Bangladesh Forest Department (FD) is not adequate and needs strengthening, through increase of manpower at the FD's Planning Cell and also improvement of the planning, monitoring and evaluation capability of the manpower employed for the purpose. Integrated and coordinated planning process is still at the infant stage. Further more revolution of information technology at the beginning of new millennium compelled all sectors to be oriented with computer networking, computer aided planning process. In this case forestry sector of Bangladesh is just at the doorstep.

BANGLADESH, 1: 3,000,000

BANGLADESH FOREST DIVISIONS

INDIA

INDIA

INDIA

BAY OF BENGAL

MYANMAR

LEGEND

— — International Boundary

Dhaka   Forest Division Boundary & Name

Dhaka   District Boundary & Name

     Forest Cover

0   50   100   150 Kilometers

Scale 1:3,000,000

Bangladesh Forest Department
RIMS/GIS Unit
March, 1999.

Prepared by: Rahul M., ACF.   RIMS/GIS Unit of Bangladesh Forest Department, Dhaka, March, 1999.

FOREST RESOURCES

In Bangladesh there are mainly three types of forests, namely, mangrove forest, inland sal forest, hill forests and village forest.

The mangrove forest originally covered a vast area of coastal Bangladesh. They account for at least half of the remaining area of natural forest of Bangladesh. Sundri (*Heritiera fomes*) is the characteristic species of the mangrove forest; among others gewa (*Excoecaria agallocha),* goran (*Ceriops decandra*) golpatta (*Nypa fruticans*), baen (*Avicennia officinalis*), *passur (Xylocarpus mekongensis*), kakra (*Bruguiera gymnorhiza*) and keora (*Sonneratia apetala)* are important mangrove species.

Inland sal (*Shorea robusta*) forests originally covered most of the lowlands and floodplains in the central and western parts of the country. This forest has been dramatically reduced in area and now exists only in a number of widely scattered and degraded patches. Mixed subtype is dominated by sal in the canopy, and includes many other associated species such *as Terminalia bellerica, Albizzia procera, Lagerstroemia flos-resinae*.

The hill forests consist of moist tropical evergreen and semievergreen forests, which extend from northeast to southeast of the country. Principal species are garjan (*Dipterocarpus* spp.), civit (Swintonia floribunda), kadam (*Anthocephalus chinensis*), pitali (*Trewia nudiflora*) and bandarhola (*Duabanga grandiflora*). Besides, bamboo is found in abundance throughout several of the Forest Reserves.

These forests consist of mixed fruits, fuelwood, shade and other multipurpose trees and bamboos in homesteads and villages throughout Bangladesh.

Large areas of forestland in Bangladesh will inevitably be converted to agricultural use in coming decades. Logging and cutting for fuelwood will continue.

INFORMATION SYSTEM IN THE FOREST DEPARTMENT

Information on resources status is most important aspect of its scientific management. Though the information system depends on the kind of resources and the objectives of management system. Forest resources today have been identified as one of the vulnerable and economically important resources. At the same time it is the prime ecosystem of the environment, degradation of which is considered as a threat to the existence of the earth. In case of tropical forest in particular today one can not think of forestry in isolation of the people or avoiding the issues relating to the environment. Only the poor people live in or near forests and are dependent for food, fodder, timber and income. Forests therefore, are the most important resources, and extremely important component of the environment and plays a vital role in the improvement of the socio-economic condition of the people.

Timely acquisition and management of data on resources is important for its sustainable management. Previously forest was managed for commercial purpose only. Social and Environmental aspects were given due importance. But one can not think of forestry in isolation of the people or avoiding the issues relating to the environment.

The growing importance of forestry demands quick appraisal of status, peoples socio-economic condition and the parameters responsible for the environmental degradation. To keep pace with the present modernization in the forest management technology, Forest Department has adopted a computer based Resources Information Management System (RIMS).

RIMS was introduced under a World Bank Project. The system produces reports relevant to all aspects of the management plan, silvicultural prescriptions and provides information on present and predicted yields from relevant operations. Thus this provides the basis for quantitative management planning and control. This is designed as an aid intensive forest resources management of a Forest Division through a management plan and also in perspective planning in forestry.

Thus the RIMS is a two-way information system. The raw data are supplied to the computer from the field divisions. The processed information containing activities including cutting, planning, tending operations etc. are sent back to the field Divisions from the RIMS Unit. After performing operations the data on new situation are fed to the computer for updating the data base through prescribed formats.

With the development in technology, data management and analysis for spatial information is possible through a Geographical Information System (GIS). GIS is a system of hardware and software which is designed of support the "Capture, management, manipulation, analysis, modulation and display of spatially referenced data" in order to solve complex planning and management problems. GIS provides the means to capture a certain area with all kinds of spatially related data for that area (e.g. data on forest types and growth, administration, demography, socio-economy, environment, infrastructures etc.) Once spatial and associated tabular data have been entered into the computer, it can be used as a tool for management purposes such as production of thematic maps, area calculation, visualization of different scenarios etc. At present the World Bank financed Forest Resources Management Project (FRMP) is supporting the development and integration of GIS with the existing RIMS.

It was mentioned earlier that RIMS database deals only with the stand related information based on mappable management units. The restriction with the RIMS database is that the link to the mappable units-normally forest sub-blocks-is not available in a suitable computerized form.

The combination of RIMS with a suitable GIS would provide the missing link between database and maps. The integration could enhance the capabilities as follows:

enhance mapping process and map products by inclusion of non-forest features like topography, infrastructure and administrative boundaries based on a consistent projection system.
allow up-to-date map presentation of current state of the forest.
enable simulation of different management scenarios and present them in map form.
allow inclusion of non-forest data, which is of importance for forest planning and management (e.g. thana-wise or village demographic data, socio-economic data, location and characteristics of consumers and markets for forest produce)
produce thematic maps on higher level (e.g. division level), which can serve as overview map for general decisions and forest policy,

provide means for a reporting system, suitable to keep records at FD HQ up-to-date in order to provide them with a decent data and map base for forest policy and forest management decisions.

REVIEW OF THE CURRENT AND PAST FOREST PLANNING PROCESS

PAST PLANNING PROCESS

Forestry planning process in Bangladesh is still traditional. Forestry is one of the major sub-sectors of agriculture in Bangladesh and is considered a revenue-earner. The Government has been devoted to the development of its forest resources by implementing many development projects through the Forest Department. These projects were carefully appraised and approved by several concerned authorities for implementation, which has caused delays in implementation. Approved development projects are included in the Annual Development Plan (ADP), which is again formulated as per target of Five Year Plan. The Fourth Five Year Plan (1990-95) is the last successfully completed planning document of Bangladesh. Right from independence to Fourth Five Year Plan a total of ninety-one development projects costing Tk. 5830.0 million have been implemented under forestry sub-sector.

SHORTFALL AND IMPLEMENTATION PROBLEMS: A REVIEW (1972-1997)

During the First Five Year Plan period and the follow up Two Year Approach Plan period the objectives and the strategies pursued were merely traditional ones. The development activities could hardly associate the people and little attention was given to the private sector, especially to improve the village wood lots, planting in marginal wastelands etc.

During the Second Five Year Plan Period the strategy was to maximize production through development of forest resources in government forest and to develop the homestead wood lot, particularly through fast growing species and fruit trees and also to develop strip plantations along roads, highways, railways, canals & embankment sides. The programme to stabilize newly accreted land in the coastal areas through afforestation with mangrove species gave new dimension of activities to the forestry sub-sector.

During the second plan great emphasis was laid on the development of rural or village forestry. During the Third Five Year Plan period emphasis was on conversion of the existing low-yielding into high yielding forests, afforestation of degraded and denuded forest lands and newly accreted lands in the coastal areas; replenishment of village forests by supplying seedlings for planting in the homestead as well as in marginal and coastal land.

During the Third Five Year Plan period the village forests were subjected to heavy exploitation to meet the growing demand and more so after imposing moratorium on felling of natural forest. The rural forestry programme during the plan period lagged much behind its target. In addition to all these depletion of the village groves were accelerated due to increased demand for varied construction works, after creation of upazilla system, at the upazilla headquarters.

During the Fourth Five Year Plan period the main emphasis was to expand forest and provide increased supply of timber and wood. Besides, qualitative improvement of natural forest through artificial regeneration was also given priority. During the Fourth Five Year Plan expansion of

forest resources and afforestation of the newly accreted lands continued. Major thrust was people's participation and private sector investment in the management and development of forest.

During 1995-97 the main objective of the forestry sub-sector was to expand forest resources, make the forests adequately productive, develop institutional capabilities including human resource and involve local people as much as possible in forestry activities. People oriented programmes covering forestry on marginal lands, char lands, roadsides, etc. got momentum during these years. Coastal afforestation programme was also carried out during this period in support of land reclamation.

Present Planning

The ongoing Fifth Five Year Plan (1997-2002) identified necessary short falls of the past planning process and incorporated new ideas for future development. Future planned activities have been discussed in this paper. Different development projects are formulated following present policy and target of the government. Already seven development projects have been implemented within this planned period and another nineteen development projects are under implementation. Out of these nineteen development projects sixteen are ongoing projects and three are new projects included within this fiscal year.

The Fifth Five Year Plan is more competent planning document of the government and formulated on the basis of past experiences and present need. Within this Fifth Five Year Plan linkage in and around level, growth and changes in forest resources, land use, allied sub-sectors, protected areas etc. are considered during planning.

Participation of Stakeholders in Planning

Participation of stakeholders in forest planning has now been practiced in Bangladesh. However it was absent in the past. Different workshops/seminars are being arranged in the divisional level to view the grass root level ideas and share local experiences in forest planning. People's participation through RRA has been practiced for forest planning. Leaders of the society, rural elites, NGO representatives and other stakeholders are invited to the workshop to have better participation in the forest planning process. Effort has been made to introduce different alternative means to have more participation of peoples from the grass root level in the present forest planning.

Forest Department has been implementing social forestry projects in which social survey for data collection has been made, benefit-sharing module has been developed and people's participation has been encouraged. NGOs are also associated in the forestry planning and implementation process. Forest Department also consults with allied agencies like BFIDC, Pulp and Paper industries, and Match Industries during its planning process.

In Bangladesh, at present most of the major projects are funded by donor agencies such as ADB and World Bank. It is a fact that the donor agencies are also important stakeholders. To get the fund release terms and condition imposed by them are to be followed in the planning of projects. Sometimes their conditions are so rigid and difficult to implement in our country. As a result the project suffers. The donors in many cases fund the project according to their own policy, which is contradictory for sustainable forest management.

PRIORITIZATION OF ALTERNATIVES FOR PLANNING

Earlier investment so far made in the forestry sub-sector and its management objective was to ensure higher revenue earning for the government. But this outlook has been changed. At present, the planning process considers various other issues such as environment, wildlife conservation, soil conservation, watershed management, biodiversity conservation, conservation of genetic resources, socio-economic improvement through people's participation, forest-based small-scale and wood-based large-scale industries, employment opportunities, women employment, rural development, poverty alleviation, ecotourism etc. The guiding factors for priority setting in forest planning alternatives are the National Forest Policy, national goals, international treaties and convention.

People's participation in tree growing and forest management has been the main theme of future forestry development in the country as tree growing and forest management can contribute to poverty alleviation. Community forestry and social forestry has been promoted by giving priority to poorer communities and peoples specially the poorer section and women employed on priority basis in nurseries, plantations, silvicultural practices and harvesting. Attentions has been given to the production of non-wood forest products and their processing specially bamboo, rattan, murta, medicinal and aromatic plants as these will generate employment opportunity in the rural areas.

Charland stabilization through afforestation will be continued which will also protect the property and human life in the hinterland against natural calamities. The stabilized charlands, where mangrove vegetation cannot be sustained any more will be planted with economically important species like coconut and other suitable upland tree species.

Farmlands especially in the northern districts will be managed through development of appropriate farming system by applying agroforestry technology. Tree crop combination in such farmlands can contribute towards economic growth of the concerned area and the people.

Denuded areas in the state owned forest including the scattered tree areas will be rehabilitated through afforestation of appropriate tree species especially with indigenous ones. Major thrust will be provided in the afforestation of denuded Unclassified State Forest (USF) areas in the greater district of Chittagong Hill Tracts through multiple approaches.

Plain land sal (*Shorea robusta*) forest areas will be managed and developed through participatory approaches. Economically viable, environmental friendly and sustainable modules will be developed and applied in this tract with people's participation. The specially designated protected areas and then existing core natural forest area will not be exploited rather will be managed for the conservation of gene pool and biodiversity.

Besides, credit facility will be provided to investor in establishing nursery and tree farming in privately owned lands as well as in state forestlands. Mass media will be utilized to lunch public awareness campaign in disseminating information on tree planting and management and also to disseminate information on the consequences of miss-management of forest resources and success stories of conservation and proper utilization.

The major objectives of the forestry sub-sector development considered during planning are to:
rehabilitate man and land through tree planting and thereby to increase the production system;
alleviate rural poverty through intensified afforestation in the village groves, marginal lands etc.;
intensify farm forestry and agroforestry activities in the northern parts of the country by adopting
suitable tree-crop combination;
reforest denuded and degraded state forest lands;
bring all vacant public and private lands under tree cover;
meet basic needs of all forest products by integrating trees with farming system;
improve environmental situation for supporting agricultural and other biological production;
develop the protection areas and the core natural forest areas as conservation areas to protect the
gene pool, wildlife and biodiversity;
create employment opportunities for the landless poor, marginal farmers and woman; and
have computer network and better database for good planning in the forestry sub-sector.

Use of remote sensing and GIS techniques in forest planning

Within Forest Department, Resources Information Management System (RIMS) was established
under the World Bank financed Second Forestry Project. Geographic Information System (GIS)
has also been developed under Forest Resources Management Project. Thus Forest Department has
been equipped with GIS and Remote Sensing in support of forest planning. Forest inventories are
conducted through remote sensing. All parts of forest area of Bangladesh are inventoried except
for Hill Districts and the database thus created is used for developing management plans and
information system. Remote sensing has now been utilized in forest planning. The aid of remote
sensing also helps in quick appraisal of situation, which facilitates to decide on the variability of
planning process. Remote sensing also gives repetitive coverage of the forestland through which
adjustments in planning can also be possible. GIS is a decision making tool which in combination
and also by integration can help to build up data base for the planning process and the data base
just started to be utilized in forestry planning process.

STRENGTH OF the current planning process

Currently we are using database for forest management on a pilot basis. But this support is not
adequate. Forest composition maps that are now available do not cover all forest areas of
Bangladesh. Use of remote sensing and GIS techniques in forest management, which ultimately
helps in forest planning, is also insufficient. Forest Department is also using computer but in a very
limited scale. Development of computer networking as a pilot programme is under way within
Forest Department. This networking is planned to be introduced in all the divisions of the Forest
Department. Thus forest-planning support will be enhanced in near future. Recently we have
developed a Resource Information Management System (RIMS), which is partly responsible for
the interpretation of remote sensing data and to develop the GIS. The cell that has already been
developed has a few forests cover maps, which have been prepared by using remote sensing and
GIS.

Weakness of the planning process

The planning process in bangladesh has not been modernized yet. The planning process is still weak and obsolete in many instances. The following issues are identified as the weaknesses in the planning process:
Inadequate database
Dearth of forest type map/forest composition map
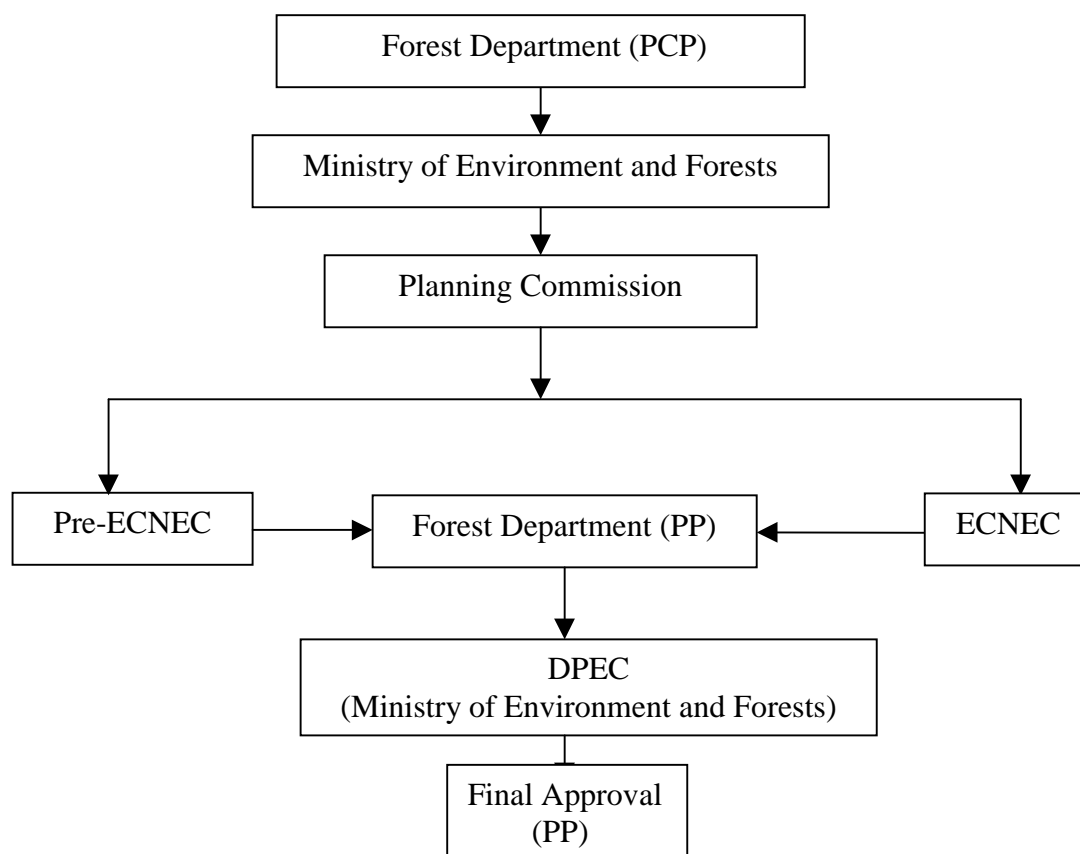Lack of computer use
Lack of skill manpower
Lack of EIA during planning
Lack of training facilities
Lack of interest in adopting the change

EXISTING FOREST PLANNING PROCESS

```
                    ┌─────────────────────────────┐
                    │   Forest Department (PCP)    │
                    └──────────────┬──────────────┘
                                   ▼
             ┌──────────────────────────────────────┐
             │  Ministry of Environment and Forests  │
             └──────────────────┬───────────────────┘
                                ▼
                 ┌──────────────────────────────┐
                 │     Planning Commission       │
                 └──────────────┬───────────────┘
                                ▼
   ┌──────────────┐      ┌──────────────────────┐      ┌───────────┐
   │  Pre-ECNEC   │─────▶│ Forest Department (PP)│◀─────│   ECNEC   │
   └──────────────┘      └──────────┬───────────┘      └───────────┘
                                    ▼
                  ┌──────────────────────────────────┐
                  │               DPEC                │
                  │ (Ministry of Environment and Forests) │
                  └──────────────┬───────────────────┘
                                 ▼
                        ┌──────────────────┐
                        │  Final Approval  │
                        │       (PP)       │
                        └──────────────────┘
```

Figure 1. Schematic Diagram of Forest Planning Process

PCP = Project Concept Paper
PP = Project Performa
DPEC = Departmental Project Evaluation Committee
ECNEC = Executive Committee for National Economic Council
NEED FOR A BETTER PLANNING PROCESS

Outside the Forest Department

Participation of stakeholder to view their idea through RPP/ Workshop
Development of forestry in consultation with other allied sectors like agriculture, wood based
industries such as BFIDC, Match industries, Pulp and paper industries etc.
Interactive or interchanged process may be developed.

Within the Forest Department

Database to be built up for forest stand at beat, range and division level. Since Bangladesh is a
highly populated country, per unit production need to be increased many times.
A proper database will help to draw a proper plan in order to integrate all the variables for higher
production. Forestry today is not only a revenue-earning source but it is also used for the
protection of gene pool and bio-diversity management.
To develop holistic plan quick appraisal and timely data collection is utmost necessary for a well-
accepted plan.

DEVELOPMENT OF REMOTE SENSING UNIT

Forest Department needs to develop a permanent remote sensing cell tagged with the central
forestry-planning unit.
A methodology or a process needs to be developed to acquire remote sensing data from abroad on
a regular basis.
At first a micro level data base need to be developed so that at the later stage remote sensing data
can be interpreted on the basis of that micro level information.
Forest Department does not have that sort of strength or mechanism to accommodate such kind of
planning process.

At present whatever may be the piece meal activities in the department those are developed under
different projects funded by International donors (ADB/WB). But for the continuity and
sustainability a permanent set-up is mandatory within the department with skilled manpower and
necessary computer hardware and software. A central monitoring and evaluation system along
with the planning is also lacking in the Forest Department. Implementation of the programmes
should be monitored and evaluated to judge the accomplishment, which can be a basis for the
future planning process.

RECOMMENDATIONS

Well-organized planning process is absolutely necessary which should be capable of organizing
sub-sectoral issues in the planning process addressing both for the stakeholders as well as the
department.
In the process of planning and plan implementation, emphasis need to be placed on inter-sectoral
co-ordination in view of the close linkages, between forestry and other sectors such as agriculture,
livestock, fishery, industries and energy.
Forest's role in environmental conservation and protection of biodiversity should receive serious
attention in the plans for forestry development.

A well-organized database is also necessary for forestry planning. Forest Department has its own database but in a limited scale. Database once developed should be updated on a regular basis. In this case RIMS should be given support to develop its own facility for collection and maintenance of its own database. Moreover the structure of database is different from one country to another. But nowadays a Global Forest Resource Management (GFRA) is conducted throughout the World to have a standard resources management system. FAO is responsible to develop a unilateral data base system for this region. So the individual country, which develops database, should be compatible with data structure developed in the FAO guideline.

A skilled manpower is needed to handle these database and for the conformity of the planning system. A devoted and permanent set-up is needed to be engaged with the central planning unit of the department.

Number of computers, currently under use, is inadequate to handle the total planning process of the department. Up-dated computer facilities along with the modem, Internet need to be procured for the efficient planning process. Integration and cooperation may be achieved if computerized net working could be developed.

For the maintenance of the computer and peripherals and also for the training of the personnel, the normal budget of the government is very scanty and not adequate in many instances.

Monitoring and evaluation should be equally strengthened with in the planning system.

INFORMATION AND ANALYSIS FOR SUSTAINABLE FOREST MANAGEMENT IN
BHUTAN

D.B. Dhittal
Head, Forest Resources Development Division
Department of Forestry Services
Bhutan

INTRODUCTION

Scientific management of forests started in Bhutan with the preparation of first forest management
plan in 1964. The first plan was prepared for Sarpang forest division. The duration of the plan was
for ten years (1964-65 to 1973-74).

One year later, a second working plan for Samtse forest division was prepared. These plans have
been prepared meticulously, as during those days, there were lot of difficulties in getting reliable
data. However, both the plans lacked, very much, in socio-economic information of the area. It
was very difficult to collect information. It was further aggravated by the difficult terrain and the
varying reliability of the information.

DURING THE SEVENTIES, THE DEPARTMENT OF FORESTRY SERVICES (DoFS) PREPARED
MANAGEMENT PLANS WITH THE TECHNICAL ASSISTANCE FROM UNDP/FAO PROJECTS. THE PLAN
PREPARED UNDER THE TECHNICAL ASSISTANCE OF THIS PROJECT WAS FOR CHIMAKOTI FOREST
MANAGEMENT UNIT. THE DURATION OF THE PLAN WAS FOR A PERIOD OF TEN YEARS (1976-77 TO
1985-86). THE FORMAT OF THE PLAN WAS VERY SIMPLE AND REDUCED. HOWEVER, SOME OF THE
REQUIRED INFORMATION WAS LACKING. THE PLAN ALSO DID NOT TAKE CARE ON THE SOCIAL ASPECT
FOR THE PEOPLE LIVING THERE. THE USUFRUCT ROLE OF THE FOREST, THE LOCAL PEOPLES'
DEPENDENCE ON THE NEARBY FOREST ETC. WERE NOT CONSIDERED.

Only from the beginning of the nineties, there was a slight shift in the management planning
system. More considerations were given to the social aspects besides the ecological and
economical aspects. Effort were made to collect reliable information from various stake holders
The prescriptions were drawn based on the forest functions, which were identified in the field and
mapped.

MANAGEMENT PLANNING

AS REQUIRED BY THE NATIONAL FOREST POLICY, THE AIM IS TO BRING THE GOVERNMENT RESERVED
FOREST OF THE COUNTRY UNDER EFFECTIVE AND SCIENTIFICALLY PREPARED FOREST MANAGEMENT
PLANS. TO ACHIEVE THIS REQUIREMENT, APPROVED FOREST MANAGEMENT PLANS ARE PRE-
REQUISITE FOR ANY COMMERCIAL HARVESTING OF FOREST PRODUCE. THEREFORE, THE FOREST
MANAGEMENT PLANS ARE PREPARED WITH PRIMARY OBJECTIVES OF ACHIEVING THE FOLLOWINGS:
conservation of the fragile environment of the country;
ensuring a sustainable supply of timber, fuelwood and animal grazing and non-timber forest
products for the local consumption; and

allocating sustainable forest products in excess of local needs to promote value-added forest based industries.

A number of important criteria have been developed to guide the development of these forest management plans in order to achieve the above mentioned objectives:

Managed forests should attempt to satisfy local requirements for timber, fuelwood, grazing, fodder, compost litter and other traditional uses as a first priority.

Forest will be managed for long term sustainable yield, with allowable harvest calculations based on a detailed forest inventory and scientific growth and yields studies.

Forest harvesting systems should ensure environmental protection by minimizing soil erosion and land degradation, protecting natural drainage systems and avoiding permanent changes in the composition of vegetative species.

Forest management should be holistic and should consider not only the production of forest commodities but also watershed protection, wildlife conservation, maintenance of biodiversity and social uses.

Silvicultural systems should ensure regeneration of the principal species by natural means and only if natural regeneration is not obtainable should artificial regeneration techniques be adopted.

INFORMATION FOR FOREST MANAGEMENT PLANNING

Collection of reliable data is an important tasks for preparing sound forest management plans. In Bhutan, the type, content and the detail of data gathered differ among the functional and territorial divisions of the Department of Forestry Services. Functional divisions like the Nature Conservation Division and Forest Resources Development Division mainly collect data to provide information for preparing management plans and also to provide statistics on forest resource status. Territorial Divisions and the Forest Protection and Utilization Division collect data on forest utilization and offense cases. The Forestry Development Corporation collects information on the resources availability and the market trend.

TYPES OF INFORMATION

Broadly, the following types of information are collected:

Information on forest Resources;

Information on socio-economic status of the people living in and around the forest management units; and

Information on the ecological condition of the forest.

INFORMATION ON FOREST RESOURCES

FOREST RESOURCES INVENTORY

Selection of the Area
The area to be inventoried is selected based on field survey. Economic, ecological and social criteria are considered while selecting the area for Forest Management Unit.

Data Collection
All possible data are collected in order to provide a sound base for decision making in management planning. The data collection is divided into three separate parts. Each part is described briefly below. The data are collected using the following formats:

Forest resources data using format (see annex);
Forest functions mapping within the management unit; and
Socio economic data using the format (see annex).
Each of the data collection methods and results are discussed separately in this paper.

Inventory Design

While designing the inventory, the following points are considered
the objectives of the inventory;
the accuracy desired;
the extent and nature of the area;
condition of the forests; and
costs.

The forest resources inventory has the following objectives:
to provide a relatively accurate overview of the growing stock and regeneration potential of the natural forest in the area, according to major forest types;
To give an overview of the general site characteristics of the natural forest, in terms of soils, non-tree vegetation and use by local people; and
to provide an indication of timber quality in the different forest types;
to furnish essential data on tree height to enable the construction of local volume tables for the main species.

Therefore in order to capture the above mentioned information, the field works are geared accordingly to collect the following information:
(i) species found in the area (ii) trees (iii) stand types (iv) volume per hectares (v) basal area per hectares (vi) periodic annual increment per hectare, (iii) site condition of the area.

The inventory is designed aiming at sampling error of ± 10% at confidence level of 95%. The number of sample plots are calculated using the formula given below:

$$n = (t^2 * CV^2) / SE\%^2.$$

Where,
n = number of sample plots required,
t = t distribution (at df = α, p= 0.05)
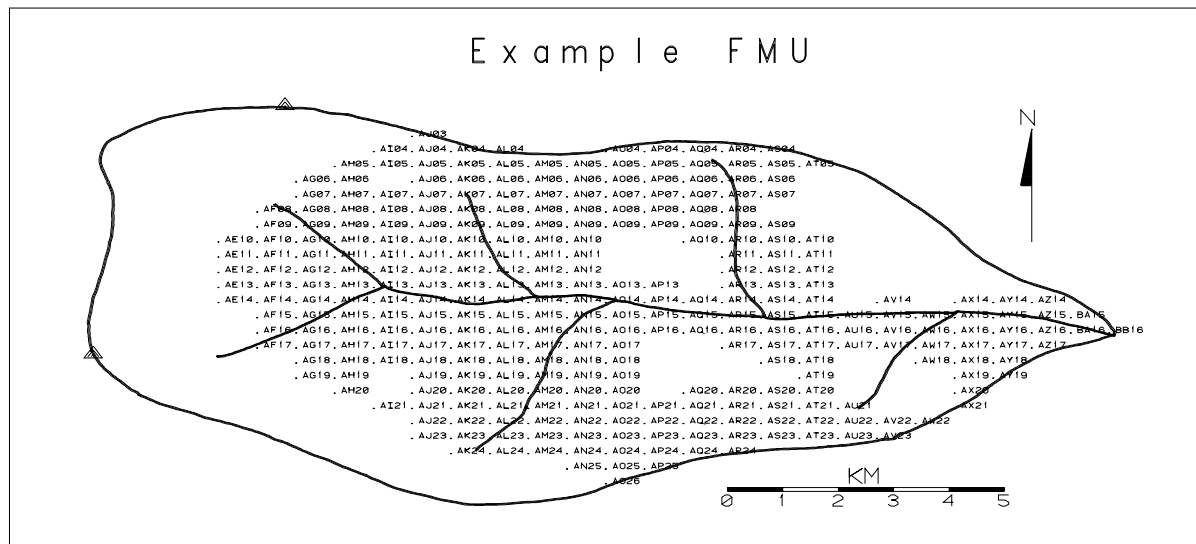CV = Coefficient of variation (The average value of coefficient of variation is taken to be 85%).
SE = Sampling error (SE % was taken to be 10%).

Location of Sample Plots

THE SAMPLE PLOTS ARE USUALLY LOCATED IN A NORTH-SOUTH DIRECTION. THIS IS TO FACILITATE EASINESS IN WORKING ESPECIALLY IN THE MOUNTAINOUS AREA. THE DETAIL IS SHOWN IN THE FOLLOWING FIGURE.

Sampling grid as generated by the GIS for the example FMU.

Sample plots that are actually to be measured, since they fall in land use categories defined as accessible natural forest.

DATA RECORDING ON SAMPLE PLOTS

The data, on each sample plot, are recorded on format. The details of each parameter are briefly given below:

Plot identification
Name of the inventory unit
Plot number
Any special observations
Altimeter reading
Land use type
Canopy height
Canopy closure
Accessibility

Site Characteristics
Aspect
Stand condition
Non-tree vegetation
Sign of commercial wood extraction
Sign of domestic wood extraction
Sign of grazing
Fire
Shifting cultivation etc. etc.

Soil
Stoniness cover
Depth litter + humus
Top soil colour
Top soil moisture
Top soil texture

Wildlife
Wildlife observation was done only in the major plots.
Identification of the different species of animals; or
Recording the evidence of a particular species based on the signs.

Regeneration
Regeneration is recorded on the regeneration plots only. Recording is done for 1.30 m height and up to 9 cm dbh. for the commercially valuable species.

SELECTION OF TREES FOR MEASUREMENT

After recording the general plot information as described in the above-mentioned paragraphs, and field verification that the plot is accessible and falling in the natural forest, the other data are collected from the measurement of live trees having a dbh of 10 cm. and more. The sample plot,

used in Bhutan is a combination of 3 overlapping circular sub-plots as shown in the following figure.
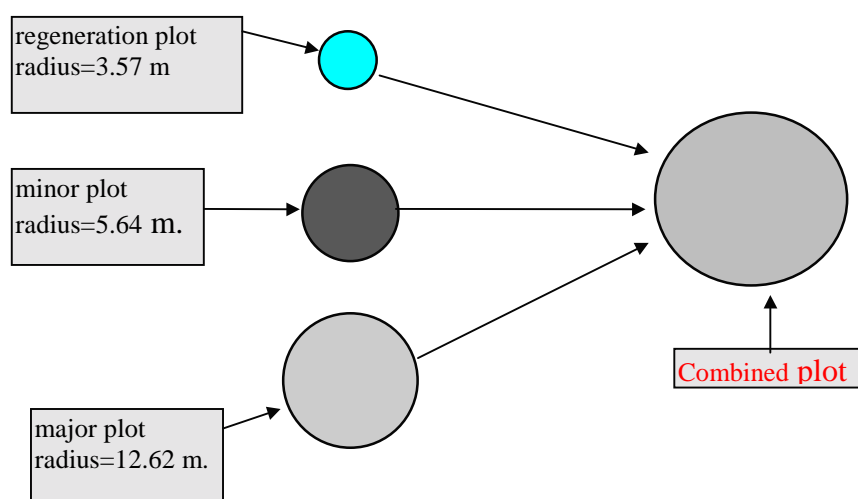
Size and shape of the sample plots

The specifications for the constituents concentric sub-plots (fig. above) of the sampling unit are given in the following table.

Sub-plot	radius(m)	area (m^2)	area (ha.)	dbh of 'in' trees
Regeneration	3.57	40	0.004	0-9, taller than 1.30 m.
Minor	5.64	100	0.01	10-29 cm.
Major	12.62	500	0.05	30$^+$ cm.

Specifications for the constituents concentric sub-plots of the sampling unit.

DIAMETER MEASUREMENT
Diameter at breast height (dbh) of all the sample trees are measured at 1.30 metres height from the ground level using the diameter tapes.

HEIGHT MEASUREMENT
Total tree height measurement is done only in the special plots. Every fourth plot is identified as a special plot. Tree height is measured using the clinometres and entered in the tally sheets.

Development of maps

Updating of the existing topographic maps is usually done for every Management Unit All the basic data, obtained from aerial photographs, are recorded in map of 1:50,000 scale. These data are, then, digitized using the computer technology known as geographic information system (GIS technology). The other required maps are produced using the software ARCINFO in GIS.

Analysis forest inventory

GIS		PLOT
Aerial photo Interpretation and Field thruthing		Forest Inventory
Map Transfer	Entry of photo Location	Data Entry Validation
Digitizing and creation of forest Stands		File of plots and trees
Stand files with areas and forest types	File for locating the plots in stands	
	Combination file created by spreadsheet	
	Quality control	Entry of strata to Plot
	Stratification plots and area for data	Calculations for trees and plots
		Calculation of final results

Chart 1 : Flow chart for calculation of inventory result.

Introduction:
Data compilation of the field inventory is one of the most important tasks for preparation of the management plan. The forest resources inventory data provide an idea of the quantity of timber available in the particular management unit. For analysing the result, a special computer program has been used known as <PLOT>. The following steps explain the procedure adopted for calculating the result after the data are collected from the field.

Data Entry:
After completing the field work, the data recorded in the tally sheet are entered into the computer using the input main menu option of <PLOT> system. The data from the tally sheets ends up in the database files, viz. PLOT.DBF, SITE.DBF, TREES.DBF, REGENER.DBF AND WILDLIFE.DBF. The databases for particular inventory are kept in a sub-directory of <PLOT> for future use. <PLOT> programme can checks for common errors during data entry, such as wrong codes as well.

Manual Data Correction:
As soon as data entry in the computers is completed, a hard copy is produced to check for and correct common errors.

Data Validation:
The errors that are difficult to detect manually, are detected by the computer during data validation process. These errors are then corrected and fixed accordingly.

Other information obtain through aerial photo interpretation is entered into GIS. The detail information of the photographs is then transfer in the base map of scale 1:50,000. Thereafter stand files with area information and forest types are prepared. After having done that, stratification is done with the help of these two sources of information, the calculation of result using <PLOT>program is done thereafter.

Model to Predict Tree Height, Bark Thickness and Wood Increment:
The total tree height is only measured on special sample plots, (i.e. every fourth plot) for the other plots, tree height is predicted from tree dbh by using a height-diameter function model. The objective is to obtain volume estimates for all the plots from tree diameter either measured or estimated tree height. The measurement of bark thickness and radial wood increment for conifers is obtained by measuring the bark thickness with a bark gauge and increment borer respectively.

The curve for predicting tree height, bark thickness, and radial wood increment from tree dbh. are fitted using regression. The calculation is done using statistical software called MINITAB[7]. The best fit is entered into the database in <PLOT> and calculation is done.

Volume Functions:
Volumes is calculated in <PLOT> using general and local volume equations which is available for the main tree species, and these are defined in the databases.

Preliminary Stratification and Calculation:
Based on the inventory design, and further experiences acquired during the field work, a set of preliminary strata will be defined, and each sample plot that are measured in production forest are allocated to one of these strata. After doing the above mentioned steps the results were calculated, with the help of computers.

NB. The Original Bhutan Country Report incorporates examples of a range of survey forms utilised to collect data on socio-economic forest functions and ecological condition of the forests.

INFORMATION GAPS FOR THE PREPARATION OF MANAGEMENT PLANS

Presently, the main constraint has been to obtain reliable forestry information and maps. This has become a bottleneck for the smooth implementation of this program. Some of the most pertinent information requirement vis-a-vis its gap are given below:

Forest land classification

---

[7] Statistical software.

Forestland classification is the first prescription element. This activity sets the stage and context of the activities and yield projection. It is here that we decide what we mean by heterogeneous and homogeneous forest, the individual forest types. The aspect, elevation, soil types, and drainage system are also decided.

Inadequate information on ecological and silvicultural characteristics of different forest types

One of the major issues confronting sustainable forest resources management is the inadequate knowledge on ecological and silvicultural characteristics of different forest types, which will prevail under different treatment conditions. In addition, very little is known about traditional use of forestland and alternatives to certain unscientific use such as forest grazing by cattle.

Further, adequate information on the stand dynamics would be required. Since the dynamics of the stands are based on ecological principles which have contributed to the nature of the stand, such as succession, competition, tolerance and the concept of zone of optimum, the information on these subjects would be essential for making correct silvicultural decision.

Inducing natural regeneration in fir stands and in broad-leaved forest has become very difficult. The nature does not seem to be responding to the silvicultural systems prescribed in these forest types. Even the mixed conifer stands are, sometimes, not responding properly.

Therefore, more work in this field is necessary. This work could also be done in collaboration with other concerned agencies of the Forestry Services Division.

General volume table not available

"Volume table is defined as a table showing for a given species the average contents of trees, logs or sawn timber for one or more given dimension". This dimension may be (i) dbh alone (ii) dbh and height or (iii) dbh, height and some measure of form or taper. The main objective of these tables is to estimate the volume of an average standing tree of known dimensions and also to estimate the volume of a given crop or marked trees in a given coupe. Forest Resources Development Section (FRDS) has prepared local volume tables for few conifer species. More work needs to be done in this field in collaboration with other concerned agencies, in future.

Information on growth and yield of main species

To have accurate estimation for forecasting future yield from a forest the growth and yield table, at least, for the main species is very necessary. This table gives the yield of stand on unit area basis. Since the yield from a forest depends on several factors such as its structure, growth pattern, density, the productive capacity of the site, etc., it is necessary to understand these factors properly.

"Yield table is a tabular statement which summarizes per unit area basis all the essential data relating to the development of a fully stocked and regularly thinned even-aged crop at periodic interval covering the greater part of its useful life".

Information on non-wood forest products

Information on non-wood forest products is very important and needs more attention.

Reliable information on recovery and conversion lacking

Reliable information on recovery and conversion needs to be developed to improve planning.

COUNTRY PRESENTATION ON INFORMATION AND ANALYSIS FOR SUSTAINABLE
FOREST MANAGEMENT IN CAMBODIA

Mr. Eang Savet,
Deputy Chief of Forest Management Office
Phnom Penh

FORESTRY IN CAMBODIA

Cambodia lies between latitudes 10° and 15° North and longitudes 102° and 108° East, covering an area of 181,535 square kilometers in the lower part of the Mekong Basin. The country shares borders with Thailand, Laos and Viet Nam. The total population of Cambodia was 11.43 million people in 1998, with a population growth rate of 2.4 percent per annum. Forests play a significant role in securing the livelihood of rural people. Although Cambodia has few mountainous areas, forests are essential for regulating the flow of water during the monsoon and dry seasons. In addition, forests are the economically most important renewable natural resource in terms of income generation for the private sector and the Government.

According to a 1997 survey based on satellite imagery, Cambodia was covered by 10.6 million hectares of forests (58 percent of the total land area). In comparison to 1970 inventory figures the country lost 2.6 million hectares or 14.4 percent of the forest cover within 30 years.

Major forest types are evergreen, semi-evergreen and deciduous dry dipterocarp forests. A special formation is the inundated freshwater forest surrounding Lake Tonle Sap. Not all forests are highly productive and the mean annual increment is estimated at around 0.5 cubic meters only. But as pointed out above, one of the main functions of forests lies in balancing the hydrological cycle under a monsoon climate and in providing a variety of social, cultural and environmental benefits for the 80 percent of people living in rural areas.

Protected areas comprise 3.3 million hectares of forests, about 18 percent of the total land area. This leaves an area of about 7.3 million hectares for production forestry. Concessions cover about 4.3 million hectares or 59 percent of the production forests. However, not all of them are presently operating. In principle, the preparation of master plans for concessions is the responsibility of the logging companies. These plans have to be approved by the Department of Forestry and Wildlife prior to commencement of harvesting operations. The Department of Forestry and Wildlife is also responsible for control of all forestry operations conducted by the concessionaires.

In view of the continued decline of the forest area, a reforestation program has been established since 1985. Up to 1999 the total areas planted amounted to 7,494 hectares, mostly with fast growing species, normally in the framework of tree planting on the occasion of National Arbor Day and Community events. Evidently, in view of annual forest losses through encroachment alone of over 100,000 ha, a reforestation rate of 500 ha/year is very unsatisfactory. Winning investors for large-scale planting may prove to be a better solution to our reforestation needs.

The total annual local consumption for fuel wood is estimated at about 6 million cubic meters while use for supply of domestic markets and round wood for domestic supply has been estimated at about 174,000 cubic meters.

Besides rice, which constitutes the main staple food in alimentation of the population, the products collected in the forest are playing a very important economic and social role. This predominantly involves making use of customary rights for those who live adjacent to forest areas. People collect non-wood products such as: rattan, bamboo, lianas, resins (especially from the dipterocarp species), honey, medical plants and bush meat etc., mostly in the forests in the North-Eastern part of the country. These products whose collection, use or sale is free under traditional user rights are particularly important in times of drought or failure of the rice harvest due to insect pests or flooding.

FORESTRY INFORMATION SYSTEMS

In Cambodia, forest information originates from the following two sources:

Forest Resource Information using data compiled by the Forest Cover Monitoring Project. These data are based on the interpretation of 1992/1993 and again 1996/1997 LANDSAT imagery (MRC/GTZ). Forest resources data are being processed at the central level in the GIS Unit of DFW (Department of Forestry and Wildlife) and disseminated to ministries, provinces and districts. They are accessible to projects under DFW and NGOs on request.

Forest Plantation information is being collected at the central level. The sources of information are provincial forestry offices that keep records on annual tree planting activities.

Wood supply and trade information is based on individual studies, but information is not collected systematically. Some secondary information is coming in through the Forest Crime Monitoring and Reporting project and some data on the domestic supply quota comes from concessionaires. This information is distributed to the Ministry of Agriculture, Forestry and Fisheries and to donors.

Fuel wood production and consumption is based on studies and estimates but the figures seem rather low. Only a small proportion of fuelwood and charcoal production is accurately assessed. The requests for fuelwood quantities submitted by each province to Department of Forestry and Wildlife form the basis for setting up local annual coupe harvesting.

Information on trees outside the forest is not collected.

Non-wood forest products information is based on studies, some information coming through the Forest Crime Monitoring and Reporting project and some information through workshops. This information is passed on to Ministry of Agriculture, Forestry and Fisheries and donors.

The GTZ "Sustainable Management of Natural Resources in the Lower Mekong Basin" project systematically collects all available information related to the point discussed above on community forestry and natural resources management and disseminates it via its Internet Website (http://Mekonginfo.Org), brochures and newsletters.

Stakeholders involved in data collection, analysis and dissemination of information are: Ministry of Agriculture, Forestry and Fisheries; Ministry of Environment; Ministry of Industry, Mine and Energy; Ministry of Economy and Finance; Ministry of Commerce; Council for Development of Cambodia; Council of Ministers; CARE, CONCERN, IUCN, WWF, CITES, World Bank, ADB, UNDP, UNCHR, FAO, ITTO, GTZ, EU, CARERE, JICA, AusAID, USAID, SIDA, DANIDA, DFID.

Weaknesses in the existing system of data collection and analysis in Cambodia are the lack of means, facilities or technical equipment to systematically inventory forestry information. Particularly, the forestry sector organization is not clear and suffers from a lack of expertise.

For improving collection and analysis of forestry information relevant to implementation of sustainable forest management, DFW will have to rely largely on international cooperation and support. Currently, the Royal Government of Cambodia makes considerable efforts in promoting forestry policy reform such as preparation of the new forestry law (restructuring of forestry organization). It is also planning a forest and wildlife research institute to be in charge of field investigations and collection and analysis of forest information to progress in implementing sustainable forest management.

Moreover, I would like request to FAO to support DFW as follows:

Provide new satellite images of 2000 to update the data set of forest resources of 1997;
Support the set-up of forest boundary demarcation;
Assist in strengthening human capacity in collection and analysis of forestry information; and
Set up a network among Asia Pacific Forestry Commission members for exchange of information and experience;

Finally, on behalf of the Department of Forestry and Wildlife of Cambodia and myself, I would like to express my appreciation and thanks to all those involved in organizing this workshop.

Flow Chart of Forest Information in Cambodia
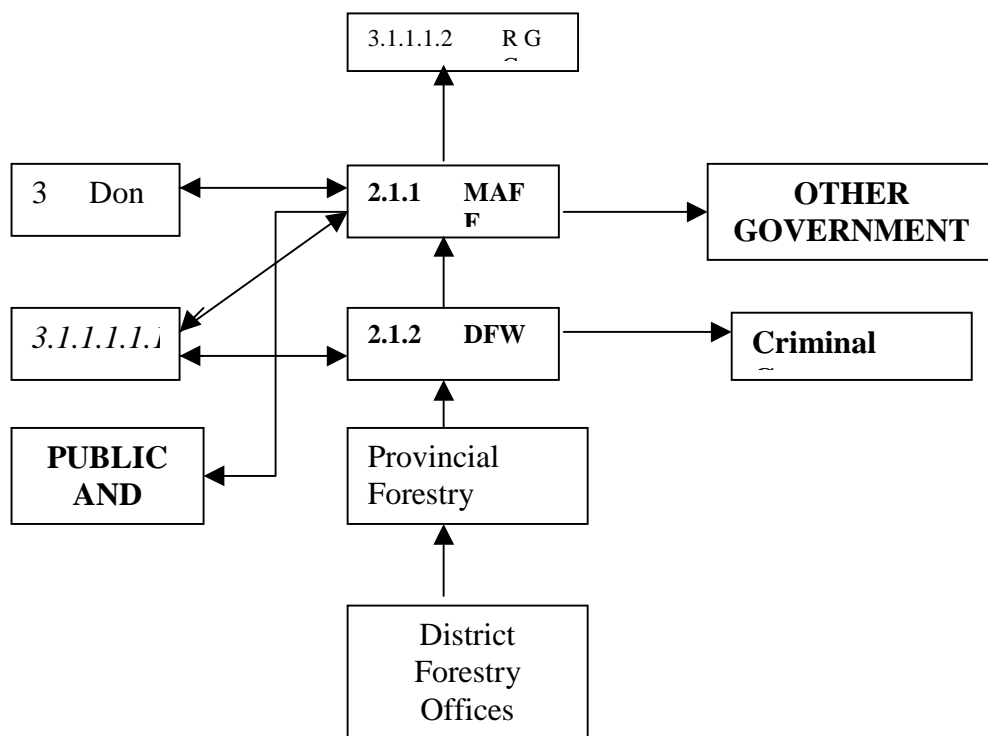
LAO PEOPLE'S DEMOCRATIC REPUBLIC COUNTRY REPORT ON INFORMATION PROCESSES AND PLANNING

SOMCHAY SANONTY
Deputy Head of Planning Division
Ministry of Agriculture and Forestry
Lao People's Democratic Republic

INTRODUCTION

The Lao People's Democratic Republic (Lao PDR.) is located in Southeast Asia, between latitudes 13'50" and 22'30" N, and longitudes 100'10" to 107'40" E. The country shares borders with China to the North, Myanmar to the Northwest, Thailand to the West, Cambodia to the South, and Viet Nam to the East. The total land area is 236,800 square km, the population in 1998 was estimated at 5.2 million with an annual growth rate of 2.76 percent. Population density is approximately 22 people per square km.

Elevation ranges from 80 meters, where the Mekong River leaves the country in the extreme South, to 2820 meters, the summit of Phobia Mountain in Xiangkhuang province. 79 percent of the country is regarded as mountainous area.

The climate is dominated by the monsoon, with distinct wet and dry seasons. Most rain falls during May to September, when the prevailing wind blow from south to west. Annual rainfall ranges from 1000 mm in the north to 300 mm in the South. The dry season begins from October to April, and is characterized by winds that blow from the Northeast.

The Mekong river flows through the country. It reaches Lao PDR from China in the Northwest, where the country also shares borders with Myanmar and Thailand. It enters Lao PDR eastward to Luang Prabang, then flows south to regions bordering Thailand, Viet Nam, and Cambodia.

FOREST RESOURCES

Lao PDR is considered to have a large area of land covered with natural forest, compared with most Southeast Asian countries. The natural forest plays a significant role in socio-economic development and needs proper management. Available data indicate that natural forest covers about 11 million hectares, around 47 percent of the total land area.

During the past 30 years there has been a significant decline in forest due to population pressures, and associated shifting cultivation, agricultural expansion and logging for commercial purposes. The Lao government is attempting to protect the remaining forest resources in order to maintain ecological balance.

Most of the forest is mixed deciduous forest, which covers 35 percent of the country. About 5 percent are Dipterocarp forest and 5 percent is dry evergreen forest. The remaining forest area is coniferous and mixed-coniferous forest.

The vegetation comprises various species of plants, ranging from small short-lived herbs to long-living trees. At low and medium altitudes (100-500 meters) species of Dipterocarp, have commercial value as hard wood. At higher elevations numerous medium size broad-leaved trees, are of commercial value as are tropical pines species and other important coniferous species such as *Araucaria cunninghamia*. Non-timber forest products also occur as a wide range of the species, including bamboos, rattans, cardamoms, benzoin, latex, bark resin, gum etc. The forests of the Lao PDR also harbour uncountable species of fauna including large mammals such as elephants, wild cows and buffalo.

The forest of the Lao PDR is broadly classified into four categories as follows:
Evergreen Forest   3,400,000 ha
Mixed deciduous Forest   5,680,000 ha
Deciduous Forest   1,600,000 ha
Other   480,000 ha
Total   11,160,000 ha

POLICY AND STRATEGY DEVELOPMENT

Sustainable forest management of the vast tropical forest resources in Lao PDR - through selective logging, establishment of forest plantations and attempts to stabilize shifting cultivation - is a cornerstone of Government policy. In 1989 the government of Lao has laid down a basic forest policy and guidelines as follows:
Biological resources of the present forest must be protected, by an approach emphasising people's participation.
Resource use values of the forests should be balanced with conservation.
Afforestation, production and forest management must be linked with food production, and encompass provisions for alternatives to shifting cultivation.
Increased forest cover, up to 70 percent of the total land area, by giving priority to annual regeneration systems.

To fulfil the strategy guidelines for the year 2000, Lao PDR developed a Tropical Forest Action Plan (TFAP) in 1990 and this was endorsed by the Lao government in 1991.

In 1994, the Ministry of Agriculture and Forestry (MAF)/Department of Forestry (DoF) formulated a strategy proposal for the forestry sector 1995-2000. In 1997 the DoF drafted a Vision 2020 in order to translate Government policy into strategies. The following priorities were outlined:
Development of viable alternatives to shifting cultivation and gradually decrease unsustainable upland farming.
Allocation of land to rural families and enterprises to encourage sustainable plantation development.
Survey the national forest resource and set up appropriate system for forest management.
Management of biodiversity and conservation areas and protection of priority watershed areas.
Development of an appropriate and competitive forest industry.
Strengthening human resource development.
Strengthening forest research strategies.

To achieve the goals of forest strategies and policy the Government of Lao has undertaken the following measures:
revised forest land use categories;
developed procedures for land and forest allocation;
developed procedures to stabilize shifting cultivation;
promote sustainable forest management and conservation; and
promotion of forest plantations. Targeted annual planting programme of 20,000 ha and the target to be achieved by the year 2020 is approximately 500,000 ha.

Legal Framework

To use the natural resource in a sustainable way, the government of Laos has issued many decrees, which relate to the utilization of natural resources. In 1996, the Forest Law was enacted by government. About 35,000 copies of the forest law have been published and over 15.000 copies have been distributed to ensure that the implementation of the law is successful.

The Department of Forestry has drafted various regulations and technical guidelines such as:
sustainable plantation development regulations;
conservation and wildlife management regulations;
village forest regulations;
C&I for sustainable forest management; and
Code of Practice development.

Shifting cultivation stabilization

The Lao government places high priority on reducing/stabilizing shifting cultivation in the country to protect forest resources and the environment. One of the 8 priorities of the government aims to protect natural resources and to increase living standards for rural people. There are many experimental activities on shifting cultivation stability, using many methods and supported by bilateral donors.

Forest land use planning and land allocation

The Lao PDR has large areas of agricultural and forest land. However, large areas have been degraded by slash and burn agriculture, forest fires and commercial logging. With a rapidly increasing population more land is needed for agricultural production. These days agriculture is limited to flat lands.

The Forest Law provides a clear definition of forests, which stipulates: *The Lao government determines which parcel of land will be designated as forestlands such as*:

Protection Forest

Protection forest is forest and forest land classified for protection of the watersheds and prevention of soil erosion. It is also includes areas of forest land significant for the national security, areas for protection against natural disasters, and for the protection of the environment, etc.

Conservation Forest
Conservation forest is forest and forest land classified for the purpose of protecting and conserving animal species, plant species, natural, and various other, features which have historical, cultural, tourism, environmental, educational, or scientific research, value.

Production Forest
Production forest is forest and forest land classified for the purpose of satisfying the requirements of natural, economic and social, development and of people's livelihoods. Production forest is designated to provide timber and other forest products on a sustainable basis and without significant negative environment impacts.

Regeneration Forest
Regeneration forest is a young fallow forest classified for the purpose of regeneration and maintenance so that it increases in maturity toward a state of natural equilibrium.

Degraded Forest land and Barren land
Degraded forest land is forest which has been heavily damaged including land without forest on it, or barren land designated to be reforested, or allocated to an individual or organization for tree planting, permanent agro-silvo-pastoral production or for other purpose in accordance with national economic development plans.

Recently, Land Use Planning and Land Allocation (LUP/LA) committees have been created at the national level and in all provinces and districts to supervise and co-ordinate the implementation of the LUP/LA programme, while the actual field work is carried out by trained agricultural and forestry staff from DoF. This unit has the overall responsibility for training and monitoring activities with regard to the LUP/LA programme.

In implementing land use planning practices, land for different purposes is being allocated to villagers, households or communities. Land allocation is a participatory process in which villagers make the allocation decisions. The demarcation of land unit boundaries prepared the process for its final phase – actual land allocation - land tenure certificates, for each participant, are to be issued by land allocation committees.

Although increasing activities in LUP/LU are carried out in the province and districts, very little information on the programme is available at central level, except for overall figures on land allocated to villagers and communities. All of the vast amounts of information and data gathered during the land-use planning process is only accessible to a limited number of people on sketch-maps and field notebooks and could easily be lost in the future.

Currently, the main projects/programmes supporting the land use planning and land allocation activities of the government are the Lao-Swedish Forestry Programme (LSFP) with sub-programmes in Sayaboury, Luang Prabang, Savannakhet and Saravane; and the Nam Ngum Watershed Management and Conservation Project supported by GTZ in Xiengkhouang. Both projects are involved in the conceptual development and model building of the national land use planning and land allocation programme.

RECENT STATE OF DATA COLLECTION AND DATA AVAILABLE

There is no forest information system yet in Lao PDR. Consequently, the quality of existing data on forest resources, production and consumption of various wood products, including industrial products is not uniform. Data collection is done by different organizations or projects to meet their own objectives. So valuable data are available from many different offices/projects as follows:

Forest Inventory and Planning Center (FIPC)
Valuable data on forest resources at national level is available for the whole country. Forest inventory activities carried out by the National Forest Inventory (NFI) sub-project. The Forest Inventory and Planning Center, previously called NOFIP, under National Agriculture and Forestry Research Institute (NAFRI) is responsible for implementation of the National Forest Inventory and manages all related databases. In preparation for selected land use planning exercises, local forest inventories and classifications have been carried out and this data is stored in digital form, such as GIS. Additional data on forest cover had been gathered and interpreted by NFI sub-programmes within FIPC and the working scale is 1:100,000. The focus of the work nevertheless lies on macro-scale forest inventories.

Forest Resource Conservation Division
Within the Forest Resource Conservation Division a small GIS unit has in the past mainly catered for needs in mapping and data management for watershed management projects, wildlife protection and biodiversity conservation e.g. in National Biodiversity Conservation areas.

Forest Management and Conservation Project (FOMACOP)
A village forestry model has been developed since 1996. This project will be finalized in September 2000. The village forestry model in FOMACOP is defined as a partnership between organized villages and the state for the sustainable management of designated forests. Conceptually it means the empowerment of villagers by strengthening their capacity and motivation and by giving them the authority to protect and manage forests and to benefit from their efforts. This village forestry system has been carried out in conservation forests, protection forests and production forests mainly emphasizing timber and non-timber forest products. The village forestry model will be promoted as a major system for sustainable forest management in Lao PDR. The activities of village forestry cover several aspects of rural development. While paying attention to the activities related to forest management, it is envisaged that village forestry in FOMACOP be considered to be "community forestry" on "village land" through fixed group participation.

Statistics and Planning Unit
A small statistics and planning unit working with both inadequately qualified staff and substandard technical equipment has recently been established. This unit, within the Planning Division of the DoF, mainly derives data from annual and quarter reports from provincial forest sectors and from data gathered by the GIS unit within FIPC. The amount of geographic data being handled is very limited and basically restricted to countywide overview maps.

The data management facilities in this case are used for a different purpose, which is mainly a compilation of statistical data to be made use of for reports and planning documents for political decision-makers.

Protection and conservation forest

National Biodiversity Conservation Areas (NBCAs)

In 1993 the Lao Government issued Prime Ministerial Decree No 164 proclaiming 20 NBCAs through out the country, totalling about 3.313.597 ha. Due to lack of fund to implement, not all of these have yet been completely surveyed to enable planning management.

Table 1. Current framework of donor support to the NBCA system of the Lao PDR

No.	Name	Area (in ha)	Supported by
1	Nam Phoui	191,000	Sida/IUCN through LSFP Phase IV
2	Nam Ha	69,000	WCS
3	Phou Dene Dinh	220,000	under consideration by EU
4	Phou Loei	*150,000*	RJCN/DANIDA WCS)
5	Nam ET	170,000	IUCN/DANIDA
6	Nam Xain	70,000	no support
7	Phou Khao Khoay	200,000	LSFP Phase IV /IUCN + ADB
8	Nam Kading	169,000	no support
9	Phou Hinboun (Limstone)	150,000	GEF/FOMACOP
10	Nakai Nam theun	323,000	GoUWB/IUCN
11	Hin Namno	82,000	WWF
12	Phou Phanang	70,000	Canada fund
13	Xe sap	133,000	FOMACOP
14	Phou Xang he	109,000	I,SFP Phase IV /IUCN
15	Xe Bang Nouan	150,000	LSFP Phase IV IIUCN
16	Phou Xiang Thong	120,000	The Netherlands/TUCN BCP
17	Dong Hua Sao	110,000	The Netherlands/IUCN BCP
18	Xe Piane	240,000	FOMACOP/GEF/FINIDA and DANIDA
19	Dong Ampham	200,000	Limited support from WWF
20	Dong Phouvieng	197,000	1 FOMACOP

Source:Department of Forestry

Wildlife conditions

Lao PDR has a high diversity of mammals, reptiles, birds and other vertebrate and invertebrate species, but very little information has been published or otherwise summmarised on the current status of individual species. Wildlife play very important roles as natural resources, which provide economic and biological values to humans.

Presently, wildlife populations in Lao PDR have declined due to hunting, habitat destruction by shifting cultivation, agriculture expansion, and resettlement. The government of Lao has tried hard to overcome this problem. Declaration of 20 NBCAs reflects the government of Lao effort in this regard.

Watershed management

ABOUT 79 PERCENT OF THE TOTAL AREA IN LAO PDR ARE MOUNTAINOUS AND most lao people are living on flat land along the riverside. About 80- 85 percent live in the countryside and are farmers. Therefore watershed protection and management are very familiar to them, by learning from experiences. The forestry sector cannot alone manage to achieve watershed goals. Recently the ministry of agriculture and forestry has developed an agriculture & forestry strategy, which highlights integrated upland farming systems.

Production forest

Although natural forest management requires a careful balancing of short term benefits (through logging mature trees) and long run sustainability (through investment in improving regeneration and tending), harvesting has become the primary consideration with regard to forest management in Lao PDR. There are no operational management plans and logging quotas for each province are worked out based on assumptions that are not adequately validated.

The wood-based industry is composed mainly around the sawmill industry. In 1996 there were 100 registered sawmills. Most of the mills are relatively small, average production capacity of about 3,000-4,000 m3 in terms of output. The total capacity of the sawmills is estimated at about 300,000-400,000 m3, but due to low capacity utilization rates the annual official production has been around 250,000 m3 during the mid 1990s.

There are two plywood mills with a combined capacity of 100,000 m3. There are no pulp and paper mills in Lao PDR. Downstream processing is still relatively limited comprising mainly parquet production for export and furniture manufacture for the domestic market. The number of parquet operations in 1996 is estimated at [no figure given - ed.] compared with about 25 in 1989. The number of wooden furniture manufacturers in 1996 is estimated [no figure given - ed.] compared with in 1989.

The volume of these operations has been estimated at 200,000-250,000 m3, which implies that annual production of sawn-wood would be about 500,000 m3 at present.

The key problems with regard to existing practices are shortages of material and human resources. Absence of appropriate technologies for logging and regeneration are the main problems with regard to production forest.

Non-wood forest products

Extraction of non-wood forest products is a relatively small-scale activity and commercial exploitation is limited to a few products such as pine resin, benzoin, stick lac, agarwood, cardamom, and some of the medicinal plants.

The main problems with regard to existing non-wood forest product management practices are: Harvesting and processing are very traditional and there has been no effort to refine the technologies and to enhance local value addition; No information is available on level of sustainable production and how output could be enhanced through augmenting and managing regeneration. While plantation type approach is feasible in the

case of certain species, information is particularly lacking with regard to multiple use management systems;
Market information, especially the final destination of the products, the prices in different markets, the margin extracted by intermediaries at different stages of transactions, etc. are not available.

Regeneration forest

Forest plantation
The government has strongly promoted reforestation and tree planting activities, with an aim to increase forest cover year by year. Presently forest cover is about 47 percent of land area, by the year 2005 forest cover is planned to be 51% (equating to 12,076,800 ha) and in the year 2010 is planned to reach up to 55% (13,024,000 ha). All tree planting activities are carried out by villagers, government, or private companies. June 1, each year is declared a National Tree Planting Day.

Table 2. Annual forest plantation development

Year	Area planted (ha)	Remarks
1975 -80	405	
1981- 85	1,384	
1996-89	1,257	
1990	716	
1991	1,359	
1992	901	
1993	2,219	
1994	3,798	
1995	8,828	
1996	11849	
1997	12290	
1998	9,030	
1999	6,353	
2000	20,000	Planned planting
Total	**81,025**	

The key problems are:
absence of information on the choice of species, especially site-species matching;
lack of standardization with regard to seed sources, seed technology, nursery and planting practices; and
inadequate data on growth rates of indigenous species and consequently difficulty in developing various management practices and determining their economic viability.

CONCLUSIONS

As mentioned above, a substantial amount data e.g. on forest resources has been compiled in FIPC and elsewhere on the macro-level for planning and monitoring purposes on provincial, national or basin-wide level.

What is presently missing is the storage and interpretation of data on land-use and natural resources management on local or micro-level. That is, at the community and possibly District level. Most of the information needed has already been gathered during participatory land use planning and land allocation exercises. This data needs to be dealt with differently from the macro-scale inventories and merits a specific unit entirely dedicated to the data management for the local level.

There are many projects that are linked to data collection at local level such as FOMACOP, FORCAP, NTFP project and others projects supported by different Donors, but all projects just develop the models, methodologies, techniques and etc. Now some projects have been evaluated, decisions and action need to be taken on models to be <u>implemented</u> in the near future.

So the major obstacles on the process of the planning and implementation in Lao PDR are:

There are many problems concerning forest survey (inventory), which provides basic information for forest management planning:
Numbers of forest surveyors, who are responsible for this field, are still very few, especially at district level.
No botanical specialists (Lao forest consists of many species, including a lot of unknown species).
Area condition is very bad (no accessible roads).
Forest condition is not uniform.
Field season is very short (field data collection can only be done in 4 or 5 months a year).

Problems concerning forest management planning are:
Knowledge of decision-makers in forest management plan is poor.
Volume increment per tree, per stand, or per forest, has not been researched.
Forest regulation is not completed yet.
The need of timber is very high, but natural forest has a low stand volume.

Problems on implementation of forest management plans are:
lack of funds especially private sector investment;
lack of experienced staff; and
lack of modern instruments.

COUNTRY PAPER: STATUS OF NATIONAL FORESTRY INFORMATION SYSTEM IN INDIA

Ram Prasad and C.S. Rathore
Director, and Assistant Professor Applied Computer Technology
Indian Institute of Forest Management
Bhopal, India

INTRODUCTION

The Indian National Forest Policy (NFP) of 1988, in its section 4.14 has highlighted a national concern on inadequacy of forest resource information and has emphasized on the need for information collection and dissemination. The relevant section in the NFP 1988, titled " Forest Survey and Database " states:

"Inadequacy of data regarding forest resources is a matter of concern because this creates a false sense of complacency. Priority needs to be accorded to completing the survey of forest resources in the country on scientific lines and to updating information. For this purpose, periodical collection, collation and publication of reliable data on relevant aspects of forest management needs to be improved with recourse to modern technology and equipment. "

The need and importance of a Forestry Information System (FIS) for the country has therefore been clearly mandated.

Reviewing the current state of collection, collation and dissemination of forestry information in India, it can be stated that the establishment of a National FIS can best be described to be in its infancy (Rathore, 1999). Although mandated in the NFP, a comprehensive and systematic mechanism for collection, collation, analysis and dissemination of forestry data at the national level is yet not available. In summary, the forestry sector in India is at a rudimentary stage in developing a holistic National Information System for handling forest data.

In the absence of a well defined centralized national forest information system, forestry information on different subjects is collected and disseminated by a number of agencies which fall in the following broad categories:

Ministry of Environment and Forests Government of India
Central Government Organizations
State Forest Departments
Academic Institutions
Non Governmental Organizations

The nature, method of collection, storage and dissemination of information by various organizations in the above categories is largely independent of each other and mostly uncoordinated.

A brief review of the current status of forestry information collection and dissemination by various organizations at the national level in india is given below:

Ministry of Environment and Forests, Government of India

The Ministry of Environment and Forests performs its primary information collection and dissemination activities through the **Environmental Information System, ENVIS**. As the name suggests, the subject range of ENVIS covers a wide gamut of environmental concerns. Data on subjects like forest resources, forest plantations, wood-supplies and trade, fuelwood production and consumption, NWFP and trees outside forest find limited representation in the current ambit of information activities of ENVIS.

ENVIS has its focal point at the Ministry of Environment and Forests in New Delhi. Basically, ENVIS has been visualized as a decentralized information system which has entrusted 25 existing organizations to collect, collate, store and disseminate information on specific subject areas. Of the 25 subject focussed ENVIS centers, *Forestry* is represented as a single subject by one node, which is located at the Forest Research Institute in Dehradun. In the ENVIS arrangement, anyone desirous of obtaining information on any aspect of forestry needs to write to the Forest Research Institute at Dehradun which would try to locate the desired information for the ENVIS user. The ENVIS Centre on "Forestry" at Forests Research Institute (FRI), has developed databases on various aspects of forestry and associated disciplines (MOEF, 2000).

Apart from the above, ENVIS is also designated as a national centre for the Sustainable Development Networking Programme (SDNP), a joint project of UNDP and IDRC, Canada which is currently providing information in sustainable development through its Internet website. ENVIS also acts as the National Focal Point (NFP) for INFOTERRA, a global environmental information network of the United Nations Environment Programme (UNEP).

It would be worth while to clarify that in its physical outlay, ENVIS is not a centrally administered interconnected computer network of environment and Forest databases. It's centers work independently storing information in ways that they individually deem fit and respond to user queries directly. Coverage of specific forestry data on specific forestry subjects in not extensive.

The **Environment and Forests Division** of the **National Informatics Centre**, New Delhi, provides wide-ranging and vital support to the Ministry in Dissemination of Information.

Ministry of Statistics and Programme Implementation (MSPI)

The Ministry of Statistics and Programme Implementation is a key agency in the country, which collects and disseminates official statistics on number of themes. The data so collected aids planning at a national scale. With reference to forestry information, two organizations within the MSPI provide major inputs. These are:

The Central Statistics Organization
The National Sample Survey Organization

The Central Statistics Organization CSO

The CSO has an Environmental Statistics Unit, which collects and disseminates environmental information. The Environment Statistics Unit, amongst other things, collects information on protection of forests, flora and fauna. Dissemination is through special reports on specific themes. In 1997, a Compendium of Environment Statistics was brought out by Central Statistical Organization. There is also an increased concentration of the department on generating data on Natural Resource Accounting. It is proposed to launch a pilot project on natural resource accounting in Goa. The CSO has close links with the Ministry of Environment and Forests but the periodicity of data update is not frequent.

The National Sample Survey Organization (NSSO)

The National Sample Survey Organization (NSSO), head quartered at Delhi, carries out socio-economic surveys, undertakes field work for the Annual Survey of Industries and follow-up surveys of Economic Census, sample checks on area enumeration and crop estimation surveys. The NSSO has a number of topic specific divisions of which the Agricultural Statistics Survey Division collects data on fodder and other forestry related issues like common property resources. It disseminates information through special reports. In 1998, at the culmination of its 54th round of national sampling, it published a report on survey of common property resources.

The organization has a substantial reach in its data collection at the National level. The National Sample Survey is a continuous process where surveys are conducted in repeatable rounds. Every round lasts 1 year. The frequency of update for a topic is usually 5 years for some topics while 10 years for some others. In every round of sampling, 10,000 sample villages and 5000 urban blocks are sampled covering around 120 to 150 thousand households. The NSSO produces data at a national level.

Central Government Organizations

Forest Survey of India

The Forest Survey of India (FSI) is an associated institution of the Ministry of Environment and Forests, Government of India entrusted with the objective of preparing the State of Forests report and national Vegetation Map for India every two years. The FSI prepares forest inventories and also carries out growing stock and volume assessments. Vegetation maps at district levels are generated by FSI. With reference to generation of primary forest cover and resources data, FSI is currently a key organization in India. The FSI has four regional offices one each in Shimla, Calcutta, Nagpur and Bangalore which, in addition to supporting vegetation mapping, also take up wood consumption studies for their respective regions (Figure 1). The Forest Survey of India at its Dehradun office also has a National Forest Data Management Centre which is engaged in Digital Image Analysis , cartography and developing Geographic (GIS) & Forestry Databases. The flow of information within the FSI and from FSI to the Government of India is summarized in Figure 2.
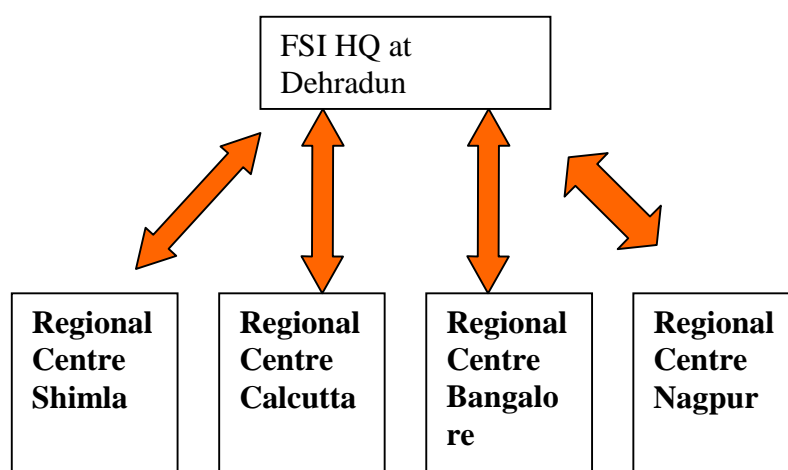
Figure 1. Organizational hierarchy of FSI
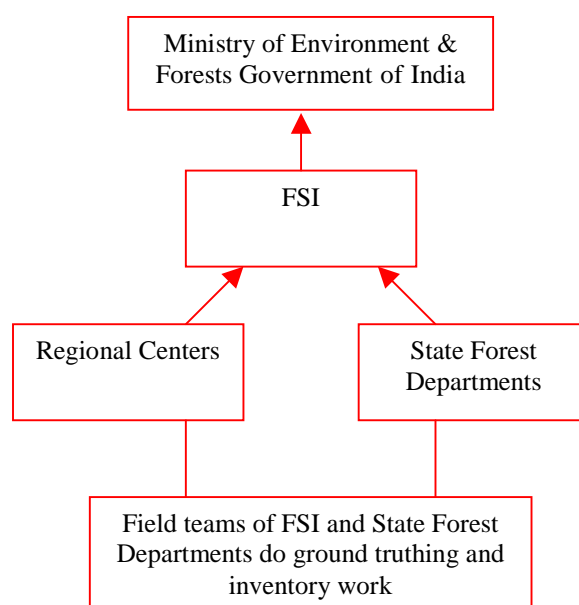
Figure 2. Flowchart showing FSI data flow

Indian Council of Forestry Research and Education (ICFRE)

The ICFRE is an autonomous institution of the MOEF located at Dehradun. The ICFRE collects and disseminates forestry information in some subject areas. Broadly, three constituent units of the ICFRE are engaged in forestry information collection and dissemination. These are:

Directorate of Statistics
Division of Resource Survey and Management
National Forest Library and Information Centre (*Library network under World Bank project*)

The above units at ICFRE depend directly on the state forest departments to supply them with information. There is no field verification of the information supplied by state FD's to ICFRE (Figure 3). In addition to this, there is no uniform system of collecting information from state FD's. Dissemination of collected information also does not have a wide reach.
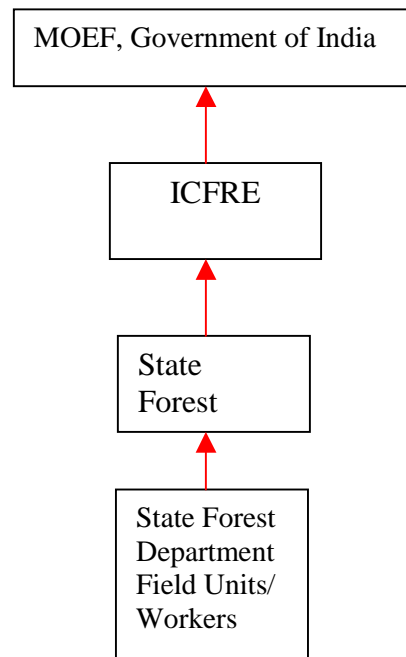
Figure 3. Flow of information to GOI from ICFRE

State Forest Departments

A number of state forest departments routinely collect, collate and disseminate forestry information. In most of the cases however, the information is not systematically collected and remains largely scattered within the state. Also in a large number of cases, information is not computerized and there are few databases that can provide information. Dissemination of such information is largely on request. The state forest departments of Andhra Pradesh , Madhya Pradesh , Maharashtra , Uttar Pradesh , Tamil Nadu , Karnataka and Gujrat have however taken steps in varying degrees to create computerized databases on forest resources (ITinFM, 2000). In some cases, there are plans to create thematic databases in the near future.

Forest working plans of forest divisions in various states have important information on a number of aspects. Some of the critical themes on which information is contained in the forest working plans are:

Extent of forest areas (by cover and type)
Timber and fuelwood yield per hectare MAI/CAI for major forest types.
Growing stock
General species occurrence - Flora and Fauna

The Minor Forest Produce Corporations and Forest Development corporations within each state also collect and disseminate forestry information on NWFPs and plantations although very little of this information is computerized or systematically collected.

Academic institutions

A few academic Institutions have also been involved in collecting and disseminating forestry information. The Indian Institute of Forest Management located at Bhopal is developing Internet based forestry resource pages. The focus of content on these pages is largely to provide an increased Indian content. The Indian Institute of Science, Bangalore, which is also an ENVIS centre, also has data on a large number of subjects. The Wildlife Institute of India (WII), which is again an institution of the Ministry of Environment and Forests, collects and disseminates forestry related information, although, in a large part, the major focus of WIIs activities centre around wildlife. The WII has developed a National database on protected areas.

It must however be mentioned that the choice of subjects, nature of information collected and the target audience for information is entirely in the purview of academic institutions. No formal mechanisms of information exchange or systematic and mutually agreed upon methods of information collection currently exist.

Non governmental organizations (NGOs)

A few NGOs in India are also collecting and disseminating forestry related information on selected subjects. Efforts of some important organizations in this direction are briefly highlighted below.

Foundation for Revitalization of Local Health Traditions (FRLHT)

FRLHT is an NGO based in Bangalore which largely concentrates on medicinal plants and revitalization of health using local traditions and practices. FRLHT routinely collects information about the medicinal plants and also runs a network of distributed databases, which involves a large number of other institutions working in this subject area. The network called INMEDPLAN (The Indian Medicinal Plants Distributed Databases Network) involves the following other Indian agencies:

Central Drug Research Institute (CDRI), Lucknow for Pharmacology;
Central Institute of Medicinal and Aromatic Plants (CIMAP), Lucknow for Agro- technology;
Regional Research Laboratory (RRL), Jammu for Phytochemistry;
Publication and Information Directorate (PID) New Delhi, for Bibliography & Abstracts;
Botanical Survey of India (BSI) Dehradun, for Taxonomy;
Centre for Indian Medical Heritage (CIMH), Coimbatore for Traditional medicine;
Tropical Botanical Garden and Research Institute (TBGRI), Trivandrum for Ethno-medicine; and
Ayurvedic Research Institute (ARI), Trivandrum for Pharmacognosy.

Society for Promotion of Wasteland Development (SPWD)

The SPWD is based at New Delhi. Its major focus has been the regeneration of wastelands. One of the primary forestry interface areas that SPWD concentrates on is Joint Forest Management or community forestry and people's participation. The SPWD collects and brings out information on various facets related to wasteland development through its publications. In terms of information collection and dissemination, it does not form part of any wider computerized information network and largely works independently.

The World Wide Fund for Nature India (WWF)

The WWF India has a centre called IGCMC, which deals exclusively with GIS and has computerized databases. The IGCMC has a digital forest cover database for India (all states), The topics or themes are mainly two - the boundaries of Protected Areas of India and forest cover classification. With reference to the source of forest cover data, the IGCMC uses FSI data for its databases.

Tata Energy Research Institute (TERI)

The Tata Energy Research Institute is located in Delhi and primarily deals with energy conservation and energy issues. With reference to forestry related information, it collects and maintains data on energy plantations for UP Hills, bio-diversity and joint forest management. TERI also has an environmental directory (TEDDY) which has information on forest resources and plantations.

Development Alternatives (DA)

Located in Delhi, DA collects information on NTFPs and NTFP enterprises as one of its interest areas. It also collects data on various aspects of Joint Forest Management in areas of its interest.

The National Tree Growers' Co-operative Federation (NTGCF)

NTGCF is a national level multi-state co-operative society based at Anand in Gujarat (HQ) which primarily provides technical and financial help to village level Tree Growers Cooperative Societies. It also works in the area of regenerating the village commons and private marginal lands through plantations. In its sphere and area of work, NTGCF maintains substantial information on status of plantations.

Centre for Science and Environment (CSE)

The Centre for Science and Environment is located in Delhi and has been closely associated with the environmental movement in India. The centre publishes the State of India's Environment and regularly gathers data on a variety of forestry issues, which include wood trade, fuel wood consumption, joint forest management and many others.

There are many other NGOs working on similar themes and have data related to forestry subjects. The review of NGOs in this paper may therefore be treated as representative and not comprehensive.

SYNOPSIS

The above brief review has attempted to provide a current scenario of major national organizations in India engaged in collection and dissemination of forestry information. With reference to this review of the status of forestry information collection in India, a few points become apparent:

Forestry information is scattered and is with many organizations.
There are no standardized procedures for information collection or exchange.
There is no integrative container mechanism to assimilate and integrate the totality of information generated by various agencies.
There are no systematic and periodic checks to verify the quality and authenticity of information generated.
The information collection by a multitude of organizations, in the absence of central integration, is leading to a lack of focus on the objectives of information collection.
Users of information are not clearly known and there are no formal mechanisms to provide forestry information to guide national policy or for developing plans.
There are numerous important aspects of forestry like forest fires, unrecorded removal of timber etc. on which there is no available information.
Mechanisms of dissemination are extremely poor and in a large part manual through reports which reach a very limited audience.
There is a severe lack of systematic computerization of information.
There is a lack of computer connectivity between forestry organizations.
There is no single point forestry data access facility
There is poor communication between users and producers of information

It also needs to be emphasized that currently, there is hardly any credible national level information available on many very important aspects of forestry. The Sustainable Forest Management process for example, with its emphasis on Criteria and Indicators, is relatively new to the Indian forestry sector (IIFM 2000). In order to initiate and implement SFM programmes, a large quantum of information on specific aspects of forestry is required. Some such areas where information does not exist but which would be critical for SFM programmes are listed below (Prasad *et al.* 1999)

Area, location and percent of forest land having erosion hazard.
Area and percent of forestland with diminished or improved biological, chemical and physical components.
Stream flow deviations in forest areas from the past.
Employment from the forest
Inventory of NWFPs in terms of diversity and yield
Annual removal of NWFPs compared to sustainable yield
Value and volume of wood and non wood products
Recreation and tourism
Economic valuation of goods and services
Harvested area of old growth forests effectively regenerated
Status of forest flora in terms of threatened, rare, vulnerable, endangered or extinct.

Lack of such information can severely impact SFM initiatives in India.

In the above scenario therefore, there is an urgent need to establish a National Level Facility dedicated solely for collection, collation and dissemination of Forestry Information in India. Such a facility would be essential to overcome the above lacunae of the existing information collection scenario. The proposed facility will fulfill the following primary objectives:

create a systematic focus for information collection and integrate various sources of existing information through a seamless network;
provide a much-needed, single point, forestry information interface;
create a computer network between data collection organizations;
standardize procedures and formats for data collection; and
analyze and regularly disseminate information to policy makers, planners, practitioners, training institutions and the public.

The establishment of such a national facility will help focus information gathering efforts towards specific objectives like sustainable forest management.

The Indian Institute of Forest Management, being an autonomous Institution of the Ministry of Environment and Forests can be a possible host to such a National Forest Data Centre. As an educational institution having a wide subject mandate, IIFM can be ideal to cover and integrate a wide range of forestry information topics under the forest management canvas.

The proposed information system, which will center around the Internet as the connecting medium, can be implemented in two phases. Phase 1 can visualize a 'quick set up' segment which would essentially involve creation of a subject list, evolution of formats and procedures and seek information from forest departments and other agencies and put them on Forest Data Centre computers in the form of hypertext pages and online databases.
This phase can also attempt to link many forestry sites in the country (and globally) that already have Internet connectivity and agree to join the information network.. Phase 1 can also envisage providing data on areas of interest on Compact Disks to various institutions in the country where there is poor Internet connectivity.
Phase 2 could involve providing technical, equipment and training assistance to participating forest departments and institutions in India such that they can themselves regulate and manage information from their respective web sites while still being part of the National Data Center Network.   Essentially this phase will be a technology transfer phase where data management capacities will be built at participating institutions in India. Information of common and national interest will reside on Data Center Computers while other information pertaining to state FD's would be established at state FD HQ's. A schematic outlay of the nature of connectivity that the proposed National Forest Data Centre can provide is shown in figure 4.
As Internet connectivity in India is growing rapidly, the NFDC proposes to fundamentally exploit the Internet as a connecting mechanism for various partner institutions. As the system can visualize it to be net based and not proposes to use any proprietary connectivity mechanisms between partners, information dissemination can have a very wide reach. It can also ensure easy and instant availability of information to users.

To summarize the current scenario, it can be said that at present, forestry information collection and dissemination in India lacks a national integrative perspective. There are no common formats for information exchange between institutions and no established mechanisms for partnerships.

Information is scattered with various institutions and lacks a robust quality and credibility check mechanism. As there is no clear demarcation of information areas between institutions due to the lack of a holistic national plan, there is considerable overlap on subject areas on which information is being collected. Objectives of information collection are also not clearly specified.

In conclusion therefore, it is felt that there is an urgent need for the forestry sector in India to organize its information collection and dissemination activities in a unifying umbrella and work out mechanisms of information exchange and information generation. Unless this is done, information collection and utilization in India will continue to lack focus and will fail to support any specific planning and management objectives.

Information Objectives
Formats of Exchange

Central Databases
Portals

National Forest Data Centre

INTERNET

Ministry Of Environment and Forests , GOI

State Forest Departments

Public / Citizens

Central Government

Forestry Educational

Policy Makers

Non-Government Organizations

Funding Agencies , Monitoring Organizations

International Partner

Information Users

Information Users and Producers

Figure 4. Schematic Outlay of the Proposed National Data Centre

References

IIFM (2000): Report of the National task Force on SFM, July 2000, Indian Institute of Forest Management, Bhopal, India.

ITinFM (2000): *Status of IT in Forest Departments,* Dec 1999 -Jan 2000 Issue, Published (electronic) by Indian Institute of Forest Management, Bhopal, India

MOEF (2000): *Ministry of Environment and Forests Annual Report 1999-2000*, MOEF Delhi.

Prasad, R., S. Raghavan, B.R. Phukan and B. Joshi (1999) (Eds.): *Proceedings of the National Technical Workshop on evolving C & I for SFM in India* , 21-23 January 1999, Indian Institute of Forest Management , Bhopal , India .

Rathore,C.S. (1999): *Information Technology in Forest Management : An Indian Perspective* proceedings of the First National Seminar on IT in Forest Management, 28-30 April 2000, Indian Institute of Forest Management, Bhopal, India.

THE PRESENT CONDITION OF FOREST INFORMATION SYSTEM IN INDONESIA

Achmad Pribadi
Head of Statistics Data Processing
Ministry of Forestry and Estate Crops
Indonesia

INTRODUCTION
Background
The tropical rain forest in Indonesia is well known as the third largest tropical rain forest (after Brazil and Zaire) in the world. It contains a great variety of biodiversity and many kinds of forest products. According to the Forestry and Estate Crops Planning Agency the total forest area is around 147.5 million ha. Thirty-six million ha are categorized as a production forest providing timber and non-timber products.

As other tropical countries, Indonesian forest soils is very fragile. It is very susceptible to erosion due to high-density raindrops and a very thin layer of top-soil. Once the forest cover is widely opened (caused by uncontrolled harvesting), then it will be difficult to recover. Therefore, to enable harvesting the forest product sustainably, a proper forest management is very needed. A good forest management which is usually called Sustainable Forest Management is defined as a sustainability of production, social function and also environmental aspect.

In order to support SFM practice, a good record of harvesting forest products and all relevant information which reflect social and environmental sustainability should be handled systematically and professionally. To improve the quality of data and information, Ministry of Forestry and Estate Crops (MoFEC) has developed electronic information technology. At present MoFEC has developed a web sites: *http://mofrinet.cbn.net.id.* On the level of echelon I, the Ministry have also installed Local Area Network (LAN), INTRANET and e-mail. Meanwhile at the Provincial office, e-mail facilities have been available.

Data and information which relates to forest utilization is mostly processed by Directorate General of Production Forest Management (DG-PFM).

The next chapter will discuss more detail about the implementation of recent forest information system in Indonesia. This will include a discussion on how various data and information is collected and served in Indonesia. The last chapter will emphasise the problems and constraints faced in processing data and information.

OBJECTIVE AND GOALS
This paper provides an overview of forestry data collection and dissemination. One of its goals is to elicit suggestions from the workshop participants. It is hoped that the workshop will be useful for improving the forest information system implemented in Indonesia.
Forest data collection and dissemination

To give a general idea of how forest data and information is processed, the first discussion in this chapter is a general description of Ministry of Forestry organization and followed by data collection and dissemination mechanism.

The Structure of Organization

The MoFEC leads 8 echelon I units namely :

Directorate General (DG) of Land Rehabilitation and Social Forest
DG of Nature Protection and Conservation
DG of Production Forest Management
DG of Estate Crops
Forestry and Estate Crops Planning Agency
Forestry and Estate Crops Research and Development Agency
Inspectorate General
Secretariat General

Every echelon I leads its echelon II; Echelon II leads its echelon III and every echelon III leads its echelon IV/group coordinator who is supported by some staff. Since most of forest product information is handled by DG of PFM, our discussion will focus on the organization that is responsible for recording such information.

Data Collection

Primary data that are collected and compiled by the MoFEC focus on timber and non-wood products potentials (rattan, resin, tengkawang nuts, etc.). Secondary data are continuously recorded and include:

Log production
Production and export of processed wood
Production and export of Non timber
Forest product provision and reforestation fund
Timber plantation development
Progress of Forest Surrounded Village Development (social aspect)
Progress of silviculture treatment

Data and information flow

Primary Data

Primary forest data are collected by the Centre for Forest Inventory (echelon I of Forestry and Estate Crops Planning Agency). After the Centre has completed a particular survey, the work of data processing is begun (for spatial data processing, GIS is used). When the work finished, such data is transferred to the Centre for Data Processing and Mapping. Some of the data is showed in the web sites and the rest will be disseminated or filed for other relevant purpose.

Secondary Data

The types of secondary data as mentioned above usually come from forest companies that harvest certain forest product.   The Mechanism of how the data is transferred from the companies to the Centre for Data Processing and Mapping are described in the following steps:

First, the data from companies are sent to District Forestry Office (via post) every month (maximum the first 10th day of the month has been sent). As the companies are not far from the District Forestry Office, the data will receive two days later.

The District Forestry Office will compile the data from all the companies in the District region and then it will send the data to Provincial office (also sent by post). The data should be received by the office by the last day of the month.

The Data from all District forestry office (of the same province) then will be transferred by post to DG-PFM in Jakarta. The data should be received early in the following month. From there the data is transferred to every relevant Directorate (Echelon II in DG-PFM), depending on the types of the data.

Every Directorate will collect and compile data received from all of the Provincial forestry offices, then transfer the data to Evaluation and Report unit by using LAN facilities.

The unit will then compile all of the secondary data from every Directorate. When it accomplished the data will transferred by e-mail to Centre of Data Processing and Mapping. Some of the data will be showed in the web sites and the rest will be disseminated or filed for other relevant purpose.

From the above description, there appears a two-month time lag of data dissemination. For example data log production in April logging, can be delivered to the user two month later. This condition is caused by:

The long bureaucratic procedure
Reliance on the postal service

Since the data flow is delayed to deliver, the government is developing the e-mail facilities to District Forestry Office where telephone facility has been installed. Hopefully this would accelerate the data processing.

Types of data and information that need improvement

According to our evaluation the following data and information need some improvement and correction.

1.   Non-wood product data potency

The data of non-wood product potency is under estimate and not complete. This is because some provincial offices have not carried out surveys or focus data collection only on a limited number of non-wood products.

2.   Forest plantation database

The improvement of plantation development database should be carried out in such ways:

Collecting data of the progress plantation development   for every tree species planted

Collecting forest plantation quality

Such data together with maintenance treatment record should be collected correctly from the plantation companies. If the data can be compiled correctly, then some projection of the annual planted forest production can be set up.

3.   Data of wood domestic consumption

The data of domestic consumption is less accurate, because the calculation of the consumption is based on the amount of registered industrial capacity. While a lot of the unregistered industries actively operated are not counted.

4.   Data on silvicultural treatments and Forest Surrounded Village Development

Such data that has been collected and compiled is under estimate because many companies have not sent the data consistently.

5.   Involved Institution

Some institutions which have been involved in forest data collection and data dissemination are as follows:

Centre for Statistical Bureau
Ministry of Industry and Trade
Ministry Of Agriculture
National Agency for Export Development
ITTO
CIFOR

The involvement of the above Institutions has enriched the availability of forest data-base.

PROBLEMS AND CONSTRAINTS

Based on the previous description, we can assume that less complete and less accurate data processing and data dissemination is caused by a major constraint, namely *most forestry officers have not accorded data and information a high priority*. They are less concerned about the importance of the accurateness and the completeness of the forest data and information. This has led to the following conditions:

Forest information system in Indonesia is less developed.
The officers are less disciplined in collecting and compiling data and information.
Data processing operators (especially those in the provincial offices) do not have a high motivation to develop their skill. Therefore the availability of an e-mail facility in the provincial office is not used optimally.
Lack of law enforcement especially against companies that do not send (or delay sending) the data required to forestry office.

COUNTRY PAPER ON FORESTRY INFORMATION COLLECTION IN MALAYSIA WITH
SPECIFIC REFERENCE TO FORESTRY DEPARTMENT PENINSULAR MALAYSIA

Na'aman Jaafar
Director of Forest Planning Unit
Forestry Department Headquarters
Peninsula Malaysia
Malaysia

INTRODUCTION

Forests continue to play an important role in the socio-economic development of Malaysia. In
addition, they also play an important role in environmental protection and biological diversity
conservation, as well as providing a storehouse of medicinal plants for pharmaceutical products.
This green heritage is also an important avenue for outdoor recreation while its aesthetic values
continue to inspire cultural and spiritual development of humankind. In addition, the forest also
serves as a critical source of clean water for both domestic consumption and industrial utilization.

The forestry sector continues to be an important sector in contributing revenues and foreign
earnings to boost the economic development of the country. Amongst the important economic
contributions of the forestry sector in 1998 are:
The export of timber and timber products from Malaysia amounted to RM14.2 billion. This
constituted 5.0% of the total gross export receipts of Malaysia at f.o.b. RM286.8 billion. For
Peninsular Malaysia alone, the timber exports (excluding rattan and wooden furniture) fetched a
total earning of RM2.5 billion.

The total forest revenue collected by the various State Governments in Peninsular Malaysia in the
forms of royalties, premium, cess for forest development, fines, compensations, licenses and fees
amounted to RM281.8 million.
The forestry sector provided direct employment to over 200,000 persons in Malaysia. For
Peninsular Malaysia alone, the sector provided direct employment to 70,961 persons specifically
10,375 persons in the logging industries, 18,044 persons in sawmilling, 8,926 in the
plywood/veneer industry, 7,348 persons in the moulding sector, 21,000 persons in the furniture,
match, pencil, woo-wool cement slabs, small-scale rattan and bamboo industries, whilst the public
sector employed some 5,268 persons.

The total investment in the major wood-based industries in Peninsular Malaysia alone was
estimated to be RM 1,539.9 million comprising RM 725.7 million or 47% in the sawmilling
industry, RM 438.4 million or 28% in the plywood/veneer industry and RM 375.8 million or 24%
in the wood moulding industry.

Thus, the Forestry Department has been entrusted with a heavy responsibility to ensure that the
forest resources are managed and utilised in a sustainable manner and the forestry sector continues

to develop in a healthy manner. In facing these challenges and meeting the objectives, the Department requires timely, relevant and accurate data covering the whole spectrum of forestry sector.

FORESTRY STATISTICS AND DATA COLLECTION

In Malaysia, several government agencies and departments play key roles in forestry data collection and statistics, analysis and dissemination. They include the Ministry of Primary Industries Malaysia, Forestry Department Peninsular Malaysia, Sabah and Sarawak, the Malaysian Timber Industry Board (MTIB), the Sarawak Timber Industry Board (STIDC), the Department of Statistics, Forest Research Institute Malaysia (FRIM) and Malaysian Timber Council (MTC).

The Forestry Departments have legal powers to compel licensees of wood-based industries to furnish data or statistics as the Department may require. Data and statistics on forestry are also collected and monitored indirectly through licensing procedures, revenue records and by attaching conditions to the licenses which oblige the licensees of both logging and mills to keep records and submit reports periodically, either on a monthly, quarterly or yearly basis to the Forestry Departments. Unfortunately, this process, in practice, is very cumbersome and requires wasteful manpower utlization to obtain results.

Nevertheless, the collection, processing and analysis, storage and dissemination of forestry data and statistics constituted an important component of the administrative functions of the Forestry Department. In this regard, the Forestry Department HQ, Peninsular Malaysia, primarily through its Economic Unit, is responsible for the compilation, analysis and publication of these forestry statistics obtained from the various states or sources. However, as information requirements vary at different levels of policy and decision making, other Units at the Forestry Department HQ, Peninsular Malaysia such as the Forest Management Unit, the Silviculture Unit, the Forest Plantation Unit, the Planning Unit, the Forest Engineering Unit, and the Industrial Development and Utilisation Unit are also involved in data collection based on their respective specialized needs and requirements.

Data collection within the Forestry Department Peninsular Malaysia from the field to the Department HQ is primarily based on the "Shuttle Returns System" that has been established for many years. The "Shuttle Returns System" developed has since been reviewed from time to time to improve its timeliness, accuracy of reporting and to widen the scope of coverage where necessary. In this regard, statistics that cannot be collected through the "Shuttle Returns System" are obtained by special surveys, either through official correspondence or by direct interviews at the sources. A large proportion of the statistics in the Annual Report of the Forestry Department Peninsular Malaysia is, incidentally, compiled annually using standard questionnaires.

As forestry is a state matter and most of the actual forestry activities are carried out at either the state or district (including forestry district) level, the State Forestry Departments and the District Forest Offices are crucial links in ensuring the success of the statistic collection system. Often, they are the initiators in the flow of information from the field to the Department HQ. In this regard, the crucial roles of the State and District Forest Offices in data and statistics collection can be viewed from the following reasons:

The State Forestry Departments are the authorities in licensing and regulating the forest-based activities or industries of the respective states.

The State and District Forest Offices maintain files and records that serve as sources to all kinds of information. Very often these records are sufficient to satisfy the needs of users.
The State and District Forest Offices have the manpower and facilities to assist the Forestry Department HQ, Peninsular Malaysia to carry out surveys. This can be easily seen from the "Shuttle Returns" that are sent through the District Forest Offices, and it is their responsibilities to ensure that the Shuttle Returns are duly completed and returned to the HQ before the stipulated deadlines. In fact, no survey is carried out without first obtaining the cooperation and assistance of the State and District Forest Offices.

In this context, specific personnel at the State and District Forest Offices are specially assigned to take responsibility in handling information requests and questionnaires sent by the Department HQ. To ensure their competency and to familiarize them to the any new changes or innovation to the "Shuttle Returns", these personnel, whom are also responsible to execute other duties not related to information and statistics collection, are given periodic training. This periodic training is also necessary as these forestry personnel are transferable and continually replaced. In addition, personnel from the Department HQ, most notably from the Economic Unit, are also available to provide assistance and advice in handling these Shuttle Returns, questionnaires or any inquiries. This service is done either through correspondence or field visits whenever necessary.

SOURCES AND METHODS OF FORESTRY DATA COLLECTION

The forestry data and statistics currently collected are multitude in quantity, varies in scope and details, sources and method of collection. Nevertheless, they can be broadly classified into the following categories:

Statistics on forest land;
Statistics on silviculture;
Statistics on forest plantation;
Statistics on forest harvesting;
Statistics on timber;
Statistics on forest or timber-based industry;
Statistics on forestry organisation and administration; and
Statistics on timber trade.

Statistics on forest land

Land and forestry are state matters. This is enshrined in the Federal Constitution of Malaysia. As such, each State is empowered to enact laws and formulate policies to govern land utilization in their respective states. In this regard, forest land can be divided into three main groups, namely Permanent Reserved Forest, Stateland Forest and National Parks and Wildlife Reserves.

Permanent Reserved Forest. As provided by the National Forestry Act, the State Government has the power, by notification in the Gazette, to constitute any land a reserved forest or to decide that any reserved forest, or any portion thereof, shall cease to be reserved. These changes in the areas of the Permanent Reserved Forests are recorded in the registers of reserves kept at the District and the State Forest Offices. The registers of reserves are generally kept well up-to-date. Each reserve register contains information on gazette number, date of gazettement, a photocopy of the page in the Gazette declaring the constitution or excision, detailed location with map, and the area

calculated either on a map estimate or on a field survey carried out by the State Survey Department.

In addition, National Forest Inventory which is being carried out once every ten years by the Forestry Department Peninsular Malaysia provides further information on the Permanent Reserved Forests. The inventory would define the extent and location of the forested areas and classify them by forest types and broad volume categories. This inventory employs data gathered from sample plots measurement in the field, aerial photographs as well as satellite imageries.

Stateland Forest. The administration of the Stateland Forests rest with the State Land Department but logging on the Stateland Forests is controlled by the State Forestry Department. The area and coverage of the Stateland Forests are determined by the respective State Survey Departments. The State Administrative District Office keeps a register on the area of the stateland forests within its administrative district, on both alienated and non-alienated basis. However, the alienation of stateland forest is executed by specific government agencies involved in land development.

National Parks and Wildlife Reserves. National Parks and Wildlife Reserves are administered and controlled by the Department of Wildlife and National Parks under the Ministry of Science, Technology and Environment. Statistics on these reserves such as location and land area are compiled by each State Forestry Department and published in the Annual Report.

Statistics on silviculture

After forest harvesting, the logged-over forests are inventoried to assess its status and determine the type of silviculture treatments needed to aid regeneration and to improve forest yields.

Annual silvicultural treatment operations are planned by each State Forestry Department and submitted to the Silviculture Unit in the Forestry Department HQ, Peninsular Malaysia which monitors and coordinates the reforestation program and activities. Amongst the information maintained are progress and achievements of work including the type, extent and location of treatment operations, manpower requirements and costs. At the district and state levels, these activities are entered into the Annual Felling and Treatment Plans and the respective Reserve Records for the compartment and reserve concerned.

Statistics on forest plantation

Forest plantation records are kept and maintained by the District and State Forest Offices involved in plantation establishment. Data on area planted, year, costs and list of contractors are compiled and submitted to the Forest Plantation Unit of the Forestry Department HQ, Peninsular Malaysia which is coordinating the implementation of the plantation projects.

Statistics on forest harvesting

Forest harvesting from both the Permanent Reserved Forest and Stateland/Alienated Land Forests is regulated by licenses issued by the State Forestry Departments. Information captured in the license form include serial number, name and address of holder, date of issue and expiry, map and boundary description, logging prescriptions, name and location of checking station where the produce is to be measured, payment conditions and road standards and specifications to be adhered to.

Records of licenses issued and cancelled are entered into Shuttle Return forms by each District Forest Office and submitted quarterly to the Forestry Department HQ, Peninsular Malaysia where it is compiled and published in the Forestry Department's various publications.

A register of forest offences and breaches of licenses is also maintained by each State and District Forest Office, detailing the offences committed and the manner they are dealt with. Monthly returns on forest offences are forwarded from the State Forestry Departments to Forestry Department HQ, Peninsular Malaysia. As all licensees must obtain a sub-license for each worker before he is allowed to enter the forest, these records form the basis of employment statistics in the logging sector.

The completed logging activities and other related information such as outturn per hectare, species removed, and others are entered into the Reserve Records and the Annual Felling and Silvicultural Treatment Plans.

Statistics on log production

As in the case of forest harvesting, the District Forest Offices capture and maintained information on log production. These Offices record all the licenses issued for harvesting of forest produce in their register of licenses. In addition, individual files of licenses record various data on production, forest charges, renewals, termination of licenses and others. When the produce is removed, a removal pass is issued for each consignment (truck-loads) which records the type and volume of produce, including the royalties and forest development cess/fund due on that consignment. One copy of the removal pass is forwarded to the Collector of Forest Revenue in the State Forest Office who oversees the collection of revenue and monthly compilation of revenues and volumes by tree species, by licenses, by forest districts and volumes by destination. These statistics are transmitted monthly to the Forestry Department HQ, Peninsular Malaysia through Shuttle Returns, comprising:

Form 1 – Monthly production of logs, poles and minor forest produce and revenue collected;
Form 2 – Monthly log production by producers;
Form 3 – Monthly silviculture cess collection and expenditure; and
Form 6 – Monthly log movement and export of logs to other states.

Statistics on forest or timber-based industry

The operators of the forest or timber-based industry such as sawmills, plywood/veneer mills and moulding mills are required by conditions of their licenses to keep a book of log records that contain information on the number of removal passes, date of entry into the mill, log number, species, volume input into the mills, volume input into the processing machinery, output of converted timber and sales of timber to domestic markets. The information are forwarded by the mills to their respective District Forest Office through the monthly Shuttle Returns who in turn would check, verify and endorse the information and subsequently dispatched them to the Forestry Department HQ, Peninsular Malaysia.

Industry data that are covered by the Shuttle Returns, such as the wood-wool cement plants, pencil factories, Medium Density Fibreboard mills, wood chips, match factories, timber preservation plants and others are monitored through periodic surveys, using questionnaires or direct interviews.

Statistics on forestry organisation and administration

Information on administration, staff deployment and manpower requirements are compiled and recorded at the district, state and federal levels. The number and categories of staff are reported in the Annual Report of the Forestry Department Peninsular Malaysia.

In addition, the Forest Planning Unit at the Forestry Department HQ, Peninsular Malaysia also collects and compiles information on the progress of implementation of programs, projects and activities for both the federal and state levels under each Malaysia Plan period. These information, which are gathered monthly and quarterly, include physical and financial achievements for various projects and activities ranging from infrastructure development, forest management and development activities to community forestry projects and human resource development and manpower training.

Statistics on timber trade

Information on timber prices, export volume by species group and destination, import volume by product type and point of origin are captured by the Malaysian Timber Industry Board (MTIB). This information is disseminated for both domestic and international consumption through information bulletin published periodically. Forest produce statistics can also be found on the homepages of the MTIB and the Malaysian Timber Council.

ISSUES AND LIMITATIONS

Although the state of forestry statistics can be considered adequate in meeting the current requirements and the procedures for data collection is satisfactory, there is nevertheless a few issues and limitations that need to be addressed in order to enhance data collection efficiency and effectiveness.

The current procedures of information collection and data flow though suffice to meet the needs of the Forestry Departments and the requirements of the industry, it is cumbersome and requires wasteful utilization of human resource. The need for data entry and verification at multiple levels (from the mills, district office to the Forestry Department HQ, Peninsular Malaysia) posed serious limitation as it greatly undermine the objective of a fast, timely and accurate data collection and compilation system. Thus, there is a dire need to fully computerize data capture, analysis and retrieval system which will greatly reduce manpower requirement, time taken and most important of all, errors in data entry and analysis. In this regard, with the advancement of electronic networking, the possibility of formulating an on-line data transfer and retrieval system should be given serious consideration.

In this regard, the Forestry Department Peninsular Malaysia had embarked on the Forestry Information System Project since Fifth Malaysia Plan (1986-1990) and carried through the Sixth Malaysia Plan (1991-1995) and continued into the current Seventh Malaysia Plan (1996-2000). Through the project, certain components of the data entry and transfer have been computerized. In addition, Malaysia, with the cooperation of the European Union, had jointly implemented a project to fully computerize forestry information system and develop an on-line forestry data capture and retrieval system. Although the joint project had made some progress towards this end, it was unfortunately terminated before completion.

Timber has been the prime concern of forestry. However other minor and non-timber forest produce such as rattan, bamboo and herbal pharmaceutical products have gained greater, if not equal importance, particularly since the last decade. In consonance with this new development, information on the distribution and volume or quantum of these resources need to be assessed in the field and captured accordingly so that appropriate planning for their management and development can be done accordingly. However, the procedure for their assessment in the field is far from satisfactory. Thus, measures must be taken to develop new techniques and methodologies for their assessment and the subsequent data capture and dissemination so that the availability of the resource can be fully utilized in a sustainable manner.

CONCLUSION

The state of forestry statistics in Malaysia is generally well developed. The data sources are well defined and records kept at the sources are well maintained, especially with regard to data required on a routine basis. Problems that arise are related to personnel competency and priority given to the job, which affect timeliness, interpretation of questions and data, and eventual accuracy of reporting.

The methodologies and procedures used for data collection are also generally adequate and seemed to meet the objectives of data needs of the Forestry Department Peninsular Malaysia. The most encouraging aspects for the present and future development of the statistical systems in the forestry sector are:
Malaysia has a well- established forest administration;
Forest resources are under the jurisdiction of the respective states (therefore only 13 forest owners); and
There are many good legislation governing the forestry activities, wood-based industries and the exportation (and importation) of timber and other forest products.

There is nevertheless room for improvement, especially in the use of computer to simplify the compiling, processing, retrieving and analysis of the data collected. The Forestry Department Peninsular Malaysia would continue to accord great emphasis to its efforts in computerization and networking. The new and improved procedures and methodologies for the assessment of minor and non-timber forest produce will be similarly given priority in the coming Eighth Malaysia Plan period (2001 – 2005). With these improved facilities and capabilities, both for the assessment in the field and the realization of computerized data base, the Forestry Department Peninsular Malaysia is poised to play its technical role more effectively and strive towards more integrated, comprehensive and effective planning and management of the forest resources at all levels of the organization. Similarly, it will enable more effective and efficient monitoring and coordination of forestry activities and operations of the various State Forestry Departments.

COUNTRY PAPER: FORESTRY INFORMATION COLLECTION IN NEPAL

Bal Krishna Khanal
Deputy Director General, Planning Division
Department of Forest
Kathmandu

BACKGROUND

The importance of information and analysis for sustainable forest management has always been recognized in planning processes, however, being a learning and doing process, any shortfall cannot be omitted.

Good data analysis is the basis of sustainable forest management. However, the types of data collected should be compatible to enable comparisons within certain spans of time to know the status of, and identify changes in, forest resources. So far as forestry data (statistics and information) is concerned it is compiled in two aspect. The projection figure comes from statistics where as factual figure is derived through revenue collection. The detail statement of revenue collection clarifies the amount of forest products collected and revenue generated from particular species. It may be timber, fuelwood or any non-timber forest products.

No studies have been made trees outside forest. However, non-timber forest products have been part and parcel of forest management in community forest or Government managed forest. Precise information on trade flows is difficult. Certain trade flows from community forestry users group has already been supplying to their own users group, adjoining users, within district and outside district with government permission. However, there are legal complexities. Similarly from government managed forest there is a tradition of collecting one headload of dry fuelwood without paying revenue. Hence information will not be available in such cases.

Again, there is no authority to supply fuelwood for the industries. Hence there is more scope to work on such issues. In government managed forest most of the forests are over matured mostly in the Terai region. Forest in inaccessible areas are under utilized hence there is a scope of introduction of fuelwood development programs, cable way logging system and promotion of briquette and charcoal-making for utilization of the wood fuel.

Information is collected from district by a financial statement, which also quantifies and specifies the types of forest products and revenue collected. This statement can be named as supply status of forest products. Dissemination of information is done through the annual report of forestry sector coordination committee, which meets once a year and all relevant ministry departments, agencies, organizations, NGOs, INGo, and national institutions are invited.

Review of data collection and use in planning process

The goal of an information system is to convert a magnitude of data into meaningful information, which could be used for sustainable forest management. The nature of data distinguishes planning from other data business because virtually all planning data are intimately related to spatial locations. Therefore, it is not surprising that the planning process has been greatly influenced by the relative quality of spatial and attributed data. A planning process has been generalized into the following 5 steps:

Problem identification
Objective determination
Invention of alternative solutions
Evaluating alternatives, selecting the best alternatives
Implementation of the planning, monitoring the results

A successful ***Planning Information System*** must integrate the appropriate set of retrieval, analysis and display functions of a database. Advanced technology has the abilities to query and display ever increasing amounts of spatial information using powerful computer systems.

Ongoing forest development activities are preparing forest management plans, conducting forest inventory, aligning forest roads etc. Planning these activities needs different kinds of data both spatial and non-spatial on past and present. In Nepal, the Forest Department is conducting various activities that require analysis of spatial as well as attributed data. Maps were produced for the implementation of forest management plans, plantation and demarcation activities. In forestry, spatial and non-spatial data collection has developed simultaneously over the last 50 years. Aerial photo acquisition, interpretation and forest inventory were major activities of then Forest Resources Survey Office (FSRO) under the Department of Forests during 1960s.

Data collection and management in the Forest Department

Many purposes can be met by data generation, analysis and subsequent publication of reports. In the Department of Forests, similar to other government departments, major part of data collection, storage, information extraction from the data is done in traditional textual or tabular way. The government is still in a stage of infancy in automated method of data storage and retrieval. The traditional method of keeping a register for each kind of activities is very strong. The laws and bylaws reflect such procedure.

Data collections on forestry activities are made in two broad categories. These are on community and national forest categories.

Data for community forestry and related activities

Number and area of handed of Forest User Groups.
Total number of families involved.
Area of new plantation done in handed over community forests.
Income generating activities.
Social nature of user group formation, gender issues, ethnic issues.
Products harvested and distributed.
Fund of the CFUG and mobilization.

B.   *Data on national forestry and related activities*

Area under management regime.

Area taken over by forest squatters.

Quantity of fuelwood harvested.

Quantity of timber harvested.

Quantity of Non-Timber Forest Products (NTFPs) harvested.

Number of legal cases against forest offences, poaching and trafficking of wild life products.

Number of families staying in the forest as squatters.

Area of new plantation.

Fire and other incidents.

Revenue collected by sales of forest products.

The department of forests has three main divisions working under the overall supervision of the director general. The department mainly takes care of field implementation of development programs. District forest offices are established in 74 districts out of total 75 in the country. These offices are the focal point to implement forestry development activities through out the country. Many bilateral projects are supporting forestry activities in different districts. The planning and monitoring division of the department coordinates the annual planning process. The process of dissemination of information is illustrated in figure 1.

District forest offices, after the completion of the fiscal year, report the progress of implemented activities to respective divisions in the department: each division holds this information separately. The planning and monitoring division at the end of each fiscal year compiles necessary information for making composite annual report to forward to the ministry of forest and soil conservation and national planning commission.

Almost all the donor-funded projects concentrate on sustainable management of community forests. Bilateral projects associated with forestry sector include:

Natural Resource Management Sector Assistance Program (NARMSAP), *Community Forestry Field Implementation Component (CFFIC).* The program of this component is being implemented in the 38 districts of the hills of Nepal, funded by DANIDA.

Hill Leasehold Forestry and Forage Project (HLFFP). This project is implemented in 10 districts of central and western development region. The project is funded by International Fund for Agriculture Development (IFAD) and technical cooperation from FAO.

Nepal Australia Community Resource Management Project (NARCMP). Funded by the Australian government and implemented in the two districts of central Nepal.

Nepal UK Community Forestry Project (NUKCFP). Operational in 7 hill districts, 4 in eastern hills and three in western hills funded by the Department of International Development (DFID), UK.

Nepal Swiss community Forestry Project (NSCFP). Covers three hill districts in the central and eastern hills of Nepal. This project is supported by Swiss Development Cooperation (SDC).

Environment and Forest Enterprises Activity (EFEA). Covers eight districts in western and Far-Western development region of the country. This project includes three districts of Terai, one district of Inner Terai, and remaining four districts in Hill. This project is being supported by USAID.

Churia Community Forestry Development Project (ChCFP). Implemented in three districts which includes two Terai. This project is operating in the financial support of GTZ.

Community and private forestry component (cfpc) and tree improvement and silviculture component (tisc) are special programs funded by dannida under the narmsap. The area for cpfc is as for cffic. The tisc command area is the entire country.
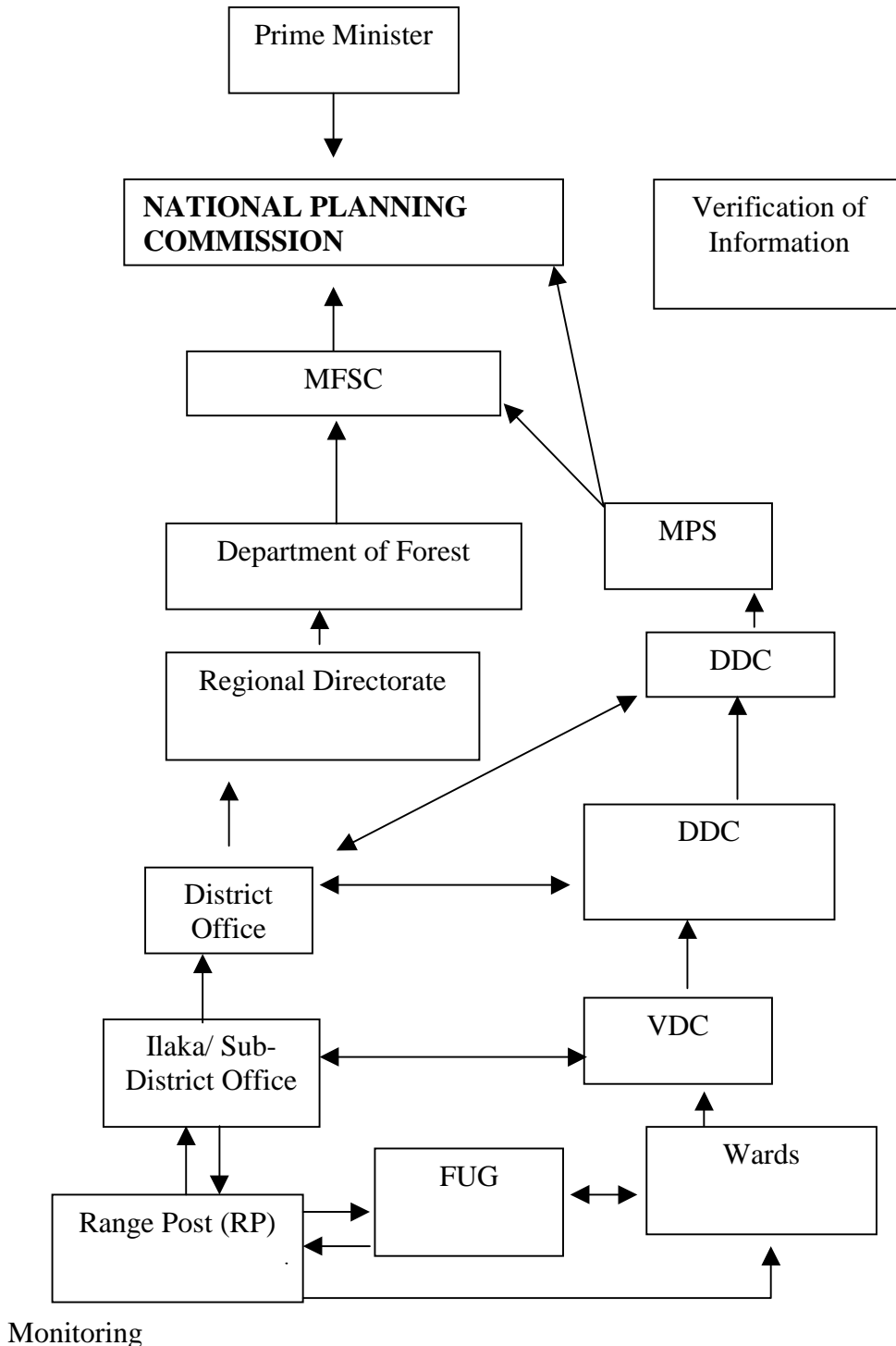

FIGURE 1.   INFORMATION FLOW MECHANISMS AND VERIFICATION OF INFORMATION

The existing **Management Information System (MIS)** in the Department of Forest was started during 1990 in the previous phase of the present day Community Forestry Field Implement Component (CFFIC), then World Bank funded Hill Community Forestry Development Project (July 1989 – June 1999).

The British government has been funding forestry sector projects for a long time. The British project, Nepal UK Community Forestry Project (NUCKFP), has its own model of data capture and retrieval. A forest user group (FUG) database has been developed in Koshi hill area as a central information bank. The same kind of database exists for Dhoulagiri Hills area. Lately, these projects have become pioneers in introducing photo maps, rectified aerial photographs, in community forestry planning and decision making processes.

LIST OF INSTITUTIONS INVOLVED IN DATA MANAGEMENT

The Tree Improvement and Silviculture Component (TISC) is developing **Iso-Potential Vegetation Maps** for the whole country. These maps may be used for various purposes in natural resource management and for effective planning and monitoring process from national to local levels. Other projects also collect attribute and spatial data and analyze the data for planning and monitoring purpose. These data are much related to the community forestry development processes. The mechanism of data update is annual. In addition to the bilateral or multilateral projects, other organizations involved in data management are:

Department of Forest Research and Survey
Department of National Parks and Wildlife Conservation
Survey Department
Department of Soil Conservation and Watershed Management
National Planning Commission Secretariat, Participatory District Development Program.
Central Bureau of Statistics (CBS)
International Center for Integrated Mountain Development (ICIMOD)
Tribhuvan University, Geography Department
The King Mahendra Trust for Nature Conservation
Katmandu Metropolitan City Office

In 1990, ICIMOD established Mountain Environment and Natural Resource Information Service (MENRIS) as a resource center of Hindukush Himalayan Region for the study and application of GIS technology. MENRIS/ICIMOD has built up a national level database integrating both spatial and non-spatial data. The source map is 1: 250 000 map of Nepal. Major themes are: *National boundary, district boundary, road, river network, settlement and spot height points, elevation contours, national park and reserves system and vegetation types.* Recently, MENRIS has established a core Katmandu Valley GIS database based on 1:25 000 topographic maps and remote sensing images. The database is available in an interactive CD-ROM to increase information sharing.

Central Bureau of Statistics (CBS) under the National Planning Commission (NPC) Secretariat is the focal point for collecting socioeconomic and demographic data. Each year the Bureau updates the data either by projection or by primary data collection and publishes a Yearbook. Nepal has a

long history of census taking. The first recorded population census of Nepal was taken in 1911. This has been continued in an interval every 10 years. The first scientific census taking with modern approach was started since 1952/54.

MAJOR ISSUES, WEAKNESS AND GAPS

Some issues related to the data management in Nepal, particularly in the forestry sector are identified as below:

The topographic maps prepared in different time in the past are different in terms of their scale, graticule and spatial details.
Thematic maps prepared in 1984 using the aerial photographs of 1978/79 are not updated yet. Objectives and strategies of forest management have changed over the years. Therefore, forest inventories made at different periods are not comparable with each other.
The management units used by the Master Plan and National Forest Inventory (NFI, 1999) is different. The Master plan has used physiographic zones, assessable and non-assessable forest area, whilst the NFI has used Hills and Terai zones as well as reachable and non-reachable forest areas.
Planning and monitoring is becoming merely a ritual process. It does not include information that could be useful for decision making. Therefore, the need of data collection, storage and easy retrieval is not felt widely among the professionals.
Although, the supply of hardware and software has increased in many organizations, the commitment of organization and professionals is seriously lacking.

data collection strategy, IMPROVEMENT AND analysis

Organizations have different methods of acquiring, storing, processing, analyzing and viewing data. Exchanging, sharing and integrating data from different sources has become increasingly important for efficient utilization. However, at present, handling of information among different institutions is neither efficient nor cost-effective. Data are generally unavailable or poorly maintained, outdated, or incorrect. Maps are in different scales and have different coordinate systems complicating overlays and integration. Spatial information is not defined in a consistent manner and, therefore, of low standard. Data are not archived in such a way that they are available for use in later stages.

Assessment of the need of different types of data was made during the regional planning workshop in the winter of 2000. A data gap was identified and the participating districts agreed to make up the gap with appropriate data. Another important conclusion made out of this discussion was the lack of coordinated approach of information dissemination among development partners. One of the major tasks of the central government is to evaluate whether or not the project approach in that sector is contributing to the overall national development goals. It becomes only possible when the isolated efforts of a single project and program is evaluated in the light of broader national goals.

Realizing the importance of integrated data management for the forestry sector, a central databank, Integrated National Forest Database (INFDB) system is being established in the Forest Department. Data storage will be done using two basic methods. Spatial data will be stored in GIS

database. Non-spatial data will be stored in digital form in Relational Database Management Systems (RDMS). Such non-spatial data comprise of biophysical and socio-economic aspects. To make data updating easy, selective permission would be provided for updating and retrieval of data up to regional levels. The updating mechanism will gradually be expanded to district levels. The department has prepared an action plan for these activities. The plan is supposed to be implemented by the department of forests. Since many development activities will only be completed at the end of each fiscal year, bulk of data will be collected at this time. Consequently, much of the data update will take place from the beginning of the new fiscal year, generally after 2nd week of july every year.

Socioeconomic data necessary for forestry purpose, like census and economic surveys, are periodically collected by the Central Bureau of Statistics (CBS). In Nepal, CBS is an apex body that takes care of collection, storage, update and dissemination of such data. Mechanism will be established to acquire such data in digital form and update the Integrated National Forest Database (INFDB) periodically.

Line Departments like Department of Soil Conservation and Watershed Management (DSWM), Department of National Parks and Wildlife Conservation (DNPWC), and Department of Forest Research and Survey (DFRS) are working in close cooperation. The primary user of DFRS output is the Department of Forest. This department conducts National Forest Inventory and related forest activities.

Similarly, a network among the regional countries will be made in order to facilitate data sharing. The publication of data will also be made in the network. Department of Forest, Nepal, is in the process of maintain appropriate web site for this activity. This will be very useful to international organizations, researches and other interested stakeholders in the forestry sector of Nepal. All geo-referenced data will be prepared, processed and stored in a GIS environment. Department of Forests is also working in the establishment of a functional GIS laboratory as soon as possible.

Since manpower development is the crucial step, training and refresher courses will be organized for the concerned officials in the Department and Regional Offices. People will be sent for training organized by the Department of Geography, Tribhuvan University and outside periodically. The Planning and Monitoring Division in the Forest Department will coordinate all these activities to be expedited in stipulated time.

The Government should formulate the policy of information automatization in all of its agencies. As envisaged in the ninth Five Year Development Plan of the country (1998- 2002) Planning and Monitoring Section of every Ministry and the Departments of the central government should be in the node of network. This will facilitate information sharing and bring efficiency in program monitoring.

CONCLUSION
The Department of Forests is slowly automating its information storage and retrieval activities. The department is advocating the procurement of PC units for district forest offices to the respective donor agencies and requesting they assist in supporting the district office until the office becomes able to handle the system independently. The department itself is routinely sending staff to software application training. The donors are also supporting in this endeavor of the department.

Some donor-funded projects have already introduced spatial analysis mechanism in district level planning process. They are slowly introducing aerial photographs for various activities including forest boundary delineation, user segregation and area mapping. In future, relevant spatial and attribute data for planning will be made available through an well-accepted process in an information management system.

COUNTRY PAPER: DEVELOPMENT OF FORESTRY INFORMATION SYSTEM FOR MONITORING AND EVALUATION OF FORESTRY SECTOR MASTER PLAN PROGRAMMES IN PAKISTAN

Tariq Nazir
Section Officer Forests
Ministry of Environment, Local Government & Rural Development
Islamabad

BACKGROUND

The forestry sector plays a highly important role in Pakistan's economy. It employs half a million people and provides 3.5 million cubic meters of wood to meet industrial requirements and provides almost one third (15 million tonnes of oil equivalent) of Pakistan's energy needs. Forests and rangelands support about 30 million livestock. Livestock industry's contribution exceeds US$400 million to Pakistan's annual export earnings.

Contribution of forestry to Gross Domestic Product (GDP) reflects the value of material goods only. In 1997-98, contribution was estimated at Rs. 739 million or 0.12 percent of the national GDP. While economic value of forests in terms of cash earnings is based on wood resources, there is a growing concern that this role cannot be seen exclusively in terms of wood products. The role which the forestry sector plays in soil conservation, regulating flow of water for irrigation and power generation, reduction of sedimentation in water conveyances and reservoirs, employment, outdoor recreation and maintenance of ecological balance far exceeds the direct economic benefits. According to the concept of forests for people, value links between forests and communities, though not measured quantitatively cannot be under-estimated.

Forests provide forage to one third of Pakistan's 90 million head of livestock. Leather, wool and other livestock products contribute US $ 400 million or 9 percent of total export earnings. Rangelands comprising 28.50 million ha including 6.28 million ha under Forest Departments' control is 32 percent of total area of Pakistan. Rangelands are degraded to one-third of their productive potential. Forests and rangelands support a variety of flora and fauna.

There is a long history of over- exploitation of forests and rangelands in Pakistan. Consequently, fragile ecosystems have been severely degraded. Out of Pakistan's total landmass of 87.98 million hectares, state owned forest area consists of 4.25 million hectares (4.8 percent).

Pakistan is deficient in timber production. Growing needs for wood and wood products are satisfied through imports. Pakistan imported 966,940 tonnes of wood and wood products in 1997-98 at the cost of Rs. 8,063 Million. During 1993-94 Rs. 4,905 million were spent on import of wood and wood products as compared to Rs. 2,880 million in 1994-95, Rs. 7,073 million in 1995-96 and Rs. 7,382 million in 1996-97, showing an increase in imports. A similar trend in export of wood products is observed.

Self-sufficiency in wood production from the meagre 4.8 percent of public forests cannot be attained due to priority assigned to agriculture for resource allocation in physical and financial terms and climatic limitations. To meet the growing wood requirement of Pakistan, potential lies with cultivated area spread over 20.85 million ha, uncultivable area of 25.63 million ha and cultivable but undeveloped plain of 9.30 million ha. Promotion of social forestry/agroforestry will directly expand the forestry resource base. Expanded forestry resource base will contribute to meet 53 percent of household energy needs and wood-based industry, stabilize environment, reduce pollution, generate income-earning opportunities and alleviate rural poverty.

Forest planning processes

After independence, pakistan adopted land development approach for socio-economic development in the country. A planning commission was constituted to carry out the job for the entire country. Over the years nine five-year plans and a few annual plans to take the process of planning were developed on the pre-determined directions.

The national executive council (ecnec) approved the objectives of each five-year plan. The objectives represent the shared vision of the people in regard to their socio-economic development. It comprises development goals, strategy, policies and thematic issues and sectoral programs to achieve the objectives set for the economic development of the nation. The data for preparation of forestry plan is collected from the following sources:
Provincial working plans and management plans;
Annual plantation reports; and
Resource surveys by state.

Annual targets for massive tree plantation campaign are fixed at federal level twice a year in monsoon and spring. The provincial chief conservator of forests presents review reports of the targets achieved, bottlenecks, etc.

Planning at provincial level
The provincial development working party (pdwp) under the chairmanship of the governor approves the provincial plan at state level. The sectoral targets are received from the central government and feedback is taken from local level. The cdwp finalizes the targets and programs to achieve the targets for various sectors. The sectoral allocations are made on the following criteria:
Fully funded projects through provincial resources;
Partially funded projects by province and partially by the central government; and
Fully funded by the central government.

PLANNING AT DISTRICT LEVEL

District councils are responsible for formulation of district plans. The provincial government determines the target for each sector. Then action programs to meet these targets are prepared. Their working plans and resource survey data provide the basis for formulation of specific schemes and projects. After appraisal and evaluation, district plans are included in the provincial plans, which are further appraised for inclusion in the national plan.
It is pertinent to note here that there is no direct link between district plans and forest management plans prepared by the forest division. The forest management plans are prepared for a period of 10-20 years in accordance with the objective and priorities outline in the national forest policy and

framework of five year plan. The forest working plans are approved by the provincial forest departments. Funds are allocated by the planning section of the forest department.

The weaknesses of present planning processes

Top to down approach
Lack of integration and coordination
Highly centralize and directive base
Lack of participatory spirit and methodology
Lack of watershed and ecosystem functioning management
Lack of modern tools and technology
Lack of grass root orientation.
The office of the inspector general of forests is implementing a component of forestry sector project with the financial assistance of asian development bank. Its objectives are:

Design a system for coordinating investment activities and identification and preparation of forestry projects for donor and domestic funding within the framework of fsmp;
Monitor and evaluate the effectiveness of various programs in the forestry sector and institutionalize the system countrywide;
Review and refine the fsmp priorities and strategies by undertaking special studies of national importance in research, education/extension, policy, land tenurial systems, forest management, marketing of forest products and codification of legal instruments; and
Develop a forestry database and update the fsmp.

The office of inspector general is working to develop a monitoring and evaluation system. The purpose of monitoring is to achieve efficient and effective implementation by providing feedback to project management at all levels. This enables management to improve operational plans and to take timely corrective action in case of shortfalls and constraints. Monitoring is thus a part of the management information system and is an internal activity. As an integral component of the management function and hence an essential part of good management practice, monitoring needs to be conducted by those responsible for project/ programme implementation at every level of the management hierarchy.
Evaluation is a process of assessing systematically and objectively the relevance, efficiency, effectiveness and import of activities in the light of the objectives. It is a process of determining what has been accomplished and comparing them with what should have been accomplished and providing ways of improving implementation of activities still in progress and helping management in planning and programming future projects.

Monitoring and evaluation, taken together, form a unified system and a vital function of management. Both are tools for analyzing sound decisions. Regular periodic reports on the human resources, physical and financial inputs and outputs supplemented by information from existing databases and special studies provide the basis for monitoring analysis. On the other hand, these monitoring analyses supplemented by some in-depth studies provide a basis for on-going evaluation. Together, these two processes supplemented by biophysical and socio-economic data provide the basis for major, terminal or ex-post evaluation.
The proposed framework will help in

Formulating, developing and reviewing the national policy framework for sustainable development;

Undertaking action research to support the economic importance of forestry in the country;
Identifying policy gaps in the forestry sector master plan;
Coordinating the national response and participation in the international environment conventions; and
Promoting and communicating sustainable development awareness.

framework of proposed monitoring work
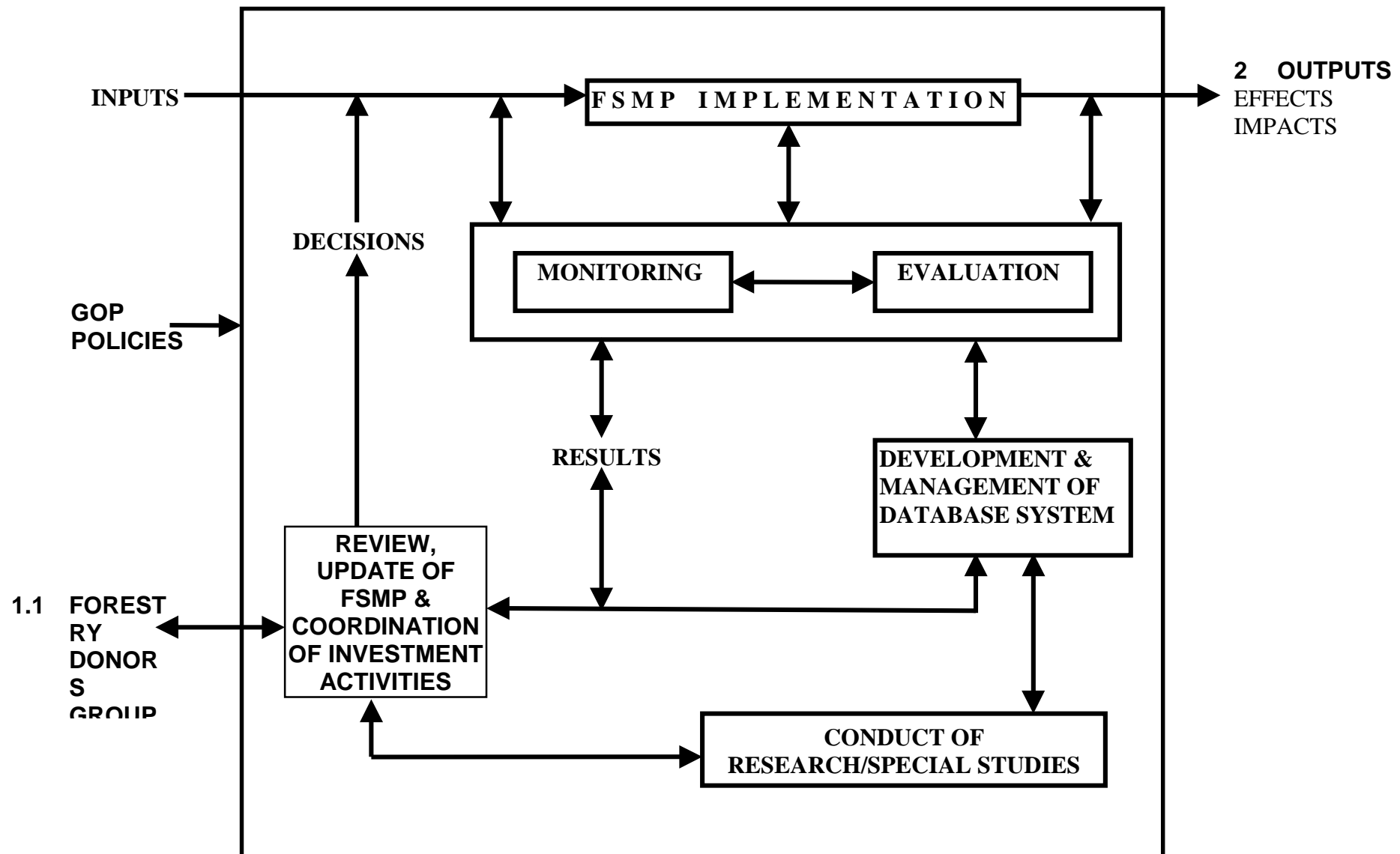
THAILAND COUNTRY REPORT

KAEWTA KONGCHUNTUK
STATISTICIAN
DATA CENTER, INFORMATION OFFICE
ROYAL FOREST DEPARTMENT

BACKGROUND

Since harvesting in forest concessions, except the mangrove concession, was banned in 1989 in order to save the nation's forest throughout the country, Thailand's forest products industry has turned to another facet. At present wood supplies in Thailand depend on imported wood especially from neighboring countries. In the future, timber imports will be reduced and domestic requirements will rely on forest plantations as much as possible. To provide direction, Thailand's Eighth National Economic and Social Development Plan (1997-2001) covers such forestry policies as restoration of forest conservation area to 25 percent of the total country land area. It also incorporates a policy of conservation of existing mangrove forest area to 1,600 million square kilometers in the last year of the plan, in order to maintain environmental equilibrium and also promote biodiversity. Utilization of forest products has also been closely monitored. A data collection system was established in order to help determine progress of the plan.

The current status of national forest information system
The Royal Forest Department of Thailand has set up a Data Center in its Information Office, responsible for collecting, compiling and disseminating information on forestry. Forestry statistics reports are published annually. Electronic copies of the report are available at the Royal Forest Department's website (www.forest.go.th). The Data Center provides forestry data to Thai and foreign students and researchers. Some detailed specific forest information are excluded from the annual report, for example forest inventory information. Most data received are from various reports that have been specially designed and assigned to forestry branch offices throughout the country to fill in and send back monthly. Some data are extracted from reports of other offices such as Department of Customs or Internal Trade.
Data are currently collected and made available in six subject areas:

1. Forest resources

Data forest resources are the existing forest area and forest inventory collected and compiled under the responsibility of Forest Resources Assessment Division, Forest Research Office. Data of the existing forest area are acquired from the interpretation of satellite imageries (LANDSAT) every two or three years. This information is included in the annual forestry statistical report. For forest inventory, the Royal Forest Department uses the Unit System Forest Inventory Method to collect data. Using computers, data were processed and collected in the form of database on forest resources in each forest. It indicates number of trees, species, regeneration, growth and yield and composition of forest and is disseminated in reports classified by forest name in certain provinces.

2. Forest plantations

Data of forest plantations available are only for those plantations that are on government budget. The task is under the responsibility of the Reforestation Office. This office receives plantation area data reported by Regional and Provincial Forest Offices all over the country. Besides the

government forest plantation area, there are other data on forest plantations areas from the Forestry Industry Organization and Thai Plywood Company Limited, which are the government organizations involved in reforestation. The Data Center then collects all these data from the responsible units and uses computers to analyze and disseminate the information in the annual forestry statistical report**.**

3. WOOD SUPPLIES AND TRADE

In 1989 concession harvesting was banned in order to save the nation's forests throughout the country (except the mangrove concession). Since then, wood supplies in Thailand depend on imported wood especially from neighboring countries. Quantities of wood production available are those of permitted and confiscated logs reported by Provincial Forest Offices monthly to Data Center who then analyzes them using computers. Data of imports and exports are collected and analyzed from data extracted from monthly report of Department of Customs, Ministry of Finance. For wood trade, only in Bangkok and suburban areas are domestic wood prices collected and compiled, from data derived from reports of Department of Internal Trade, Ministry of Commerce.

4. FUELWOOD PRODUCTION AND CONSUMPTION

Data on fuelwood production available include imports, exports and also data of permitted production and confiscated products reported monthly by Provincial Forest Offices directly to Information Office. These data are inevitably underestimated since true data of production and consumption exclude wood that rural people collect without permission. Imports and exports data are collected and analyzed from data extracted from a monthly report of Department of Customs, Ministry of Finance.

5. TREES OUTSIDE FOREST

Data of trees outside forest is only available in the form of quantities of log production. This excludes trees grown in private area because the owner can legally cut any tree without permission. The exceptions are teak (*Tectona grandis*) and yang (*Dipterocarpus spp.*) because a permit is required before cutting even though they are grown on private land. These data are reported by Provincial Forest Offices and sent monthly directly to Data Center for collection and analysis by computer.

6. Non-wood forest products

Data of non-wood production available include imports, exports and also data of permitted production and confiscated products reported monthly by Provincial Forest Offices directly to the Information Office. These data are inevitably underestimated since true data of production and consumption exclude those that the rural people harvest harvested without permission. Imports and exports data are collected and analyzed from data extracted from a monthly report of Department of Customs, Ministry of Finance.

MINISTRIES, DEPARTMENTS, AGENCIES, ORGANIZATIONS, NGOS AND OTHER NATIONAL INSTITUTIONS INVOLVED IN DATA COLLECTION, ANALYSIS AND DISSEMINATION
INFORMATION/DATA SOURCES OUTSIDE THE ROYAL FOREST DEPARTMENT INCLUDE:
Department of Customs, Ministry of Finance, (for imports and exports data);
Department of Internal Trade, Ministry of Commerce, (for domestic prices data);

Forestry Industry Organization (FIO), Ministry of Agriculture and Cooperatives, (for plantation data); and
Thai Plywood Company Limited, Ministry of Agriculture and Cooperatives (for plantation data).

Perceived weaknesses and gaps in the existing system of data collection, analysis and dissemination
At present, forest statistics data rely mainly on reports from Regional, Provincial and District Forest Offices. With constraints on manpower and budget together with amount of work to be done, reports are sometimes perceived as low priority (if not least priority). In terms of coverage forestry statistical system does not cover information on all wood data. This is the biggest problem encountered in data collection since the government intends to provide people or factories with convenience and facilitate industry growth by cutting short the permission on processing to none. Without permission, there is no way to know the amount of production from trees not grown in a forest.

Changes or addition that would significantly strengthen or improve process for information gathering, analysis or dissemination
Royal Forest Department tries to improve process for information gathering, analysis or dissemination by training provincial forest officers on how to fill information required in the reports using computer. Currently, Royal Forest Department has a development plan on computer system. Every Provincial Forest Office will have at least one computer that can be online with the Royal Forest Department and every report can be sent to Data Center directly, correctly and quickly through electronic system.

National planning framework or strategy for improving collection and analysis of forestry information
A national planning framework for improving collection and analysis of forestry data remains unavailable. However, the Forest Research Office of the RFD is developing criteria and indicators at the national level for the implementation of sustainable forest management.

VIET NAM
COUNTRY PAPER

Ngo Sy Hoai & Phan Trung Dien,
Ministry of Agriculture & Rural Development,
Viet Nam

BACKGROUND
The forestry sector of Viet Nam is undergoing drastic changes toward sustainable forest management. The recently launched 5 Million ha Reforestation Programme (2000-2010) along with efforts to put remaining forests under proper management testifies the utmost determination and commitment of Viet Nam to the world-wide processes started since the UNCED 1992. Despite the increasing attention given to sustainable forest management in Viet Nam, real on-the-ground progress still lags. Current Government incentives for sustainable management of forest resources still lack the scope, momentum and enforceable institutions needed to succeed. The lack of a precise and properly collected and analyzed information system is found as an important reason contributing to this situation.
In Viet Nam, the information for forestry administration are currently collected and processed by the following agencies:
General Department of Statistics
Provincial Department of statistics
District Statistics Office
Commune Office

Forest Inventory and Planning Institute
Regional Forest Inventory and Planning Brigades

The Department for Forestry Development
Provincial Sub-department for Forestry Development
District agriculture-Forestry Division
Commune forest person-in-charge

The Department for Forest Protection
Provincial Sub-departments for Forest Protection
District Forest Protection Stations
Forest Rangers

Various departments and/or ministries
(General Dept for Land-use Management, Ministry of Trade,
Ministry of Science-Technology & Environment etc.)
NGOs (WWF, Birdlife etc.)

AS IT IS APPARENT FROM THE ABOVE LISTED, FORESTRY RELATED INFORMATION IS COLLECTED AND ANALYZED BY AGENCIES UNDER THE CONTROL OF THE FORESTRY ADMINISTRATIVE SYSTEM, AND ALSO BY AGENCIES THAT ARE OUT OF THE FORESTRY ADMINISTRATION.

Forestry Information

General Dept. for Statistics	Other Ministries/ Departments (General Dept. for Land-use, Ministry of Trade, Ministry of Science-Technology & Environment etc.), NGOs	Forestry Development Department	Forest Protection Dept.	Forest Inventory & Planning Institute (FIPI)
Provincial Dept. for Statistic		Provincial Sub-dept. for Forestry Development	Provincial Sub-department for Forest Protection	Regional Forest Inventory & Planning Brigades
District Office of Statistics		District Office of Forestry	District Forest Protection Station	Inventory & Planning Teams
			Forest Rangers	

Figure 1. Agencies involved in the collection and analysis of forestry data

Forest resources, forest plantations
The Forest Inventory and Planning Institute of Viet Nam (FIPI) is assigned to collect data on forest resources including natural forests and plantations and provide data for the Ministry of Agriculture and Rural Development to announce the national forest resource data every five year period. Data is collected based on satellite imageries (LANDSAT and SPOT) and aerial photos with most crucial forested areas. Ground surveys are also used to verify the data. Besides, FIPI may also access statistical data submitted by provinces, particularly with the plantations established within the inventoried period.
The flow of information is as follows:
Forest owners/tree growers ⟶ Commune ⟶ District ⟶ Province ⟶ Departments/FIPI ⟶ MARD

Wood supply and trade
Information on wood supply concerning major forest products such as lumber, plywood, veneer, paper products, sawlogs, pulpwood, and pitprops is available from two major sources: the Forestry Development Department, MARD and the Ministry of Trade. Of this, the Department of Forestry Development, MARD is collecting data on domestic-used forest products, while the Ministry of Trade and Custom Department are collecting data on wood commodities for export. Data on logging provided by these agencies, however, is not reliable since illegal logging, which often exceeds licensed logging, is not recorded.

Fuelwood production and consumption
It is reported that biomass fuels provide 74 percent of total amount of energy used in Viet Nam. There are two agencies taking care of fuelwood supply as a significant source of energy, but no reliable data has been made available since fuelwood is regarded as a free commodity.
Trees outside of the forests

Tree planting in home-gardens, along roads and dikes etc. constitute the scattered plantation component. This forms an essential proportion of the total annual tree planting and exceeds the concentrated plantations in terms of number of planted trees. Data collected in a way similar to that applied for concentrated plantation shows that the scattered trees planted in the past decade (around 500 million trees a year) corresponded to a planted area of 200,000 - 250,000 ha per year, on a basis of 2,000 stems per hectare.

Non-wood forest products
NWFPs are commercially and locally important. However, little attention has been given to NWFPs and there are no precise data on number of species, exploitable volume and value of NWFPs except a group of commodities for export such as cinnamon, colophan, star aniseed, rattans etc.

Weaknesses and gaps in the existing system of data collection, analysis and dissemination.
Following are the major problems to be addressed to improve data collection and analysis for sustainable management:

Lack of a well developed network of data collection from grassroots level to the decision making level;
Lack of a comprehensive database needed for forestry administration as well as for sustainable forest management;
Discrepancy of methodologies used by different organizations at different nodes; and
Hardware and software needed for data collection and processing has not been made adequately available.