International Workshop

Model Forests
for Field-Level Application
of Sustainable Forest Management

RECORD OF WORKSHOP DISCUSSIONS

March 10 - 12, 1998
Tokyo, Japan
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Executive Summary

The Tokyo Workshop on Model Forests was hosted by the Forestry Agency of Japan and was provided with sponsorship from the International Model Forest Network Secretariat (IMFNS). The three-day event brought together participants from 17 countries and four international organizations to this first of four annual workshops to be hosted by Japan on the issue of field-level applications of sustainable forest management. This inaugural workshop also represented a Japanese contribution to the consultation process to determine the future of the IMFN, as agreed to by 12 countries in meetings held on the margins of the World Forestry Congress in Antalya, Turkey, in October 1997.

The Tokyo workshop sought to identify views among participants as to what model forests are and how they can operationally contribute to the goals of sustainable forest management at the field or landscape level.

To stimulate this discussion participants were asked to report on model forest or analogous initiatives in their countries and to discuss the model forest concept within the context of three specific questions: What are the attributes of a model forest? What does a model forest do? How does it do it (locally, nationally, and internationally)?

The workshop output consists of the Compilation of Key Findings, which was endorsed at the closing plenary. The document will be used by the Forest Agency of Japan in its planning for the 2nd international workshop on field-level applications of sustainable forest management and by the IMFNS as input into its global consultation on the future of the IMFN. Although the compilation document does address all three questions posed in the discussion, time did not permit in-depth discussion of the needs and expectations of participants in model forests with respect to networking.

The workshop was successful in identifying a number of common themes and a variety of shared ideas concerning model forests. In both plenary and facilitated working group discussion, considerable attention was given to the importance of an inclusive and flexible partnership structure and its role at the local level; of the need for model forests to be useful demonstration sites; and for them to address sustainable forest management issues at the operational level. There was broad concurrence that model forests need to be relevant to both local communities as well as within given national policy frameworks and take into account the cultural, institutional and political setting.

There is no standard template for model forest development. The attributes of partnership and sharing through networking are common to model forests, however, the activities and approaches taken to meeting the objectives of sustainable forest management must incorporate the variations and special circumstances found in the local environment due to differences in the social, cultural, economic and political setting.

The workshop findings validated the key attributes of partnership and networking which have been used to define model forests. The findings of this workshop will be incorporated with those of other regional and bilateral meetings in the IMFN consultation process and reported to the participating countries and other interested organizations.
1.0 Background

The background of the workshop can be described as follows:

The International Workshop on Integrated Application of Sustainable Forest Management Practices, held in Kochi, Japan in November 1996, proposed a “new culture” on land use planning and forest research and extension, which recognizes the linkages between the field level and the international level in the forest sector. The conclusion of the workshop was submitted to the Intergovernmental Panel on Forests (IPF) at its fourth session for its deliberations on the Proposals for Action, and consequently, IPF, in its final report, acknowledged the usefulness of testing and demonstrating the concept of national forest programmes on an operational scale.

Based on the outcomes of above-mentioned workshop in Kochi, Japan is now planning to host a series of international workshops on the promotion of field-level demonstration of sustainable forest management or namely, “model forest” projects, which is to be held annually from FY1997 to FY2000. This initiative is a part of Japan’s strong commitment to promote and facilitate international actions toward achieving sustainable forest management, and is also consistent with a proposal made in August 1997 by the High-Level Advisory Group on the International Forest Issues appointed by the Director-General of Forestry Agency, Japan, which called for a global initiative on developing and implementing field-level model forest projects for the demonstration of sustainable forest management. Background information on this series of workshops is found in Annex F.

In addition, on October 16, 1997, an informal meeting of heads of forestry agencies from 12 countries and the FAO was held during the World Forestry Congress in Antalya, Turkey. The purpose of the meeting was to exchange views and interests in model forests and to discuss a multi-country consultation process to chart the future of the International Model Forest Network (IMFN).

Japan attended the meeting in Turkey and announced its plan to hold the first of its series of model forest workshops in Tokyo early in 1998. This was welcomed by the countries present at the meeting as well as by FAO and IMFN Secretariat. This first workshop which was hosted by the Japanese Forestry Agency and sponsored by the IMFNS supports the IMFN consultation process.

2.0 Workshop Objectives

The workshop objectives were:

1) to deliberate and exchange views on the role of model forests in achieving sustainable forest management;

2) to propose practical options for effectively promoting model forest projects;
3) to enhance international cooperation in this context; and ultimately

4) to develop and propose ways of feeding back the result of model forest projects to the overall land use policy planning process in each country

The Tokyo workshop focused in particular on the first two of the four objectives
In support of the Workshop objectives, participants in the Working Group discussions were requested to exchange views on the attributes, goals, objectives, activities and other defining characteristics of model forests, under the headings of

- Attributes and Characteristics of Model Forests (MF)
- At the operational level, what role can Model Forests play in progressing towards SFM?
- How can MFs work nationally and internationally

Recommendations were sought on the characteristics necessary for the model forest concept to be successfully and practically applied at the field level.

3.0 Keynote Address

The workshop included two keynote addresses. One from Mr. Yoshio Hironaka, Director, Agriculture, Forestry and Fisheries Credit Foundation, Japan and the other from Mr. S.K. Pande, Additional Inspector General of Forests, Ministry of Environment and Forests, India. They are attached to this report as Annex C.

4.0 Key Findings

The following compilation of key findings is based on the conclusions of the three working groups, supplemented by information from the keynote speeches and the presentations.

4.1 The attributes and characteristics of model forests

(a) The following attributes and characteristics of model forests involve people

- People take part voluntarily in model forest implementation as partners, whether as individuals or in groups or communities, in the decision-making process;

- Participation should be broad-based, reflecting the diversity of users and their range of their needs from the forest. All should participate on an equal footing, but with particular attention to those frequently omitted such as the poor, the landless or women. It must be recognized that
partners may be unequal in experience and that there may be the need to pursue special training or education for some groups;

- Participation should include land-owners, government and industry. The support of landowners is essential, who retain decision-making rights and responsibilities in conformity with respective national laws, regulations and state policy.

- Management objectives should reflect the needs and interests of the people and as such will differ from country to country and from model to model - "each model forest is unique";

- the model forest is a training centre for human resource development and capacity building

(b) Model forests activities should aim to demonstrate

- model forests should demonstrate appropriate practices;

- the sharing of information and teaching for the transfer of technology is an important attribute of model forests

(c) The primary activity of model forests is sustainable forest management at field level, which should be in conformity with the environmental, social and economic requirements of sustainable forest management

- management systems chosen should reflect the objectives, the available budget and the capabilities of the participants

- within the objectives determined by the participants, management should be for a range of benefits, including watershed management

- the management systems of the model forests should be simple, relevant, practical and appropriate;

- management systems should manage the forests as ecosystems and optimise biological diversity to the extent possible;

- supporting data and information systems are required for the effective planning and management of model forests - among other systems they include commercial forest inventory, the assessment of biological diversity, inventories of non-timber products, and estimates of the value of NTFP or services such as the protective function of watersheds;

- forest management and supporting systems can be based on adaptations of existing systems, or on new systems developed by research.
Forest management and supporting systems must be appropriate to different scales and, linked to the demonstration function at (b) above, must be replicable, adaptive and subject to a process of continuous, long-term improvement.

(d) Model forests include a wide range of other activities in support of management

- such other activities will often include research and development, training, public awareness, networking locally, nationally and internationally (see Issue #3);
- the development of local indicators may be necessary to measure progress towards sustainability in forest management

(e) Model forests should be linked to national forest and land use policies

- the linkage may be from top down, in that the model forest objectives and activities must conform to national policies;
- the linkage may also be from bottom up, in contributing to national level policy development

(f) The structure of the model forest has certain characteristics

- it is flexible and dynamic;
- the organisational structure may be defined by ownership
- the territorial structure may comprise watershed management

4.2 The operational role of model forests in progressing to sustainable forest management

The following summary of the conclusions of the three working groups repeats in some instances attributes already covered under section #1, and includes some under #3

(a) Empowerment

The degree of empowerment of people to manage forest resources will depend on local conditions.

Whatever the level to which ultimate control is delegated, the primary concern is to establish effective partnerships, equal participation and effective mechanisms for conflict resolution.

(b) Defining sustainable forest management in local terms, and re-defining it over time as needs change. Criteria adapted from national processes may assist in the definition of local sustainable forest management
(c) Contribution to food security

Model forests may have an important role in promoting food security for participants in terms of food directly from the forest (fruits, fodder etc.), protection for agriculture and livestock and watersheds, and the provision of rural employment and income.

(d) Generation and sharing of data and information

The generation of data and information has already been noted as an attribute of model forests. This contributes to informed decision making by participants, but an extra effort may have to be made to inform less experienced partners so that they can take part effectively in the process. The availability of information makes the decision-making process more flexible and open and contributes to the building of trust.

The provision of information is also closely linked to the role of model forests in public information for the conservation, protection and sustainable management of all forests.

Data collection and analysis is essential for monitoring and evaluation of the model forest’s performance and impact. Data collection is required for the quantification of local indicators of trends in progress towards sustainable management.

(e) 3-T’s - Test, Try, and Teach

The role of the model forest is to test hypotheses through research, to try them out and develop them at operational level, and then to teach the new techniques to the target audience, at local level or through the exchange of information through networking.

Indigenous knowledge or experience relevant to sustainable forest management or (for example) the uses of non-wood forest products or medicinal plants may be tested and adapted.

Teaching need not be confined to the field level, but the role of the model forest may be to send upwards details of experience gained which may contribute to national planning or policy development.

(f) Contributions outside the model forest

The model forest may have a role to play in contributing to development outside the immediate project boundaries. Its implementation may demonstrate the commitment of the government to local action.

The model forest may contribute to general improvements in land use management through its demonstration function, or to defining the place of forests in relation to other forms of land use, or in helping people to identify their broad relationship (e.g. economic, spiritual, social or cultural) to the forest.
The model forest may serve to check national standards for sustainable forest management, new equipment etc. by virtue of its controlled environment.

The model forest may promote thinking in 3-dimensions, doing, knowing and being in the forest, including the intrinsic value of forests.

4.3 The Model Forest at National and International Levels

Although there is no global formula, the model forest could be set up following these broad steps:

- appraisal/evaluation to review/facilitate local dialogue (introducing the "catalytic agent");
- bringing the potential partners together and identifying the opportunities;
- model forest decision-makers consult with interested parties on possible shared objectives etc.;
- draw support from the rest of the participants, up to the general population;
- identify the goals and objectives;
- establish a representative body;
- implement the project within national legal and policy frameworks.

The organisational structure for the model forest will vary to meet different political and social conditions; no single structure will fit all cases. It should, however, capture the range of values of the participants and involve private owners where they are present. Frequent dialogue and co-ordination with government at local and national/regional level is necessary in the development of the structure.

Co-ordination and co-operation between national model forests should be encouraged, to share experience and to reduce duplication of efforts and resources. Those setting up model forests should learn from those who already have experience.

In establishing the model forest there will likely be need for changes in the attitudes of forest managers in relation to devolving control and decision-making and new skills will be needed for all forestry staff – model forests require "model foresters".

As the national network of model forests develops there will be need for some sort of focal point or secretariat to promote and co-ordinate networking and information-sharing. The national secretariat may serve to co-ordinate action needed at national level to solve local problems e.g. the removal of constraints to provide free access to markets.
Support to the implementation of model forests through networking will generally be important, depending on the geographical spread of the activities being implemented by the model forest; those of purely local interest may not benefit from networking. Different networking techniques should be used appropriate to circumstances, and conventional techniques should not be scorned.

Time did not permit in-depth discussion of the needs and expectations of participants in model forests with respect to networking, especially at the international level. Activities and mechanisms for international networking will require further exploration.

Partners for networking may include university academics, research workers, the media and even local industries. There may be possibilities for linkages with existing international networks to help develop a network.

In joining an international network countries should consider the cost and obligations to the network and the benefits expected from it.

5.0 Co-Chair's Synthesis

The following workshop synthesis was prepared and written by the two workshop co-chairpersons, Dr. Yukichi Konohira and Dr. John Naysmith.

"First we would like to acknowledge the excellent work of the Workshop Secretariat under the leadership of Mr. Nagame. Many people have worked extremely hard prior to and throughout the workshop and without them the success we have been able to attain over the past three days would not have been possible. We would like to extend our particular thanks to the Workshop translators - they have done a fine job.

Now turning to the results of our deliberations. As your Co-chairs Dr. Konohira and I were impressed as we went through and analyzed last evening the results of the three Working Groups.

The outcome of the Working Group sessions when combined with the substantial discussion that took place this morning in the Plenary session have resulted in a Key Findings Document of which all Workshop delegates can be proud.

In their Welcome Addresses on Tuesday, Mr. Takahashi and Mr. Johnson made several important points.

Mr. Takahashi spoke of "our sincere hope that a new series of international foresters' dialogue, starting this year, will provide an open forum toward better understanding and formulation of model forests for the practical demonstration of sustainable forest management." I am certain Mr. Takahashi will be pleased when he is briefed on the effectiveness of this Workshop to do just that, and with the results you have attained.
You will recall that Mr. Johnson urged us to move from the policy down to the practical level, that is to the people, the trees and the land. Dr. Konohira and I are impressed with the extent to which the Workshop, that is all of you, have succeeded in doing that.

The Key Findings Document is a very substantial, practical and potentially far-reaching one. Delegates were asked to focus on two objectives namely: to deliberate and exchange views on the role of Model Forests in achieving sustainable forest management; and to propose practical options for effectively promoting Model Forest projects. In the context of these objectives the Workshop organizers posed three questions

- What is a Model Forest?
- What does a Model Forest do?
- How does it do it?

Each question was addressed in clear, practical terms. The result is a Plenary document that, like Model Forests themselves is dynamic and people oriented. To be effective the Key Findings Document must now be connected to a broader audience if it is to be a catalyst for the establishment of new Model Forests. It has, in our opinion, all of the qualities necessary to advance the concept of Model Forests at the Global scale.

The Document speaks to the involvement of local people. Much has been said about empowerment - we believe the Workshop Document makes clear the role of the Model Forest and how it can appropriately assist in this important issue. Knowledge, skills, increased level of awareness, all bring with them empowerment. What is needed are the appropriate initiatives to enable such capacity building to take place.

As this is done we must not forget the power of the local genius, that is the collective traditional knowledge that has existed with people at the local level for generation upon generation.

The Workshop Document also states that there must be a range of economic benefits that flow to local people. There was unanimous agreement on this point. The Document also refers to the environmental benefits that accrue from Model Forest initiatives. This is equally important - we sometimes lose sight of the fact that economic benefits are often the direct outcome of reducing environmental degradation.

Model Forests, as have been described in the Document, underscore the connection between the forest and human kind. Although the principal objective of Model Forests is Sustainable Forest Management considerable emphasis is placed on the involvement of people. For example: Workshop delegates have agreed that Model Forests should have: objectives that reflect the needs and interests of the people; broad-based participation in which all partners participate on an equal footing; and the support of land owners. Delegates also observed that Model Forests require "model foresters", involved as they will be in the devolution of control and decision making.

A key point related to the role of a Model Forest was that it must operate within national policy and legislation - that is within the "laws of the land". In so doing Model Forests should contribute to the
general improvement in land use management through the demonstration of best practices and the sharing of information.

The Workshop concluded that there could be no global formula for the establishment of Model Forests since they must reflect different political and social conditions. Cooperation among national Model Forests should be encouraged however to reduce duplication of effort and to facilitate the opportunity to learn from each other.

Finally Dr. Konohira and "I wish to say how much we were impressed with the quality of the presentations, the discussions that took place in the Working Group and Plenary sessions, and the constructive atmosphere that prevailed throughout the Workshop. All of those factors have led to a Key Findings Document that provides excellent guidance for countries wishing to consider establishing Model Forests and a sound basis for future international discussions on their role in sustainable forest management. Congratulations on a job well done."
ANNEX A

Agenda
International Workshop on Model Forests
for Field-Level Application of Sustainable Forest Management

Tokyo, Japan
March 10 - 12, 1998

Agenda

Tuesday 10 March:

08:00 - 09:00 Registration of participants, second floor common area.

09:00 - 10:45 Opening session:
Welcome address:
- Mr. Isao Takahashi, Director-General, Forestry Agency, Japan
- Mr. Fred Johnson, Executive Director, International Model Forest Network Secretariat
Introduction of Co-chairpersons:
- Dr. Yukichi Konohira, Professor, Faculty of Agriculture, Tokyo University of Agriculture and Technology
- Dr. John Naysmith, founding Dean & Professor Emeritus Forestry, Faculty of Forestry, Lakehead University
Objectives of the workshop:
Introduction of bureau members:
Logistic issues and review of the agenda:
Key-note address:
- Mr. Yoshio Hironaka, Director, Agriculture, Forestry & Fisheries Credit Foundation, Japan
- Mr. S.K. Pande, Additional Inspector General, Forests, Ministry of Environment & Forests, India

10:45 - 11:00 Coffee break:

11:00 - 12:20 Country presentations:
- Canada: Dr. Dan Welsh, Director, Programs Division, Canadian Forest Service
- Japan: Dr. Takao Fujimori, Director, Forest Environment Division, Forestry and Forest Products Research Institute of Japan
- Canada: Mr. Mike Waldram, General Manager, Manitoba Model Forest Association, Canada
- USA: Mr. James Brown, State Forester, Oregon Department of Forestry, Oregon, USA

12:20 - 13:30 Lunch (Kiku room):

13:30 - 14:30 Resumption of country presentations:
- Russia: Mr. Evgeny Zabubenin, Deputy Head, Khabarovsk Krai Forest Service, Russia. (Vice-President, Gassinski Model Forest
Association
Finland: Dr. Taneli Kolstrom, Dean of the Faculty of Forestry, Joensuu University, Finland
China: Dr. Yaoguo Xiong, Vice-President, Chinese Academy of Forestry & Dr. Zhaohua Zhu, Director, International Farm Forestry Training Centre, Chinese Academy of Forestry

14:30 - 14:50 Coffee break:

14:50 - 16:10 Resumption of country presentations:
Vietnam: Dr. Nguyen Ngoc Lung, Director, Forestry Development Department, Ministry of Agriculture and Rural Development
Lao P.D.R.: Mr. Khambay Khamsana, head of Lao-Japan Forestry Cooperation Unit, Lao P.D.R.
Myanmar: Mr. Kyi Maung, Director, Forest Department, Myanmar
Kenya: Mr. Ben Wandago, District Head, Forestry Department, Ministry of Environment and Natural Resources, Kenya

18:00 Dinner:

Wednesday 11 March:

09:00 - 10:00 Resumption of country presentations:
Indonesia: Dr. Silver Hutabarat, Head of Technical Cooperation, Directorate General of Forest Utilization, Ministry of Forestry, Indonesia
Thailand: Mr. Apiwat Sretarugsa, Director, Planning Division, Royal Forest Department, Thailand
India: Mr. Bharat Lal, Ministry of Environment and Forestry, India

10:00 - 10:15 Instruction to Working Group sessions:

10:15 - 10:40 Coffee break:

10:40 - 12:00 Working Groups sessions:

12:00 - 13:30 Lunch:

13:30 - 16:30 Resumption of Working Groups sessions:

14:30 - 15:00 Coffee break

18:00 Dinner:

Thursday 12 March:
09:00 - 10:30  *Informal presentations by interested groups*

10:00 - 10:30  Morning coffee:

10:30 - 11:00  **Plenary session:**
   Working Group reports

11:00 - 12:30  **Plenary session:**
   Open discussion on working group observations and perspectives.

12:30 - 14:00  Lunch:

14:00 - 15:15  **Resumption of Plenary session:**
   Presentation by Plenary Rapporteur of a Draft Compilation of Key Findings
   Co-chairs deliver a workshop synthesis

15:15 - 15:30  Coffee

15:30 - 16:00  **Closing session:**
   Mr. Isao Takahashi, Director General, Forestry Agency
ANNEX B

Opening and Closing Remarks
OPENING REMARKS

Mr. Isao Takahasi
Director General
Forestry Agency
Japan
Opening Address to The International Workshop on Model Forests for Field-Level Applications of Sustainable Forest Management

Tokyo, Japan, 10 - 12, 1998

by
Isao Takahashi
Director-General
Forestry Agency, Japan

Distinguished participants, friends and colleagues, Ladies and Gentlemen,

It is a great pleasure and privilege for me to extend welcoming remarks on the commencement of this international workshop, which is hosted by the Japanese Forestry Agency. At this point, I would also like to extend my sincere appreciation to the International Model Forest Network Secretariat, which has provided its sponsorship to this workshop.

Ladies and Gentlemen,

I wish to express my sincere welcome to all of you who have come from around the world. Even though invitations were given on relatively short notice, around eighty people from seventeen countries, four international organizations and four international or national NGOs have chosen to participate in this hall. I understand this to be a result and reflection of how highly people are interested in the workshop theme, that is the importance of the practical approaches toward sustainable forest management at the field level.

Since the Earth Summit in Rio de Janeiro in 1992, dialogue toward sustainable forest management has made significant progress mainly through the Intergovernmental Panel on Forests. It should be noted that the IPF Proposals for Actions represent a meaningful consensus on a wide range of forest and forestry issues. Moreover, through the full use of the newly created Intergovernmental Forum on Forests, additional effort should be made in order to promote and facilitate the implementation of the IPF Proposals, to review, monitor and report on progress toward sustainable management of forests, and to consider matters left pending as regards the program.
elements of the IPF.

Parallel to the dialogue in the United Nations, several intensive regional initiatives have been conducted. One such initiatives is the working group on Criteria and Indicators for sustainable forest management. As Japan participates in the Montreal Process Working Group, the main concern in the process as well as other processes is now shifting from identifying criteria and associated indicators to applying and implementing these criteria and indicators at the field-level. The identification of a set of practical requirements for sustainable forest management through the criteria and indicators development processes will be a great asset for our society.

A practice related to certification and labelling of products from sustainably managed forests has also been conducted, mainly in European countries. There seem to be many difficulties of application in the market, especially for small-scale producers. However, this approach will be one of effective facilitation of measures for sustainable forest management conducted by both producers and consumers in the near future.

Ladies and Gentlemen,

The Japanese Forestry Agency has been promoting the importance of field-oriented practical approaches in terms of sustainable forest management. As one of such approaches or initiatives, we have been conducting and providing fora for field-oriented discussions among foresters and researchers world-wide since 1991. In November 1996, during the International Workshop on Integrated Application of Sustainable Forest Management Practices in Kochi, which was co-sponsored by Japan, Canada, Malaysia and Mexico, in partnership with FAO and ITTO, the idea of a new culture on land use planning and forest research and extension was proposed, one which recognizes and accepts that integration of a wide range of multiple values, needs and aspirations is essential toward sustainable forest management. Participation of all stakeholders at the field level is highly prioritized among other initiatives. The full range of this proposals, which is available in your hand-out, was submitted to the fourth session of IPF for consideration in its deliberation on the Proposals for Action.

I would also like to introduce a proposal prepared by the High-Level Advisory Group on International Forest Issues in last summer. This proposal, which is available in your hand-out in summary form, consists of two parts: global strategies toward
achieving sustainable forest management, and Japan’s action. One of its global strategies is a “Global Green Network” in which two different linkages, - vertical and horizontal ones - are identified. The vertical linkages request close and two-way communication among field practices, national policies and global initiatives. The horizontal linkages request a network of similar activities at each level, such as a field level network, and a national level network. The horizontal network is also supported by a partnership of interested groups.

The model forest concept and similar initiatives will be considered as an effective approach of the practical demonstration vertical linkages at the field level. In practical terms, new and innovative initiatives and approaches linked with the conservation of biological diversity and multiple values, will not be homogeneous world-wide. It is therefore, region-wise, sub-region-wise or nation-wise that effective approaches can be identified through demonstrative or trial field applications in a various of selected model areas. In this connection, the challenge of creating so-called model forests has been taken up by several countries.

Ladies and Gentlemen,

In this workshop, on-going model forest projects as well as research and conceptual level approaches are presented. A high value will be placed on your intensive analysis on these merits and demerits on your constructive discussion toward the conditions, roles of model forests as well as the modalities of its network. It is our sincere hope that a new series of international foresters' dialogue, which starts this year, will provide an open forum toward better understanding and formulation of model forests for the practical demonstration of sustainable forest management.

I do hope that all participants will make a significant and positive contribution in session and that they also enjoy early spring season in Tokyo.

Ladies and Gentlemen,

I would like to now to officially open the International Workshop on Model Forests for Field-Level Applications of Sustainable Forest Management.

Thank you very much.
OPENING REMARKS

Mr. Frederick Johnson
Executive Director
International Model Forest
Network Secretariat
Honoured colleagues, ladies and gentlemen; it is indeed a pleasure to have the opportunity to participate in this workshop in Tokyo. The IMFNS is pleased to be working with our hosts, the Japan Forestry Agency, and to be a sponsor to this event.

This morning I would like to provide you with some background on model forests, the experience of the Secretariat in its work in numerous countries, and some of the issues and questions that surround model forests and the issue of networking.

BACKGROUND

Firstly, I would like to provide you with a brief reminder of why forestry is a global issue and why international cooperation is important.

GLOBAL FORESTRY ISSUES AND WHY AN INTERNATIONAL EFFORT

- Social and economic benefits that forests provide to society
- Deforestation
- Forest ecosystems' health and productivity
- Protection of water sources and conservation of soil
- Conservation of biodiversity in forests
- Positive contribution to global geochemical cycles e.g. carbon cycle
WHAT IS THE CHALLENGE AND WHO ARE THE PLAYERS?

Economic, Environmental and Social Dimensions - the need to find balance and to resolve conflicts.

"THE CHALLENGES AND THE PLAYERS"

Environmental

- Governments
- NGOs/Environmental Groups
- Industry
- Native Groups
- Local Communities
- Academic Research Organizations
- Private Landowners
- General Public

Social

Economic

We know what the issues are but the challenge is finding the solutions. Processes and means are needed to allow the players to come together to explore ways and means which provides a balance to the competing demands for the use of forests and the land base. Sustainable management of forests will not occur unless balance can be found for these economic, environmental and social demands.

The corners of the triangle represents the 3 often competing demands on the use of the land base and the use of forests and related resources. How can one bring balance to these demands? It would seem simple to do so but it is not as there is a long list of parties and groups which have often very different views on the issue. Please note that the list given here is given as an example and is not meant to be exhaustive.

THE OTHER CHALLENGE - FROM POLICY TO THE FIELD LEVEL

THE OTHER PART OF THE CHALLENGE: GETTING FROM THE POLICY LEVEL TO THE PRACTICAL LEVEL
Mr. Takahashi in his address referred to the need to demonstrate action at a practical field level. This is the other part of the challenge - getting from the what I call "up in the clouds" or the policy levels of the upper atmosphere down to a practical field level where we are dealing with people, forests and resources.

BACKGROUND ON WHAT ARE MODEL FORESTS

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<th>WHAT ARE MODEL FORESTS AND WHAT DO THEY DO?</th>
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<tr>
<td>• Partnerships</td>
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<td>• Networking</td>
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The concept of the model forest is a simple one in that it calls for a groups that reside or have interest in a working forest area which is under multiple use to come together as a partnership to undertake activities collectively or in collaboration. All of this is undertaken with a common objective of sustainable management of forests and related resources.

In addition to this partnership, there is a commitment to sharing the knowledge and experiences within the model forest partnership and externally to other model forests. This sharing, or networking, is the aspect that makes this approach and the IMFN unique.

<table>
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<th>WHAT DO MODEL FORESTS DO?</th>
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<tr>
<td>Areas</td>
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<tr>
<td>• Coordination</td>
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<td>• Development</td>
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<td>• Networking</td>
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Therefore, the model is not the forest - the model is the process of the collaborative partnership and networking.

Partners in model forests work on a broad range of activities which cover development of commercial and non-commercial nature and in education and training. Both areas can involve research work as well as work on practical solutions.

THE INTERNATIONAL MODEL FOREST NETWORK

The mission of the IMFN is to foster co-operation and collaboration in the advancement of sustainable forest management through a world wide network of landscape-level working model forests.

COUNTRY INTEREST IN MFs AND THE IMFN

<table>
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<th>INTEREST IN MODEL FORESTS AND THE IMFN</th>
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<tr>
<td>• Leadership (country and international levels)</td>
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<td>• Demonstration</td>
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<td>• Knowledge / technology transfer through networking</td>
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<td>• Development goals</td>
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EXPERIENCES OF THE IMFNS - THE PROGRESS TO DATE AND WHAT DID WE LEARN IN THE PROCESS

The IMFNS, a Canadian-sponsored body housed within the International Development Research Centre in Ottawa, Canada, has been working for some 2 and a half years. It has been active in:

1. Delivering the Canadian international program involving collaboration with Mexico, Russia and Malaysia in terms of model forest development and in networking.

2. Working with the USA which has 3 model forests that have been active in the IMFN from its early beginnings and with other countries in developing model forests in their regions. In addition
to the expansion in Mexico from 2 to 3 model forests (Mariposa MF), the IMFN has commencement of the Chiloé MF in Chile, and the 2 model forests in Japan.

Some countries are in advanced stages of developing forests, such as Argentina while others are at an early level in exploring interest or possibilities for establishing model forests which include China, Vietnam, Indonesia, Australia, as well as the UK, Malawi and South Africa.

The experience to date with model forests and networking has been very positive.

IMFN SECRETARIAT AND EXPERIENCES

- Model forest development and networking has not been a static process
- Unique settings and conditions in countries (cultural, institutional)
- Core principals of partnership and networking considered valid
- Questions of coordination and networking internationally

We have found that the process has been a dynamic one and viewpoints have evolved as more experience has been gained. The issues in various countries concerning forestry and the competition for the land base are similar but the conditions and circumstances are different due to differences in culture, institutions, etc. The principles of model forests in terms of partnerships and networking are considered valid, however, how can one provide definition of these principles to fit these cultural and institutional differences such that the principles are maintained? Also there are questions concerning the best and most efficient way to networking.

COUNTRY LEVEL CONSULTATIONS

ANTALYA MEETING
ISSUES AND QUESTIONS

- Refining Model Forest Definition
  - What are the criteria that define model forests?

- Networking
  - Needs at national and international levels
  - priorities in terms of activities
  - coordination

With these questions in mind and a need to collectively determine the future course for the IMFN, the IMFNS hosted a meeting of 12 countries and the FAO during the World Forestry Congress in Antalya, Turkey, October 1997. The objective of this meeting was to exchange views on model forests and on networking. The 12 countries involved included those that are active in the IMFN and those that are pursuing or considering the establishment of model forests (Argentina, Australia, Canada, Chile, China, Japan, Malaysia, Mexico, Russia, South Africa, USA, and UK).

Canada indicated at the meeting that, like other countries with forest interests, it has been giving encouragement to processes designed to advance sustainable management of forests. Related to this has been the promotion to adopt the model forest concept and to collaborate and share experiences and knowledge through the networking of these model forests. It has been the primary sponsor for this effort and although support will continue to March 2000, it was indicated that other countries were needed as partners to determine the future of the IMFN and to determine a process to truly internationalize it if the IMFN is to continue.

COUNTRY-LEVEL CONSULTATIONS ON FUTURE OF THE IMFN

- October 1997 Antalya Meeting
- Japan hosted Workshop - Asian Perspective
- USA hosted Workshop - American perspective
All of the countries present at the Antalya meeting agreed to engage in a collective dialogue designed to refine the criteria for model forests and to provide perspectives on their needs and expectations in networking, the role of model forests nationally and internationally, and the approach to coordinating and supporting an international network. It was agreed that this consultation would be done through a series of bilateral and multilateral meetings which would focus on these issues. This is detailed in the IMFNS newsletter of November 1997, a copy of which is attached. (Attachment #1)

The plan is to provide the results of these consultations to the heads of forestry organizations in a meeting at the margins of the FAO (COFO) meeting in Rome in March 1999. The first of these consultation meetings is the Tokyo Workshop hosted by Japan. The IMFN Secretariat is pleased to be a sponsor along with our Japanese hosts and we look forward to assisting as a facilitator in the discussions over the next 3 days.

Other meetings that are planned in the consultation include:

i) a meeting of model forest practitioners in Wemme, Oregon, USA at the end of March 1998.

This meeting is being hosted by the US Forest Service and although it is not a formal part of the country-level consultations, the exchange at that meeting will no doubt provide guidance in the view of model forests and the future of the IMFN. Included in the Portland agenda will be a presentation by Japan on the results of the Tokyo Workshop.

ii) other consultation meetings planned include a regional meeting involving Chile and Argentina in May 1998, a workshop in Russia in April 1998 and possibly a meeting in Mexico in June 1998.

The results of all of the above workshops and meetings will be brought forward for discussion with policy advisors from the 12 countries involved in the Antalya meeting. Subsequently, conclusions and recommendations will then be drafted in preparation for the meeting in Rome in 1999.

**THE ISSUES AND THE QUESTIONS**

For the final part of my presentation, I would like to briefly describe some of the issues and questions that will be the focal point in the consultation process and pertinent to the discussions in this workshop.

## MODEL FORESTS

- Partnership
- Commitment to sustainable development
- Activities that address the issues and problems
- An organizational structure to provide coordination
- Cooperation and sharing
The first of these are what are described as the “attributes” of model forests. These touch upon the issue of partnership, demonstration to the commitment to sustainable development, activities that address the issues, organizational structures that provide coordination, and cooperation and sharing through networking.

Proposed definitions of these “attributes” were provided to you prior to the workshop (attachment #2) and it is hoped that these will assist in the discussion and exchange of ideas.

Other questions which will be addressed in the consultation include the following:

THE CONSULTATION PROCESS

- Refining the definition of a Model Forest (attributes and characteristics)
- Determining the interests and needs of individual countries
- Determining Networking needs at national and international levels
- Defining organizational structures, governance and coordination for the International Network
- Defining obligations in support of the International Network

I would like to take the opportunity at this time to thank the Japan Forestry Agency for hosting this important initiative. The IMFNS has been pleased to work with the JFA as a sponsor to the workshop and I know that the discussion and exchange that will occur during this meeting will be invaluable in providing advice for the future of model forests and the IMFN.

Frederick Johnson
Executive Director
IMFN Secretariat
March 1998
On October 16, 1997, an informal meeting of heads of forestry agencies from 12 countries was held during the World Forestry Congress in Antalya, Turkey. The purpose of the meeting was to exchange views and interests in model forests, the role of the IMFN, and to discuss a multi-country consultation process to chart the future of the IMFN. Countries were invited to the meeting by the International Development Research Centre (IDRC) which has the responsibility for the IMFN Secretariat and its development work in model forests internationally. Dr. Yvan Hardy, Assistant Deputy Minister, Canadian Forest Service, chaired the meeting on behalf of IDRC.

Dr. Hardy described the decision of the Canadian sponsors — IDRC, the Canadian International Development Agency, the Department of Foreign Affairs and International Trade, and the Canadian Forest Service - Natural Resources Canada — to continue supporting the IMFN through to March 31, 2000. This support will be directed to the IMFN Secretariat and its work with Mexico and Russia and with other countries in developing their interests in model forests and in networking. Funding for new model forests outside of Canada will have to come from sources other than from Canada. There may be exceptions to this where there may be a fit and interest on the part of the Canadian International Development Agency. In terms of the future of the IMFN, however, he stated that a decision will have to be made which will define the support on the part of other countries for the IMFN. Canada is therefore seeking partners to chart the future of the IMFN if it is to play a global role in forestry.
Canada, Mexico and Russia have active model forests and have been participants in the IMFN since its inception. All have positive experiences and described their actions and plans to increase the number of model forests within their countries. The USA, which has been a participant in the IMFN since its early beginnings, confirmed the benefits offered by the network and its interest in the continuation of networking on model forest activities. Malaysia described its work on similar initiatives which are linked to ITTO (International Tropical Timber Organization) criteria and indicators for sustainable forest management.

Argentina, Chile and Japan described their work on the development of model forests which are now at advanced stages in their respective countries. For the remainder of countries present which included China, Australia, United Kingdom and South Africa, they are in the early stages of model forest development or exploring their interest in networking and possibly joining the IMFN.

Discussion centered on the need to refine the criteria which define model forests to take into account the unique cultural and institutional differences amongst countries. All affirmed the value of the core principles of model forests which are built on partnerships to explore and find new ways to enhance sustainable management of forest resources and sharing experiences and knowledge through networking.

All of the countries present agreed to engage in a collective dialogue over the next 18 months to refine the criteria for model forests and to provide perspectives on their needs and expectations in networking, the role of model forests nationally and internationally, and approaches to coordinating and supporting an international network. This consultation will be done through a series of bilateral and multilateral meetings which will focus on these issues.

**THE CONSULTATION PROCESS**

The Canadian partners and the IMFN Secretariat have been working diligently in the task of promoting the model forest concept, assisting in the development of model forests, and in the internationalization of the Network. The consultation process aims at advancing the dialogue on the future development of the IMFN, and the formalization of its organizational arrangements, with interested countries that have experience with the model forest concept, or are at various stages of pursuing their interest. Regional workshops will be structured to address the following questions and issues:

- Refining the definition of a Model Forest (attributes and characteristics)
- Determining the interests and needs of individual countries
- Determining Networking needs at national and international levels
- Defining organizational structures, governance and coordination for the International Network
- Defining obligations in support of the International Network.
In conjunction with the IMFN Secretariat, regional perspectives will be developed with the assistance offered by Russia, Japan, Argentina and Chile in their respective geographic regions. Consultation processes in other regions will be developed with the IMFN Secretariat. Japan indicated strong support for this process and offered assistance in developing an Asian viewpoint by convening a workshop in Japan. Japan also expressed the desire to link this work with on-going global discussions in forestry such as the Intergovernmental Forestry Forum and in particular in terms of implementation mechanisms to demonstrate sustainable management of forests at the field level.

The consultation process will consolidate regional and country views to provide input to a meeting of country representatives in September 1998 at which time options will be explored and recommendations will be developed with respect to the future of the IMFN.

Decisions and recommendations reached by the end of 1998 will be conveyed to the heads of forestry agencies for their consideration in a meeting planned on the margins of the March 1999 Committee of Forestry (COFO) meeting in Rome. FAO, which attended the Antalya meeting as an observer, indicated support for the IMFN initiative and the IMFN consultation process. FAO offered assistance to convene a meeting on the margins of COFO and where appropriate to provide support in the regional consultations.

Concurrently with the above consultation process the IMFN Secretariat will maintain its activity in delivery of the international program, its work with Mexico and Russia, and assisting the development of model forests in other interested countries. These areas of work will continue as the consultation process proceeds to define and develop the IMFN of the future.
Existing Model Forests:
- Canada: W. Newfoundland; Fundy; Lower St. Lawrence; Wazwaniipi; Eastern Ontario; Lake Abitibi; Manitoba; Prince Albert; Foothills; McGregor; Long Beach; Mexico: Chihuahua; Calakmul; Monarch Butterfly
- Russia: Gassinski
- United States: Applegate AMA; Cispus AMA; Hayfork AMA

Developing Model Forests in:
- Argentina; Chile; China; Japan; Malaysia; Mexico; Russia; Vietnam

Regions Expressing Interest
- Australia; Ecuador; Indonesia; Poland; SADC; United Kingdom

Some Upcoming Events

March 1998 (actual dates to be determined)
Consultation Process — Asian Workshop on Model Forest
By invitation only
- Tokyo (Japan)

March 1998 (actual dates to be determined)
Consultation Process — Chile/Argentina Workshop on Model Forest
By invitation only
- Site of meeting to be determined (Chile)

March 30 - April 3, 1998
Assembly of Model Forests
- Portland (USA)

April 1998 (actual dates to be determined)
Consultation Process — Russian Workshop on Model Forest
By invitation only
- Site of meeting to be determined (Russia)
Annex 2

ATTRIBUTES OF MODEL FORESTS

Experience has pointed us to a broader listing of attributes to describe model forests and I offer these for your consideration.

1. Partnership

A model forest is a partnership which identifies the goals, sets priorities and establishes policy guidelines for the overall program. A model forest is inclusive and will involve in the partnership the principle land users and other stakeholders in the geographic region e.g. industry, community groups, government agencies, non-governmental and forestry groups, academic and educational institutions, national parks, aboriginal groups, private landowners and others as appropriate.

Example indicator: The majority of the resident population can access the partnership through a partner which represents their principle activity or area of interest.

2. Commitment to Sustainable Development

A model forest uses and demonstrates the most environmentally appropriate forestry practices and techniques. The overall objectives and program of work are based on an ecosystem approach and reflect a vision of sustainability.

Example indicator: The partnership has an agreed upon strategy for determining progress towards sustainability.

A model forest will have the support of the appropriate national, regional and or local government that has jurisdiction over the land and of other interested community and private-sector representatives active in forest and natural resource management. Where appropriate, the model forest program of work should relate to an overall national or regional forest sector plan.

Example indicator: Participation by communities, landowners and managers in the partnership committee is reflected in the governance structures.

3. Magnitude and Scope of Activities

A model forest must be of a size that includes the full range of forest uses and values in the surrounding geographic region. The activities undertaken reflect the realities and needs and the local and national level. The activities support increasing the knowledge base, assessing impacts and supporting new approaches to sustainable development.

Example indicator: The majority of the forest values as defined in the national forest plan (or other similar documentation) are reflected in the model forest.

4. A Governance Structure to Address a Broad Range of Values

A model forest is managed in an integrated manner for all forest values identified as important by the partnership. The management process is both participatory and transparent. The governance structure reflects the cultural, social, political and economic realities of the area. The governance structure supports consensus building amongst the partners.

Example indicator: A governance structure has been documented and approved by the partnership.

5. Cooperation and Sharing through Networking
A model forest partnership agrees to share its experiences and knowledge throughout the IMFN. At local, regional, national and global levels model forests share experiences, successes, failures and lessons learned with other model forests on the critical aspects of forest management which underlie the search for new models and approaches to sustainability. Model forests also provide opportunities for urban interests to participate and to have an impact on the evolutionary processes supporting sustainable forest management.

Example indicator: The commitment to sharing is demonstrated through network activities, linkages to other model forests and participation in global processes such as the development and application of criteria and indicators of sustainable forest management.
CLOSING REMARKS

Mr. Isao Takahasi
Director-General
Forestry Agency
Japan
Concluding Address to The International Workshop on Model Forests for Field-Level Applications of Sustainable Forest Management

Tokyo, Japan, 10 - 12, 1998

by

Isao Takahashi, Director-General, Forestry Agency, Japan

Distinguished participants, friends and colleagues, Ladies and Gentlemen,

It is my great pleasure and privilege to conclude the first session of this memorable international workshop, which has come to be known as the "Tokyo Workshop on Model Forests."

First of all, I would like to express my sincere appreciation and congratulation to Dr. Yukichi Konohira and Dr. John Naysmith for their excellent chairpersonship which brought this session to a fruitful and successful conclusion. I also wish to extend my heartfelt thanks to Mr. Yoshio Hironaka, Mr. S. K. Pande, Mr. James Ball, Mr. Bambang Soekartiko, Mr. Takeuchi Ishikawa, Dr. Zhaohua Zhu, Ms. Mary Coulombe, Mr. Peter Besseau and Mr. Yasuhiko Nisawa for their devoted contribution, valuable inputs, facilitation of working group discussion, drafting of key findings and so on. My further gratitude is extended to all participants whose deliberation and inputs are genuinely meaningful in terms of the reformulation and enhancement of the concept of model forests.

Last December, at Kyoto, the COP-3 of the United Nations Framework Convention on Climate Change reiterated the importance of achieving sustainable forest management in a holistic manner, one which encompasses the full range of their functions and benefits.

Under these circumstances, as I pointed out in my opening remarks, significant efforts have been undertaken at both regional and international levels including those within the Intergovernmental Panel on Forests (IPF), and within the context of the Montreal Process to develop and apply sets of Criteria and Indicators for sustainable forest management.

It is our responsibility to underpin these efforts, without delay, by introducing and examining the concept of sustainable forest management at the field level through developing and applying model forest approaches.

Ladies and Gentlemen,

We have now a key findings document and synthesis report toward further development and application of model forest approaches. This might be a small step for us individually, however I am sure that collaboration and cooperation among us will expedite and accelerate these initiatives further.

Now, I would like to conclude this first session of Tokyo Workshop on Model Forests, and let our secretariat, in close cooperation with all of you, start preparation for the second session in the 1998--99 fiscal year.
I would like to express my sincere gratitude again to the International Model Forest Network Secretariat for its generous and meaningful sponsorship to this workshop. Without the IMFN's commitment, this workshop would not have been organized in this fruitful manner.

Thank you very much and I look forward to seeing you again at the next meeting.

Lastly, on behalf of the all participants, Mr. Frederick Johnson and I would like to present a small gift to Dr. Yukichi Konohira and Dr. John Naysmith for their remarkable and outstanding contribution.
ANNEX C

Key-note Addresses
Mr. Yoshio Hironaka
Director
Agriculture, Forestry and Fisheries
Credit Foundation
Japan
Thank you, Messrs. Chairpersons,

Before I begin, I would like to express my thanks for this opportunity to address this international workshop on model forests and to discuss with you my ideas for "worldwide development of model forest as a means of achieving sustainable forest management".

Messrs. Chairpersons,

I would like to begin my remarks today by briefly reviewing with you what has been agreed upon in international dialogs so far, highlighting the implications of these agreements for model forests. Following that, I would like to outline for you what Japan is doing to achieve sustainable forest management, after which I will state some personal opinions on field-level application of sustainable forest management.

I will then conclude with a few proposals in areas which I think necessary for effectively promoting worldwide development of model forests for achieving sustainable forest management.

1. International efforts to achieve sustainable forest management

(1) The United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in 1992 agreed to engage in "sustainable forest management". This provided the impetus to establish fora for international dialogs where countries could discuss and work towards the realization of sustainable forest management.

As a result of repeated dialogs, countries and regions around the world have begun to work on field-level model applications of sustainable forest management.

(2) The Intergovernmental Panel on Forest (IPF) was established in 1995, as one of the subsidiary bodies of the Commission on Sustainable Development (CSD).

The IPF met regularly, and in February 1997, it finalized a list of "Proposals for Action" for sustainable forest management.

There are still many unresolved issues - for example, the need for a legally binding
international instrument - but countries have made substantial advances in mutually understanding the differences and challenges in their natural, social, economic, and institutional systems, which has enabled them to formulate broad consensus on the issues in and policies for sustainable forest management.

(3) In June 1997, the nineteenth special session of the United Nations General Assembly (UNGASS) created an Intergovernmental Forum on Forests (IFF) under the CSD in order to move forward with the activities of the IPF. The IFF has been charged with three specific tasks:

a) to promote implementation of the Proposals for Action of the IPF;

b) to consider matters left pending as regards the programme elements of the IPF; and

c) to study the need for international arrangements or mechanisms including a legally binding instrument.

(4) I would like to review with you just briefly the concept, policies, and issues that have been agreed upon in international dialogs and how they impinge on the promotion of model forests.

(i) Sustainable forest management may be thought of as, "a method of treating forests that endeavors to maintain the soundness of the forest ecosystem while utilizing its vitality, doing so in such a way that the forest is able to meet a variety of human needs in a sustainable manner".

(ii) To achieve sustainable forest management, there will need to be techniques and systems established for coordinating various needs and requirements. In addition, we will need to formulate criteria and indicators for use in articulating specific, concrete conditions for sustainable forest management and in assessing the degree to which sustainable forest management has been achieved.

(iii) In addition to the perspectives of forest uses (i.e., maintenance of productive capacity of forest ecosystems, maintenance and enhancement of long-term socio-economic benefits to meet the needs of societies), the criteria and indicators should also include the perspective of forest conservation (i.e., conservation of biological diversity, conservation and maintenance of soil and water resources).

Also important will be mechanisms of monitoring with criteria and indicators, and the legal, institutional, and economic frameworks for conserving forests and achieving sustainable forest management.

(iv) The creation of uniform criteria and indicators and the formulation of international arrangements (for example, a Forest Convention) are important challenges in the achievement of sustainable forest management, but in view of diverse forest conditions in different countries, it will be more effective to first promote practical, field-level applications using model forests.

In doing so, it will be important to create mechanisms for the participation of local residents and other interested parties.

(v) In light of the different natural, social, economic, and policy backgrounds of different
countries and their forests, it is desirable that model forests use mechanisms that are suited to local conditions rather than attempting to be uniform and consistent around the world.

(vi) It will also be important to create mechanisms for international coordination and cooperation in model forest projects.

(5) It is my understanding that these are the concepts and ideas upon which this International Workshop on Model Forests for Field-level Application of Sustainable Forest Management is based. The purpose of the workshop would be to hear reports on the model forests being attempted in different parts of the world and to discuss and exchange opinions, paying due attention to their diverse forest conditions, on practical options for promoting model forests and on the scope for international coordination and cooperation.

2. Japanese efforts towards sustainable forest management

I would like to outline for you recent efforts in Japan towards sustainable forest management. Before doing this, however, I would like to give to you a brief run-down on forest conditions and institutional frameworks in Japan, as these will naturally have a large impact on the achievement of sustainable forest management.

2-1. Forest resources and the institutional framework for sustainable forest management in Japan

(1) Japan has 25 million hectares of forest land, which accounts for 67% of total Japanese land. In spite of its high proportion of forest cover compared to other countries, per capita forest land is only a mere 0.2 hectares since Japan is a very small country with a very large population.

(2) We have about 10 million hectares of planted forests, or 41% of total forest land. They were planted as part of the nation-wide effort to restore forest lands damaged during the World War II and also as a means of meeting the growing demand for lumber. How to utilize these planted forests effectively and appropriately has become one of the major challenges facing us, since they will gradually reach logging age.

(3) Another distinguishing factor in Japan is the high percentage of private ownership. The central government owns about 30% of Japan's forests; Prefectural governments, 5%, with the remaining 65% privately owned. National forests are dispersed throughout the country. National forests make up 50% or more of the Prefectural total forests only in Hokkaido and two prefectures in the Tohoku region. Most private forests are in the hands of small land-owners. About 60% of all private forest land is owned by owners with less than 100 hectares of forests holdings. This makes forest ownership in Japan extremely small-scale and diverse.

(4) There are two main aspects to Japanese policies for the promotion of sustainable forest management: appropriate use and management of forests under the Forest Planning System, and conservation and protection of forests of extremely high public value and utility under the Protection Forest System and Forest-land Development Permission System.
Forest Resources" which articulates the basic direction for the long-term enhancement of forest resources, serving as a guide for national policy and providing a reference for the management of individual forests. Under this, the government formulates the "Nation-wide Forest Plan", which contains national programs towards sustainable forest management.

(6) However, with Japan's small, diverse forest ownership pattern, it is neither technologically nor economically feasible for individual forest owners to attempt to engage in sustainable forest management on their own.

Prefectural governments therefore prepare "Regional Forest Plans" for individual river basins, in which it outlines the principles and technological guidelines for sustainable forest management on a region-by-region basis. These plans form the basis for government guidance to individual forest owners.

The system also enables several forest owners to jointly establish a "Forest Management Plan". The purpose of this system is to bring together the forests owned by small land-owners so as to enable sustainable forest management to be practiced collectively.

2 - 2. Revisions to the "Basic Plan on Forest Resources"

(7) The Basic Plan was first formulated in 1966; the latest revision to the plan came in 1996. Among the specific impetuses to the revisions, I would cite the following changes in forest-and forestry-related conditions:

a) International trends towards sustainable forest management;

b) Severe conditions for Japanese forest and forestry (i.e., the stagnation of forestry production activities, the depopulation of mountain villages, the increase in inappropriately managed forests);

c) Strong desires of the general public for more disaster-resistant land use; and

d) Increasing forest's roles to play in health, culture, and education.

(8) The two main basic concepts underlying the revised Basic Plan are:

a) to promote qualitative enhancements in forest resources; and

b) to prepare forest resources for use in health, culture, and educational purposes.

(i) The goals of forest resource management have shifted from quantitative development to more qualitative ones such as the fostering of sound state of forests and maintaining their cycle.

This implies a change in forest management practices away from mere plantation forestry to forms that seek artificial interventions to be consistent with natural processes which lead to diversifying the structure of forests so as to have multi-storied crowns and mixed species.

(ii) In order to meet the public's demand on forests for health, cultural, and educational purposes should be met by enhancing the forests so that they provide for multiple uses of forests. That is, the forests are managed so as to provide opportunities for recreation, spiritual enrichment, volunteer forestation, and interaction between urban and rural societies.
In addition, we recognize the need to adjust various functions of forests and articulate in an easily understood form the perspectives to be emphasized, in order to achieve greater efficiency in forest resource management.

To do this and to achieve the goals of forest resource management, we have identified three basic directions, focusing on those forest functions considered particularly important and worthy of emphasis:

a) "water and land conservation" (50% of total forest land designated), an emphasis on the role that forests play in preventing mountain disasters, cultivating water sources, and preventing flooding;

b) "coexistence of forests and human beings" (22%), an emphasis on the role of forests in conserving living environments and promoting health and culture; and

c) "cyclical utilization of forest resources" (28%), an emphasis on productive functions of forests (e.g., timber production).

The "water and land conservation" aspect focuses on conserving tree roots and top soil. As part of this, we endeavor to develop underbrush, stabilize forest floors, and promote lush forest growth. This also involves reducing the size of logging plots, requiring that trees reach higher ages before being cut, and promoting the development of multi-storied forests.

The "coexistence of forests and human beings" aspect focuses on a mixture of protection, enhancement, and appropriate use. It seeks to protect primeval natural forests and forests that provide habitats to scientifically valuable wildlife, with restoring them with artificial plantings and establishing monitoring systems when necessary. In addition, this aspect seeks to conserve and enhance forest amenities and scenery by encouraging more diverse forest structure and conservation of particularly scenic forests.

The "cyclical utilization of forest resources" aspect emphasizes the efficient cycle and use of forest resources in a way that is consistent with their public benefit functions. This involves appropriate tending and thinning so as to maintain the vitality and soundness of the forest.

3. Suggestions for field-level applications of sustainable forest management

I would now like to express some of my ideas on how sustainable forest management should be implemented at the field level. One of the key issues would be that an adjustment needs to be made to incorporate diverse local conditions, and another would be the issue of public participation.

3 - 1. Adjusting programs to local conditions

Residents will require different things of forests depending on the level of development of the local economy. In developing regions, it will be important to coordinate forest management with the utilization of land for other purposes, for example, agriculture. For our purposes, we can define the following stages of economic development: e.g., i)
subsistence agriculture, ii) grazing, iii) single crop commercial agriculture, iv) industry, and v) tourism.

(2) The major goals of sustainable forest management will differ depending on natural conditions of forests and the social conditions where they are located. Forests on steep slopes will have a great role to play in preventing natural disasters and conserving water and land. Forests located in flat areas may be suited to efficient timber production, or to development of agricultural land.

Forests in remote mountainous areas will play major roles in conserving biodiversity and protecting wildlife. Those close to rural communities may be used for agricultural purposes and conservation of agricultural land. Those near cities can be expected to conserve living environments and provide recreational opportunities.

(3) The mechanisms and purposes of sustainable forest management will also differ according to the form and scale of ownership. National and public forests where the scale of ownership is large may find it relatively easy to practice sustainable forest management by putting their primary emphases on public benefit functions, taking into account the socioeconomic needs of residents.

Where forests are privately owned, sustainable forest management may require legislation that regulate private rights. Government guidance may be easy for large privately-owned forests, but in countries like Japan where the scale of ownership is small and many forests have absentee owners, it may prove extremely difficult to induce sustainable forest management.

3 - 2. Public participation

(4) Resident participation is an important part of sustainable forest management, as has been pointed out repeatedly in international dialogs. One of the major challenges before us is to define, according to the conditions on the forest, first, who participates at what stages, and second, what to do about privately-owned forests.

(5) For the first of these questions, who participates at what stages, I think we can begin by defining three main stages: i) planning, ii) resource utilization, and iii) resource enhancement and conservation.

It is generally preferable to have all interested parties participate in the planning stage. Where “community forestry” is practiced, local residents should obviously be encouraged to participate. If the use is to be on a larger scale, say timber production or recreational development, then the participation of interested industries and local governments is to be expected.

The most important challenge would be the participation in forest resource management and conservation. It is desired that all forest beneficiaries take active part. We should also encourage volunteers, even on an international basis.

(6) Ideally, we would expand the range of participation in sustainable forest management gradually from local residents (e.g., farmers) to downstream beneficiaries, urban citizens, broader general public, and even to the international society.

(7) When national and public forests are involved, such broad-based participation is
relatively easy to arrange, but we will need to develop mechanisms for coordination between owners and participants where private forests are involved.

3 - 3. Historical overview of sustainable forest management in Japan

As I stated now, what we mean by ‘sustainable forest management’ will be different according to our stage of economic development and the way in which our forests are owned, and this is something I would like to illustrate for you with the historical changes observed in Japan.

(8) A century or so ago, Japan was an agricultural country, concentrating primarily on rise paddies. Forests near communities were generally used as a source of agricultural materials such as underbrush and fallen leaves, fuelwood, and logs that were taken for building homes and other construction purposes.

Use of the forests was restricted because of the role they played as Mizubayashi in ensuring agricultural water, and Tomeyama in conserving agricultural land.

Forests were owned in common by communities and managed by themselves as Iriaichi where they usually made rules by themselves on utilization and management of forests.

(9) Later, as Japan developed into an industrial country, there was less need to seek agricultural materials in the forests, and the purpose of forest management shifted to timber production. Private property rights began to replace the common ownership on forests at this time.

In more recent years, economic stagnation and depopulation in mountain villages has caused forestry and logging to slump, and many forest owners have lost their eagerness to actively engage in forestry production.

On the other hand, public opinion led by urban citizens has caused new emphasis to be placed on the public benefit functions played by forests.

(10) As I stated earlier, the Government of Japan has just revised its “Basic Plan on Forest Resources” and designated the basic principles in managing its forest resources nation wide. This was based on the recent changes in forest-and forestry-related conditions especially the severe conditions faced by Japan’s forest and forestry.

In order to promote sustainable forest management in line with this new basic principles, various administrative and financial measures are taken. Here I would like to introduce you the basic concepts and current situation of the River Basin Forest Management System and public participation in forestry in Japan, which would be suggestive in developing participatory model forest projects.

3 - 4. River Basin Forest Management System and public participation in forestry

(11) Most Japanese rivers have their upper reaches in the forests on steep mountain slopes, their middle and lower reaches in farming districts, and then quickly empty into the sea. From ancient times, people in the upper, middle, and lower reaches have been closely linked by the river, in terms of their interests in water supply, disaster prevention, and wood supply.

Because of this, Japan has developed a nationwide River Basin Forest Management System which involves the participation of interested parties in the lower reaches.
Different ownership patterns, natural conditions, and socioeconomic circumstances for each river basin make it difficult to make a uniform explanation of the system. Nevertheless, it is possible to make some generalizations on how the system works.

(12) To run the River Basin Forest Management System, we establish in each river basin a "River Basin Forestry Activation Center" and a "River Basin Forestry Activation Council" comprised of forest owners, forest industries, and other interested parties. The Center and Council formulates principles and an implementation plan for the revitalization of forestry and the enhancement of forests in the basin. They also provide for discussion and coordination among interested parties and promote efforts in line with the principles agreed upon.

It is important to encourage a wide consensus among the forest owners, foresters, and forest industries in the upstream areas and the beneficiaries in downstream areas. Forest enhancement and forestry production must move forward in a unique and autonomous manner for each river basin.

In doing this, we seek the participation of those in the basin who enjoy the benefits of forests - for example, the agricultural cooperatives, fisheries cooperatives, industries, and water users - and also the river managers considering their roles in land conservation.

(13) River basin forest management is one of the core concepts in Japan's model forest projects, which have been established for the Shimanto River Basin in Kochi Prefecture and the Ishikari River Basin in Hokkaido Prefecture, which you will be hearing more about later in a presentation by Dr. Takao Fujimori of the Forestry and Forest Products Research Institute.

(14) The general public is growing more interested in and has greater expectations for forests. Many have expressed an interest in being involved in forestation in some form. This interest in forests has led to participation in forestry by urban citizens in downstream areas of the river basin who use the water and enjoy the benefits of a sound forest environment.

(15) As urban environments deteriorate, more urban citizens are attracted by the forests and mountains as places to relieve stress, seek spiritual peace and experience nature. Participation in forestry has become one of the popular leisure activities in Japan. Mountain villages are also becoming more accepting of participants from the cities, seeking a means to revive local economies and counteract depopulation.

(16) One of the challenges before us is to find ways of involving these people in sustainable forest management. We will need to create a system that allow wide segments of the general public, including volunteers and recreationists, to participate in sustainable forest management.

3 - 5. Examples of international cooperation by Japan

(17) I would like to introduce you to some examples of international cooperation by Japan in the area of forestry and forest management that may be suggestive in carrying out participatory model forest projects. Japan's international forestry cooperation started initially with putting emphasis on large scale reforestation of lands degraded with slash and burn cultivation, by planting fast growing tree species, and on transfer of timber production.
techniques. However, more emphasis is put recently on conservation and reforestation of forests for the management of water and soil, as well as on participatory social forestry approach.

( 18 ) Philippines: Japan’s first project-type technical cooperation was carried out in the Philippines, which aimed at afforestation of lands degraded with shifting cultivation, in the upper reaches of multipurpose dam. In this project, the local residents were encouraged to participate in forestry activities by the unit of family or community, through which their interests in protecting forests and farmlands by their own were significantly raised.

( 19 ) Benin: This project involves a contract between the government and residents for the conservation of government-owned protected forests. Residents are allowed to use the forest in appropriate ways, in return for their cooperation in conservation. In order to assist the government of Benin to further promote such initiatives, Japan now plans to cooperate in developing forest maps and inventories and in formulating a forest management plan.

( 20 ) Nepal: In the mountainous region in west Nepal, Japan is carrying out a technical cooperation project which incorporate participatory forest conservation approach. This project do not rely heavily on activities directly aiming at conservation of forests, but rather supports local residents’ activities for improving their living while promoting education and extension. As a result, their recognition on the importance of conservation has been significantly improved.

( 21 ) Laos: This project has promoted local residents’ participation in conservation forest, and establishment of institutional frameworks by their own, based on village enhancement and forest management programs. Various workshop have been held to discuss possible measures for conserving and restoring forest resources, efficiently utilizing forest products, and developing alternative ways to meet the need of local residents which would replace slash and burn cultivation.

4. Suggestions for the effective worldwide development of model forests

As the final part of my remarks, I would like to offer a few suggestions for effectively developing model forests worldwide. The first suggestion I have is that ‘field-level applications must take account of the natural, social, economic, and cultural background of the forest’. The second idea that I would like to recommend to you is the ‘need for international coordination and cooperation in model forest projects’.

4 - 1. Field-level applications must take account of the natural, social, economic, and cultural background of the forest

( 1 ) First, it is important to clarify the rationale for the model forest project. The forest and the economic needs to be met by it must be clearly understood, and this information should be used in formulating principles for applying sustainable forest management at the field level.

These principles must be based on a consensus among all interested parties over:

a) the priority uses and purposes of the forest: e.g., timber production, water and land
conservation, recreation, agricultural materials, biodiversity conservation;

b) mechanisms for management and utilization: e.g., participatory community-based forest management, corporate-based management, government-based management; and

c) basic direction for forest resource management: e.g., plantation forestry, natural forestry, agricultural uses (for grazing, slash and burn cultivation, etc.).

(2) Next, it will be important to consider institutional issues regarding land use and how these issues can be solved. Coordination with other land use and planning authorities will be needed in making adjustments with other land-use rights.

From the perspective of sustainable forest management, it will be important to formulate guidelines for conversion of forests to other use and to establish the legal basis that will make these guidelines effective and enforceable. If this is not feasible, then it will be necessary to develop some other mechanism for coordination and adjustment among stakeholders. Parties who have interests in the use of the land may be involved in the model forests framework, where coordination and adjustment with them could be sought within that context.

If there is to be a strong regulatory component attached to the model forest program, then it is advisable to establish both the legal rationale for regulations and a compensation scheme for existing right-holders.

(3) There are several issues that must be considered in order to ensure that model forest projects are effective:

a) are there conflicts between the plan and existing domestic laws and forest management systems;

b) or are they acceptable and tolerable only within the scope of the project;

c) will economic assistance from the government or others be available in carrying out the plan; and

d) how will the discrepancies between plans and their implementation be monitored and checked for.

(4) I have already noted that participatory model forests should consider who participates at what stages, and how best to encourage broad-based participation.

It will be also necessary to clearly define the rights and responsibilities of participants, to publicize the model forest to residents and interested parties, to develop systems to foster willingness to participate, and to provide participants with needed technical supervision.

(5) Depending on the social, economic, and cultural background of the forest, it may be difficult to define and introduce specific criteria and indicators at this time. Nonetheless, it will be necessary to clearly articulate the following concepts at a bare minimum:

(i) If the forests are used for productive purposes, harvests should be regulated in order to maintain the productive capacity of the forest ecosystem.

(ii) Even if the main purpose of the forest is the production of timber or agricultural materials, forestry practices need to comply with the overall objectives of conserving biological diversity, water, and land.

(iii) Existing laws and institutional frameworks that are effective in forest conservation
and sustainable forest management should be clearly identified together with those needed in the future. Basic concepts under which the model forest program is to be carried out should also be identified.

4 - 2. Need for international coordination and cooperation in model forest projects

( 6 ) We must create both domestic and international model forest networks in order to share and develop the results of model forest programs.

( 7 ) International cooperation should be used to develop, expand and establish new technologies for achieving sustainable forest management: e.g., forest management practices for conserving biodiversity, methods for monitoring.

( 8 ) It is urgently needed that international assistance be provided to developing countries threatened with deforestation and degradation of forests. This may include support for NGO activities as well.

Messrs. Chairpersons and Participants

In my remarks today, I have tried to relate to you some of my ideas about the "Worldwide development of model forests as a means of achieving sustainable forest management". I would like to close by thanking you for your kind attention, and by expressing my fervent desire that this three-day "International Workshop on Model Forest for Field-level Application of Sustainable Forest Management" will be fruitful and successful for all in attendance.

Thank you.
Mr. S.K. Pande
Additional Inspector General of Forests
Ministry of Environment and Forests
India
Key Note address of

S. K. Pande,
Additional Inspector General of Forests,
Government of India, New Delhi

delivered in the

International Workshop on Model Forests for
Field – Level Application of
Sustainable Forest Management

Tokyo, Japan
[10–12 March’ 1998]
1. I deem it a great honor to be called upon this morning to address the International Workshop on Model Forest for Field-Level Application of Sustainable Forest Management. First of all let me greet the distinguished delegates, and also convey, in the 50th year of our Independence, the good wishes of my people to the people of this great country.

2. It is indeed heartening to note that Model Forests concept which emerged in Canada in 1991 to address economic, environmental, social and cultural challenges to sustainable forest management, has developed into an International Model Forests Network encompassing more than 25 countries across the globe. Forests and environment know no political boundaries. An international network of working size Model Forests, defining sustainable management in a local and regional context, can be a fruitful way of synthesizing and harmonizing the geo-political debate on forests. The understanding so generated, in my opinion, would help in continuing the dialogue in the IFF more meaningfully.

3. I also congratulate the Government of Japan on hosting this workshop, which has brought us together to share the extensive knowledge of the distinguished delegates. Further cross-fertilization of ideas and learning from the experience of the nations, who have taken an early lead, would provide synergy to the philosophy of the Model Forests to ‘think globally, act locally’.

4. It is now universally accepted that forests can be, and have to be managed sustainably to enhance the economic, environmental and social wellbeing of the present and future generations. The inter-generational
equity is now the cornerstone of the basic tenets of the forest management. After all, we are not only the inheritors of this rich heritage but are also holding it as the trustees of future generations. A time has come, when the consumptive use of the forests has to be subordinated to ensure, and even enhance, its future existence. It may be relevant to recall the words of the modern sage of India, Mahatma Gandhi, who in the early 20’s said prophetically that ‘earth has enough for everyone’s need but not for anyone’s greed’.

5. Mr. Chairman, permit me to also quote a sanskrit verse from Isopanishad, a timeless scripture of the Indian society –

‘Ishwasyam idam sarvyo yajinkch jagatyam jagat,
Ten tyakten bhunjitha ma girdh kasyachit dhanam’.

Translated, it would read –

‘This universe is the creation of supreme power meant for the benefit of all His creations. Individual species must, therefore, learn to enjoy its benefits by forming a part of the system in close relation with other species. Let not only one species encroach upon the rights of others.’

6. I have been asked by the organizers to speak on the Asia-Pacific chapter of the global forests. But, when I went through the exercise, I found it to be a region of contrast and changes. The region encompasses about one-fourth of the world’s surface but has more than half the world’s population. Some countries have virtually no forests, while others have even more than two-thirds of their area under forest cover. Paradoxical it may sound, but the region has some of the world’s leading exporters and
importers of forest products. In monetary terms, out of the thirty-five countries of the region, twenty-four are net importers.

7. Although, the countries in Asia-Pacific region can be conveniently classified as either ‘forest-rich’ or ‘forest-poor’, but the divide is getting gradually obliterated. While the former are cutting down their harvest, the latter are looking for ways and means to expand their forest resource base. It is indeed a healthy ‘two-way’ process, which will benefit the global society as a whole.

8. However, the region is presently undergoing unprecedented economic turmoil, which is likely to influence forests and forestry development also. It is hoped that the region will be able to withstand this turbulence with its strong physical and institutional infrastructure intact, availability of skilled human resource, and inherent societal values of frugality and hard work.

9. The main driving forces for change are growing population and slow performing economies. In countries, where economy has done well, the rural population is expected to decline reducing the pressure on forests. But in quite a few countries, with poor economies, the rural population is likely to grow. This will result in more biotic pressure on forests, not only for the forest products but also alienation of forest land, as a softer option, for increasing the agricultural output through horizontal expansion of farmlands, rather than taking recourse to cost and technology intensive vertical pathway of greater productivity per unit area.
10. In the Asia-Pacific region, the forests extend over 565 million ha. FAO has estimated that in tropical countries of Asia, deforestation reached an average of 3.9 million ha annually between 1980 and 1990. The two major causes for the loss of forest cover, as also forestlands are clearing for agriculture including shifting cultivation and excessive cutting of trees for timber production. Other important causes that have contributed to this loss are mining, submergence under irrigation and hydroelectric power projects, and urban sprawl. In addition, there has been qualitative degradation of forests from harvesting for fuelwood and fodder, unhindered grazing by cattle, and increased human activity in the forest due to expanding urban–forest interface. In the recent years, there have been increasing incidences of major forest fires. In 1996, 3.3 million ha of forest burned in one of the country in the region.

11. On a positive note, it would be relevant to mention that the Asia-Pacific region has witnessed large-scale plantation programme of about 22 million ha, which is nearly three-fourths of the world’s total. Moreover, the region is home to 14 million ha of rubber and coconut plantations, which are contributing substantially to the production of woody biomass.

12. One important commonality in the approach to the forest management in the region has been inclusion of the social and environmental agendas. India in its NFP-1988 has specifically subordinated the commercial use of natural forests by giving supremacy to environmental, ecological and social considerations. The forest–based industries are being encouraged for sourcing its raw material requirements from private holdings in direct partnership with the farmers. Other noteworthy developments in the
region have been the ‘two forest systems’ in China, emphasizing environmental values on sensitive sites and production values elsewhere; community based forest management practices in Philippines; Indonesian strategy of shifting from sustained timber yield management to sustainable forest and ecosystem management.

13. As a strategy to reduce pressure on natural forests, India, over the past 10–12 years, has levied zero custom duty on wood and wood products. It is estimated that timber worth US $ 250 million was imported during last year. In addition, pulp and paper products amounting to US $ 550 million have also been imported during the corresponding period. Thailand, Sri Lanka and New Zealand have also restricted harvesting of timber from natural forests. Most countries of the region have accelerated their re-afforestation and plantation programme.

14. It is also interesting to note that to compensate for loss of timber revenue, there is a trend for commercializing the non-destructive uses of forests like harvesting of non-timber forest produce and eco-tourism. It is estimated that in India, these products contribute 70% of the value of all forest-based export. In view of the growing popularity of pharmaceutical and cosmetics of organic origins, it has been estimated that the trade in such forest products is likely to touch a turnover of a couple of billion dollars in near future. Taking advantage of rich biological diversity of the region, it is possible to take a lead in this trade. But, lack of knowledge related to management, utilization and marketing of these produces is a limiting factor in fully harnessing its global potential. The non-wood forest products also provide usufructs to local community in the shortest
possible time, which can serve as an important incentive in securing their partnership in managing forests. However, all such efforts are required to be supplemented by forging strong linkages between research, extension, technology transfer and regional inter-governmental cooperation.

15. May I, Mr. Chairman, conclude by saying that despite a great diversity in forest situations in the region, there seems to be commonality in approach to the forest management. The major paradigm shift has been a thrust towards more socially oriented forest management with greater devolution of authority to the local communities. At the same time, participatory strategic partnerships need to be forged to simultaneously meet the bonafide needs of the local community as well as the commercial and industrial requirements, while safeguarding the environmental and ecological values of the forests. This will call for fresh policy initiatives and institutional restructuring. Such a dialogue has to be carried out in an open and transparent manner with all stakeholders. To this end, 'Model Forest Approach' emerges as a relevant concept, which could provide experiential learning from the working models for field level applications.

16. I hope that this workshop will firm up our experience in managing forests sustainably on the lines of Model Forests programme. The series of workshops envisaged up to FY 2000, I am certain, will help in strengthening the movement globally. I wish the workshop a success and compliment the organizers on their initiative.

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ANNEX D

Presentations / Case Studies
COUNTRY REPORT

- BRAZIL -

by Paulo José Prudente de Fontes
Acting Head of Department
Forest Resources Department -
DEREF/IBAMA
1. INTRODUCTION

Brazil is a large country having a total area of 8 million square kilometers. This territory can be divided into three main ecological zones: i) the tropical rain forest in Amazon and the Atlantic Cost, ii) dry tropical forests in the Central and Northeastern regions, and iii) the humid subtropical forest in the Southern highlands. These zones are also economically and socially different. The natural forest in the Amazon region and the forest plantations in the southern and coastal zones are the most important ones, both are supplying timber to national and international markets. The Amazon exports are mainly sawnwood, plywood and veneer while the plantation-based exports are mostly chemical pulp, fiberboard and other wood panels.

Forests occupy about 50% that Brazilian territory. Protected forests including National Parks, Indian Reserve and Brazilian Reserves are mostly in hands of the Government and represents 16% of this total. Production forests are mostly private and represents 34%, but Government has power to regulate the utilization of such resources. Due to the vast Amazon forests, Brazil has been continuously in the forefront of international attention on deforestation and forest destruction. A special issue has been illegal harvesting of mahogany, which used to be a major export item. The difficulty of the fiscalization of the access to the forest resource, facilitate the usage of tropical forests, in great extent, done in an informal basis.

The reduction of such informality should be conquered with the implementation of forest politics in the country. Such politics should on one side organize and expand the offer of legally produced wood for the sector of forest bases and on the other side better the systems of fiscalization, monitoring and control.

The forest management in Brazil is focused towards a group of species which are commercially acceptable in the local, regional, national and even international levels. It is traditionally used in the production of wood and it requires economy of scale with high-cost investments in structure and equipment. The area submitted to forest management is at present estimated at 3.6 million ha, 85% of which are in the Amazon region. The production of logs of wood in the region is estimated to be around 60
million m³ per year. Considering a forest management system for the tropical forest, with a cutting cycle of 30 years and an average commercial volume of 45 m³/ha, there would be the need to manage area of approximately 40 million ha for a period of 30 years for a production of tropical wood in a sustainable profit condition. This figure corresponds to 8% of the whole Amazon region or all the area of managed tropical forests all over the world, in the early 80’s.

Sustainable forest management is in principle the only form to enable logging operations in the national forests, particularly in the Amazon forests. In this paper it is presented some information on the existing mechanism and on a specific ITTO project recently implemented on Brazil. The project deals with training and assessment of field application of sustainable forest management, and thus has direct linkages with the subject to be discussed at this meeting.

2. OVERVIEW REGULATIONS IN BRAZIL ON FOREST MANAGEMENT

The federal forest law provides the general regulation of forests and establishes criteria for protected areas. Forest management in the Legal Amazon is also regulated through the federal law.

In order to have a logging permission, timber industry submits to IBAMA - Brazilian Institute of Environment and Renewable Natural Resources (the national authority on forest) a forest management plan. The plan must be prepared by an officially registered professional forester, and must follows clearly defined standards.

The forest management plan has to be approved by IBAMA prior to logging operations are started. In order to approve such plan field and document assessment is carried out. The implementation of forest management plan is carried out by the timber industry also under the supervision of a registered professional forester. At any moment the area can be inspected by IBAMA.

Brazil applies both the Criteria and Indicators of ITTO and the Tarapoto Proposal in assessing its progress in the area of forest management. National-level criteria and indicators do not exist but, on the state level, specific measures have been developed in a few cases. In addition, a major ITTO training project has been implemented to disseminate the ITTO Guidelines in the public and private sectors. The ITTO and Tarapoto C&I have provided a general framework for the development of local certification standards as well.

3. THE PROJECT

3.1. Project Rationale and Objectives
In 1995 the Government of Brazil submitted to ITTO the project “Dissemination and Training on ITTO Guidelines and Criteria”. The project was firmed in 1996 and implementation of Stage 1 (covering the state of Para) was started in March, 1997 and completed in February 1998 as planned. The project was implemented by FUNPAR (Federal University of Paraná Foundation) in cooperation with IBAMA. The second Stage of the project recently finish covered six Brazilian state.

The project was submitted by Brazil recognizing that one of the most important aspects to achieve sustainable forest management is to improve the awareness (education) of professionals involved in the activity and also to improve their knowledge (training).

The objectives of the project were:

Development Objective

To contribute to socio-economic development in the Amazonian region through sustainable management and utilization of tropical forests.

Specific Objectives

(I) Disseminate the ITTO Guidelines for Sustainable Management of Natural Tropical Forests, Guidelines for the Conservation of Biological Diversity in Tropical Production Forests and Criteria for the Measurement of Sustainable Tropical Forests Management and provide training on their application;

(II) Survey and assess appropriateness of forest management plans and practices, foresters' skills and logging operations in six states in the Brazilian Amazonia, and collect, access information on forest management practices in these states with a view to future development of the ITTO Guidelines at regional and national levels.

3.2 - Activities

The main activities of the project included:

- To implement training on ITTO Guidelines and Criteria;

- To disseminate ITTO documents;

- To assess local conditions for implementation of forest management plan and actual implementation of such plans viz a viz, national regulation, and ITTO Guidelines and Criteria;

- To develop a data bank on the forest management plans;

- Technical support to timber companies to facilitate the field implementation of forest management plan.

3.3 - Results
The results of the project are presented in the reports prepared by the technical team. Seven volumes, including a description of all activities, findings and recommendations have been submitted by the implementing agency to ITTO.

Based on 12 forest management plans assessed, the main findings related to the subject of this seminar (Field Application of Sustainable Forest Management) are:

- Forest management plans submitted by timber companies, approved by IBAMA, contain all the information required under the Brazilian law, and to enable to implement the plan at field level;

- The forest management plan is also in agreement with ITTO Guidelines for sustainable management of tropical national forests, but there are some needs to improve the document in order to fulfill some principles listed under the Guidelines for biological diversity;

- Forest management plans could be also improved in aspects related to costs for its implementation;

- Field application was considered adequate for about 40% of the forest management plans accessed;

- Main constrain in the field implementation of forest management plans are lack of technical knowledge in forest operations, including planing of the operations, collection of information, logging, and economic/financial aspects;

- General awareness of timber companies, the ultimate responsible for the implementation of forest management plans in Brazil, is good.

4 - CONCLUSION

The main conclusions of the project are:

- Present law and regulations are adequate to fulfill international agreed parameters for sustainable forest management of tropical national forests;

- Actual field implementation of forest management plans by the timber industry has improved in the last years, and their general awareness is adequate;

- Training is the main constrain at the present, and should be considered a priority in the next years.
COUNTRY REPORT

- CANADA -

by Daniel Welsh
Director
Programs Division
Canadian Forest Service
Abstract

In the global environment of increased awareness of the need for sustainable forest management Canada initiated the Canadian Model Forest Program in 1991. The broad goal of the program was to promote partnerships of people with a direct interest in the forest who could move sustainable development from theory to practice by direct application of technology and knowledge. Ten model forests representative of the range of ecological regions, forest types and land ownership patterns across Canada were selected in the 1992-1997 Phase I of the program. Through the development of strong partnerships and effective use of tools and information those model forests demonstrated the strength of the concept.

Following a careful evaluation the program was renewed for a 1997-2002 Phase II. The second phase emphasizes sharing the experience through effective demonstration of achievements. By working together as a network through joint initiatives the model forests hope to effectively share their successes.

In summary, model forest are described as a flexible imaginative approach to promoting sustainable forest management. They possess two key elements instrumental to their success: a partnership of interested people willing to share values and work together and the information, infrastructure and tools necessary to describe and predict the state of the Model Forest’s resources and facilitate its decision making process.

Daniel Welsh
Director
Programs Division
Canadian Forest Service
Canadian Model Forest Program

Working Together to Achieve Sustainable Forest Management
Importance of Forestry in Canada

- 10% of the world's forests in Canada
- World's largest exporter of forest products
- 840,000 Canadian jobs
- 337 forest dependent communities
- Habitat for over 140,000 species
- Haven for recreation and renewal
- Integral to culture of Canada's Aboriginal Peoples

Why a Model Forest Program?

- Increased global awareness of sustainable forest management and finite resources
- A need to shift from theory to practice
- A need to combine partnerships with technology to develop sustainable forests
Model Forest Program Objectives

- To encourage the development of forest management systems that demonstrate practical application of the concepts of Sustainable Forest Management (SFM)

- To establish acceptable indicators of SFM including measurement and monitoring systems, and reporting mechanisms that can measure performance relative to the model forest's goals and objectives

Model Forest Program Objectives

- To promote the dissemination of the results and knowledge gained through the Model Forest Program at local, national, and international levels

- To encourage the incorporation of a broad range of forest values into each Model Forest
Canadian Model Forest Program

Phase I  1992-1997

Development of Partnerships,
Tools and Information
All are Model Forests but All are Unique

- Different ecological regions
- Different forest types, different forestry practices
- Different land ownership patterns
- Different population density, social/community structures and value systems

What the Model Forests Do

- Strategic planning
- Expert workshops
- Remote data collection
- Activities for SFM advancement
- Consensus-based decision making
- Disseminate knowledge, experiences and technology
- Geographic Information Systems (GIS)
- Decision support systems (DSS)
What the Model Forests Do

- Research in:
  - Agroforestry
  - Aquatic resources
  - Biodiversity
  - Ecological processes
  - Forest practices
  - Inventory
  - Management approaches
  - Socio-economics
  - Wildlife

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Evaluation

- Managed by Audit and Evaluation Branch of Natural Resources Canada
- Conducted by an external National Advisory Committee
- Over 800 participants involved
Evaluation Findings

- Accomplishments
  - The Model Forest Program is highly effective
  - The diverse locally-driven partnerships are the backbone of the Program

- Challenges
  - Need to emphasize implementation of on-the-ground SFM practices
  - Need to transfer knowledge to the larger forest management community
  - Need to enhance communications within partnerships and between model forests

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Canadian Model Forest Program

Phase II 1997-2002

Sharing the Experience
Demonstration and Networks
Canadian Model Forest Program

Vision:

A national network of Model Forests at the leading edge of sustainable forest management in Canada

New Approaches

- Strategic Initiatives
  - Communications
  - Local Level Indicators
  - Enhanced Aboriginal Involvement

- Aboriginal Model Forest
Summary

- Model Forests are a flexible, imaginative approach to promoting Sustainable Forest Management

- They possess two key elements:
  - Partnerships of interested people willing to share values and work together towards SFM
  - Information, infrastructure and tools to describe and predict the state of the Model Forest's resources and facilitate decision making
COUNTRY REPORT

- CHINA -

by Yaoguo Xiong
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Chinese Academy of Forestry
and
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The International Farm Forestry
Training Centre
Chinese Academy of Forestry
Field---level Application of Sustainable Forest Development

-----A Case Study on Linmu Township

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Since the United Nations Conference of Environment and Development held in Brazil, sustainable development has attracted global interests. Due to the important role of forest to the environment, sustainable forest development becomes the focus of concern to international society. The “Forestry Action Plan of China 21 Agenda” formulated by the ministry of forestry of China defines the sustainable development as development strategy and priority in forestry. How to realize sustainable forest development is not only answered in theory but also needs practice in concrete regions. In order to explore the feasibility and operability of sustainable forest development, a case study on Linmu Township, which is a typical forest township of south of China was carried out several years ago.

In the meaning of sustainable development, people is a principle component, and policy is also an important factor. Township, a grass-root unit of Chinese administrative management system, implements state policy to farmers, listens to the view of farmers directly, and provides many kinds of service for them. So it is a suitable region to do research on sustainable development because it is easy to consider the impact of people and policy. Linmu Township, located in the Tianmu Mountain area, is the water resource of Tai River and watershed of Lifan reservoir. It is a relatively integrated ecogeographical unit, which is required spatially in sustainable development research. There are great challenges in Linmu Township because of its conflict, which is similar to developing countries, between population and limited arable lands. The objective of the project is to explore an operable way to sustainable development, which not only increase farmers' income, but also protect environment through the social, economic and technical approach.

1.Introduction of Linmu Township

Linmu Township locates in 119°-119°2' East Longitude, 30°18'-30°23' North Latitude. It is a mountainous region that the average altitude is about 500 meter and highest altitude is 1000 meter. Its climate belongs to sub-tropical moist monsoon climate with 15.9°C annual average temperature. With the diversified mountain ecological environment, Linmu Township has rich biological resources. There are about 1,016 species seed plants belonging to 580 genera of 139 families. The total area of Linmu Township is 7,600.6ha with population of 3,835. The area of forestland is 7,225.6ha accounting for 95% with 1.88ha per capita. The arable land is 106ha with 0.03ha per capita.

2.The developing of Linmu Township

The developing process of Linmu Township isn’t always smooth. Before 1980,
the township paid more attention to agriculture and cut many trees to plant crops such as grain, corn. For an example, 750ha forestland accounting for 10% total area were damaged for agriculture from 1958 to 1970. The crops didn't grow well due to the unsuitable mountain climate and the loss of forest led to serious soil erosion and deteriorating environment. Farmers were in poverty. The government and farmers gradually realized that the model of addressing agriculture wasn't fit to local conditions. Since 1984, as a result of discussion among officers, technicians and farmers, a new plan began to put into practice step by step.

a. Take forestry not agriculture as the principal management target.
The government decreased the assignment of crop production to the farmers, returned agricultural land which more suitable to forestry to forestland and transformed gradually the low-yield forest into timber forest and cash forest.
b. Impose restrictions on forest cutting and prohibit charcoal production since 1989.
c. Encourage farmers to manage forest more intensively and make them get benefit directly.
In 1984, most collective forest was distributed to household. Based on contracts, farmers managed forest on their own and got most income, while township government only collected 30 yuan RMB/y.ha as administrative fee.
d. Widen source of income on the basis of local reality.
The government turned management focus from timber-oriented forestry to non-timber forest products (NTFPs) since 1987. Farmers began to make use of local rich NTFPs resources and improved the degree of utilization gradually. For instance: develop wild half-wild tea resource to produce high-quality tea that has no chemicals and other pollution; exploit many kinds of bamboo (Phyllostachys arcana McClure, Phyllostachys vivax McClure and Phyllostachys heterocycla var. Pubescenscmazeohwi) to make fresh bamboo shoot, dried bamboo shoot and bamboo culm; plant hickory tree (Carya Cathayensis) to produce high-quality hickory nut and other products. Other NTFP such as Ginkgo biloba, Torreya grandis Fort. Ex Lindl and some medical plants are also developed. As for agriculture, farmers take advantage of mountain area to plant crops and off-season vegetable instead of simple crops to revalue upward agricultural output.
e. Change the decision-making process.
In the past, government made decisions and farmers only put them into operation. But now, the new mechanism is multiple participation including officer, technician and farmers. According to local condition and farmers' need, the government listens to the farmers' opinion and formulates rational policy aimed at encouraging farmers' initiative, safeguarding farmers' interests and improving environment. Based on concluding farmers' rich experience formed after long time practice, technicians provide a series of techniques about NTFP production and mountain area development. They do experiments, demonstration and extension together with farmers and have training course for the farmers according to their requirements. Farmers apply techniques in practice at a large scale; in return, this can enrich and develop it. Then technician sums up these
techniques again and extend them among farmers to improve management level.

3. Achievements:
a. In Linmu Township, forest coverage increased while timber cutting volume dropped.

Table 1: The change of forestland area in Linmu Township

<table>
<thead>
<tr>
<th>Time</th>
<th>Forestland</th>
<th>Non-forestland</th>
<th>Total area</th>
<th>Forest coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>7,097.7</td>
<td>92.2</td>
<td>7,673.9</td>
<td>92.5%</td>
</tr>
<tr>
<td>1989</td>
<td>6,479.9</td>
<td>100</td>
<td>7,569.8</td>
<td>91.8%</td>
</tr>
<tr>
<td>1994</td>
<td>7,211.6</td>
<td>14</td>
<td>7,600.6</td>
<td>94.9%</td>
</tr>
</tbody>
</table>

Table 1 shows that forest coverage increased by 2.5% from 92.5% in 1983 to 94.9% in 1994, but it didn’t continually increase. From 1983 to 1989, forest coverage decreased by 0.7% because of farmers’ doubt for the stability of household contracting system. Farmers worried that policy maybe change then they cut tree disorderly. Forest destruction was so serious that forest growing stock volume dropped from 93 thousand cubic meters in 1983 to 70 thousand cubic meters in 1989. In order to make farmers trust the stability of policy; the government prolonged the contracting period from 30 years to 70 years in 1989. Farmers set their mind at rest, and then forest coverage rose by 3.1% during 5 years period from 1989 to 1994, while the timber cutting volume decreased by 20% from 3,054 cubic meters in 1986 to 2,450 cubic meters in 1996.

b. Farmers’ income increased, and NTFPs became the major source of income. After nearly ten years efforts, Linmu Township made much progress. Farmers’ annual income increased from 735 yuan RMB per capita in 1984 to 3,806 in 1997, and GNP value increased from 6.67 million yuan in 1986 to 119.8 million yuan RMB in 1996.

Figure 1: Farmers’ annual income per capita from 1984 to 1997

The curve in figure 1 indicates that the increase of income is great. At the same time, the source of income is different. (Table-2) From 1984 to 1989, about 60—
80% income was from timber, but until 1997 the timber percentage is only 10%, while 70% of total income is from NTFP.

Table-2: The structure of annual income per capita in Linmu township

<table>
<thead>
<tr>
<th>Item</th>
<th>1991</th>
<th>1993</th>
<th>1995</th>
<th>1997</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-quality tea</td>
<td>166</td>
<td>258</td>
<td>666</td>
<td>440</td>
</tr>
<tr>
<td>Fresh bamboo shoot</td>
<td>144.8</td>
<td>267.8</td>
<td>738</td>
<td>636</td>
</tr>
<tr>
<td>Dry bamboo shoot</td>
<td>150.3</td>
<td>262.7</td>
<td>681</td>
<td>293</td>
</tr>
<tr>
<td>Hickory</td>
<td>282</td>
<td>328</td>
<td>520</td>
<td>753</td>
</tr>
<tr>
<td>Other NTFPs</td>
<td>1.7</td>
<td>16</td>
<td>35.6</td>
<td>673</td>
</tr>
<tr>
<td>Sub-total income from NTFPs</td>
<td>744.8</td>
<td>1132.5</td>
<td>2640.6</td>
<td>2784</td>
</tr>
<tr>
<td>Income per capita</td>
<td>1064</td>
<td>1595</td>
<td>3578</td>
<td>3806</td>
</tr>
<tr>
<td>NTFPs percentage</td>
<td>70%</td>
<td>71%</td>
<td>73.8%</td>
<td>73%</td>
</tr>
</tbody>
</table>

c. Population growth is in control, farmers’ educational level is improved and environment becomes better.

Figure-2: Population growth in Linmu Township from 1985 to 1997

Figure-2 indicates that population growth has been controlled effectively until 1987. From 1987 to 1997, the number of net population increase is only 4. According to statistics, the population growth rate of three periods 1960---1980, 1980—1990, 1991—1997 is respectively 12.2%, 5.5%, and -1.2%.

From table-3, we can infer that farmers’ cultural level has been improved obviously since 1980s. At the same time, farmers gradually realize that they should take further generation into account. According to our survey results, about 84.48% farmers think they should leave resources for their later generation.

Table-3: Cultural level in Linmu Township

<table>
<thead>
<tr>
<th>Year</th>
<th>Undergraduate</th>
<th>High school student</th>
<th>Middle school student</th>
<th>High-primary school student</th>
<th>Middle-primary student</th>
<th>Total student</th>
<th>Student percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1964</td>
<td>1</td>
<td>10</td>
<td>62</td>
<td>215</td>
<td>546</td>
<td>834</td>
<td>28%</td>
</tr>
<tr>
<td>1982</td>
<td>1</td>
<td>216</td>
<td>678</td>
<td>1588</td>
<td>2483</td>
<td>2483</td>
<td>68%</td>
</tr>
<tr>
<td>1990</td>
<td>9</td>
<td>227</td>
<td>883</td>
<td>1515</td>
<td>2634</td>
<td>2634</td>
<td>69%</td>
</tr>
<tr>
<td>1997</td>
<td>15</td>
<td>207</td>
<td>985</td>
<td>1562</td>
<td>2769</td>
<td>2769</td>
<td>72%</td>
</tr>
</tbody>
</table>

The monitoring results from local environment protection bureau indicate that the
quality of water, air and noise in Linmu Township is up to the national standard. Soil erosion has been in control on the whole. In addition, the infrastructure in Linmu Township such as transportation and communication develop rapidly and household has been nearly achieved electrification.

In general, if township implement multi-participation mechanism and adopt comprehensive social, economic and technological approach on the basis of local natural condition especially forest resource, it is impossible to achieve sustainable development which not only increase farmers’ income, but also prevent environmental deterioration.

Of course, our experiment is just at the very beginning. The township itself is still fragile and is weak to outside interference, and there are many problems to be solved. The major problems are as following:

1. With the economic development, the conflict between small-scale household management and fierce competition in market become sharp. The system of production, processing and sell is eagerly to be improved.
2. The multi-participation mechanism needs to be formulated.
3. The training for farmers on technique of cultivation and processing, market and sustainable development theory should be strengthen.
4. The quality and quantity of existing NTFPs need to be improved and at the same time some new NTFPs and industry need to be explored, such as wild flower, medical plant and eco-tourism.
CASE STUDY

- CENTER FOR INTERNATIONAL FORESTRY RESEARCH (CIFOR) -

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Potential for Application and Demonstration of SFM

at CIFOR’s Research Forest,

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CONTENTS

Policy and Program Areas for Field Level Application of Sustainable Forest Management

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2. The Research Forest

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      Stakeholder Consultations
      Socio-Economic Studies
      Reduced Impact Logging
      Environmental Assessment

   b) Potential Contributions to SFM

3. Future Plans
SUMMARY

In December 1995, the Indonesian Ministry of Forestry designated 321,000 ha of forest in East Kalimantan (Indonesia) to be developed by CIFOR as a long-term model of exemplary, research-based, forest management. CIFOR’s interest in this research forest - the first in Indonesia - is to carry out multi-disciplinary research covering the complexity of forest management for multiple-use, to enable more informed, productive, sustainable and equitable decisions about the management and use of forests.

An important reason for the choice of Bulungan was that the Tubu River basin is possibly the largest area of unlogged lowland forest in Borneo. It has been recognised as having major conservation significance for at least 20 years. It has not been logged because it is surrounded on almost all sides by very rugged terrain. The central part of the research forest is one of the few remnants of what vast areas of Kalimantan looked like 30 years ago. The only other unlogged lowland forests in Borneo are swamp forests. Once a road currently under construction progresses a little further, its isolation will be ended and the whole area will be transformed.

The people living in and near the Bulungan Research Forest depend on the forest to meet their livelihood needs. Thus the extent and state of the forest affect their well-being; and conversely, people’s behavior affects the forest. CIFOR’s research concentrates on two aspects of this relationship between the forest and forest dwellers:

1. The impact of large-scale development activities (logging, plantations, mining) on the local population’s use of the forest.
2. Processes for reconciling forest management and local rural development.

An understanding of how local people’s use of the forest is affected by different types and intensities of disturbance is important when considering such issues as sustainability and certification. People seem to react to large projects such as logging, coal mining, industrial tree based plantations in two ways (often simultaneously):

- responses which minimize damage in the case of conflicts of interests (like losing their land use rights or other costs that may be imposed on their economic activities).
- maximizing the opportunities and benefits from the new projects whenever feasible.

Changes in the social, economic and environmental conditions following these large projects are often reflected in the utilization of NTFPs.

The CIFOR/MinFoF (Indonesian Ministry of Forestry) research and demonstration, supported by ITTO, aims to help achieve long-term sustainable forest management, integrating social and silvicultural factors, through:

- the assessment of the effect of Reduced-Impact Logging on biodiversity, conservation, ecology and socio-economics and
- the assessment of rural development trends and future policy options including the effects of macro-level development activities on people dependent on the forest.

The research and development activities will improve forest management systems and help achieve sustainability. This research is to be implemented for a 3 year period - regarded as a first phase. CIFOR and the Government of Indonesia expect to maintain research and development activities at the site for a much longer period (10-20 years). CIFOR has conducted field testing of criteria and indicators of sustainable forest management in 6 countries over the past three years. We are now seeking to apply many of these lessons in our research forest to demonstrate the utility of the lessons learned and to further refine our understanding of the processes involved.
THE CONTEXT

One of the greatest challenges for achieving sustainable forest management is the increasing complexity of society's demands on tropical forest resources. Demands for tropical forest extraction, conversion or protection are transforming the way forests look and the way they are managed, with the result that tropical forested landscapes are perhaps the single most rapidly changing land type around the globe. These demands are complicated by coinciding claims for use or control of the same area, the increasing number of social and private interests pursuing their diverse agendas and the multiple contexts of forest management, from the local to the regional, national and international scales.

The Government of Indonesia assigns high priority to attaining Sustainable Forest Management. The Bulungan Research Forest, by integrating silvicultural (Reduced-Impact Logging assessment), ecological (biodiversity assessment) and socio-economic aspects of natural forest management for multiple use, is a major contribution towards SFM. It will provide guidelines for long-term management of natural forests and demonstrate a process for inclusion of all stakeholders in substantive decision-making about forests. A specific aim is to promote and support research and development to improve forest management and efficiency of wood utilization while increasing the capacity of local stakeholders to conserve and enhance other forest values in timber producing tropical forests.

Although we are beginning to understand what sustainability is and how to maintain it at the forest management level, approaches for maintaining sustainability at the larger landscape scale remain poorly developed. The research aims to carry out systematic investigation of how to achieve forest sustainability for a "large forest landscape" in the humid tropics, where diverse, rapidly changing and often conflicting land use demands exist. This will require an understanding of the technologies, policies and information needed for meeting multiple objectives both within and across forest types in a given area. The focus of such a landscape approach is on the links among different activities. We therefore aim to better understand how to strengthen the synergies and compatibilities among demands, while minimizing the conflicts among users, and negative impacts on sustainability.

Institutional and legal framework

The principal partners of this initiative are the Indonesian Ministry of Forestry (MoF), FORDA (Forest Research and Development Agency of MoF), CIFOR, INHUTANI II (a state-owned logging company and concessionaire), Indonesia Program of the Worldwide Fund for Nature (WWF-IP) and the Indonesian Institute of Sciences (LIPI). CIFOR and FORDA have assumed primary responsibility for the design and execution of research activities, including the management of research funds from ITTO. INHUTANI II has responsibility for the management of its concession area based on silvicultural prescriptions developed in cooperation with CIFOR and FORDA, and approved by the MoF. The Ministry of Forestry provides sponsorship of proposals to ITTO and other donors, where required, and retains overall responsibility for policies and activities carried out in the BRF.

Objectives

1. Assessment of the effect of Reduced-Impact Logging on biodiversity, conservation, ecology and socio-economic status of local people.

2. Assessment of rural development trends and future policy options including the effects of macro-level development activities on people dependent on the forest.

The Research Forest and characteristics of the region where it is located
The Bulungan Research Forest (BRF) is located in East Kalimantan (Indonesia), in the Bulungan District. The area is adjacent to the Kayan Mentarang National Park where WWF-IP has been working for several years. Together the two areas constitute an expanse of more than 1.7 million hectares and lie in the heart of one of the Asian’s largest remaining areas of tropical rain forest. They also form a natural unit for integrated management. The BRF lies in the watersheds of the Tu bu, Malinau and Bahau Rivers, and the upper Bahau is the western limit of the site. The elevation ranges from 100 to 2000 m. Although there are small areas of farmland and secondary forests on the Tubu and Bahau Rivers, the area is almost entirely covered by primary hill or lowland dipterocarp forest. The forest in this area has been identified as having particular value for biodiversity conservation as it includes extensive areas of medium diversity forest on level terrain which is unusual in this otherwise steep terrain or mountainous region.

The people inhabiting the area are mainly Punan (Tubu river) and Kenyah rice farmers who practice extensive agroforestry and harvesting of non-timber forest products such as gaharu (Aquilaria spp.) and birds’ nests. A state-owned logging company, INHUTANI II, started selective logging activities in early 1997 just east of BRF. The 321,000 ha includes production and protection forest. The BRF site shows many of the characteristics of other tropical forests, particularly the increasing competition for forest use among different interests (selective logging, shifting cultivation, collection of NTFPs, coal mining, and oil palm plantations). As the BRF site is almost entirely covered by primary forest, it offers a rare opportunity to implement sustainable forest management practices for multiple use. The research study will provide important information on the impact of new activities such as logging, mining and industrial plantations, both on ecosystems and on the resident human population (including their use of NTFPs).

Stakeholder Consultation

Like the International Model Forests program, our purpose is to achieve sustainable management of natural resources, that is, a balance between human demands and the environment's ability to meet these demands. We expect to achieve this through a process of co-operation to identify and resolve conflict between resource utilisation and resource conservation, and by a partnership group of stakeholders, which addresses social, economic, cultural and environmental needs over the long term.

The management group therefore needs to know the forest condition, infrastructure and the accessibility of the forest, and the social economic conditions of the local people. CIFOR and partners have convened meetings with local NGOs, municipality, industry and concerned citizens at large, which includes transmigrants, dayaks, shifting cultivators, rattan collectors, riverboat traders, etc.. CIFOR informed the Bupati and all participants of the meeting about proposed CIFOR research in Bulungan and Kayan Mentarang areas, organised a local meeting with all identified stake-holders, including concessionaires to get them involved and ask for inputs from them. After this, a technical meeting was convened involving other research agencies, universities, NGOs and other potential clients or stake-holders of our research activities Field visits and meetings with local authorities were important as we drafted our research program.

CIFOR does not have or want a concession or strict control over the area. The Forests remain property of existing right-holders or managers - we have no claims on the produce. CIFOR is not the “landlord” of resident people within the forests (though we expect to be quite active in “action-research” with them). The umbrella agreement establishes CIFOR’s special interests and right to do research in the area, and is recognised by the existing managers (e.g. PHPA, INHUTANI). Separate agreements are written for specific activities e.g. logging experiments with INHUTANI; a biodiversity survey with PHPA; or assist with reforestation of logged over areas.
This area has been used for timber and other forest products by local people living within and outside the research area. It is a very dynamic situation, with Government-encouraged migration of villages to areas with better access to infrastructure, schools and medical services. Many villages have moved outside the area while still maintaining traditional links with it, especially for high value forest products. New activities also bring changes in population (the majority of INHUTANI II workers are from outside the area, predominantly from Java) and access to resources. Diverse new activities have been proposed for this area (including oil palm plantations, coal mining and logging) which are rapidly opening the area and when combined with previous traditional use make it an excellent location for studying response to disturbance.

Anthropological studies have been conducted in the area over several decades. CIFOR social science staff have been conducting a study on household livelihoods and forest use in the area since 1994 and have extensive data holdings on household incomes, demography and forest product collection. WWF has been facilitating and carrying out research since 1990 in the adjacent Kayan Mentarang Nature Reserve on both ecological and social topics. CIFOR’s database will integrate the available information collected by WWF-IP, and share this with other stakeholders.

Reduced Impact Logging

The project will benefit from previous experience in forest management planning and in RIL trials carried out in Sabah (Innoprise Danum Valley concession, Putz and Pinard, 1993, Pinard et al. 1995, Pinard and Putz, 1996,) and East Kalimantan (STREK project, INHUTANI I concession, Bertault and Sist, 1995). Those past experiences have clearly demonstrated that damage can be significantly reduced by applying simple techniques within a forest management plan, e.g. a pre-harvesting survey and mapping of timber trees, vine cutting, design of skidtrails network before logging and directional felling. The policy question is whether the economic and time savings associated with a reduction in the TPTI regeneration requirement would provide sufficient incentives for a concessionaire to invest in the planning and essential training required for RIL. Similar policy questions involving the ability of the concessionaire to provide adequate incentives for field crews to induce them to change harvesting practices can be envisioned. In this context, for research purposes, the Ministry of Forestry will be asked to waive both liberation thinning and enrichment planting requirements after logging.

A first assessment of the topographic features of the INHUTANI II concession and particularly of the 5,000 ha scheduled for logging over the next 5 years will be a first priority. Forest inventory and a tree location map will provide important information on the concession and allow a logging plan to be developed according to the field characteristics and forest resources. Because the BRF has some very steep topography, log extraction using a cable system, probably a skyline system, must be considered as an option to reduce soil erosion. This aspect will benefit from the technical experience of the Sumalindo concession, nearby in East Kalimantan.

Ecological assessment of RIL

The assessment of biophysical impacts of RIL will focus on biodiversity, carbon sequestration, changes in soil and water, non-timber forest products, forest regeneration and productivity, and fire risk. The impact of RIL on biophysical features must be compared with the impact of conventional techniques. A system of permanent sample plots (1 ha each) will be established in both conventional and RIL coupes (1997-1998 and 1998-1999 respectively) before logging operations. These permanent plots offer possibilities for a wide range of forestry research and are necessary for studies on forest regeneration, productivity and forest dynamics modeling. CIFOR guarantees the long-term monitoring of permanent plots. The research will be conducted by CIFOR in collaboration with a variety of local, national and international partners. Plot implementation and damage assessment methodologies will take advantage of experience from Sabah and the STREK projects.

Socio-economic impacts
The socio-economic assessment of RIL will involve comparisons of economic (societal perspective) and financial (concessionaire's perspective) analyses of RIL as well as assessment of the impacts of skill acquisition on worker performance, pay and job mobility. The assessment of these impacts will contribute simultaneously to field tests of assessment methodologies being developed under CIFOR's "Criteria and Indicators of Sustainability" research project.

Assessment of forest management planning and control costs including RIL have not yet been carried out on a concession scale. A thorough assessment of the advantages and disadvantages (to operators and concession holders) of adopting RIL techniques requires an understanding of both the economic benefits and costs of RIL operations in comparison with conventional logging operations. Concessionaires resist the adoption of RIL techniques if the economic advantage of these techniques cannot be clearly demonstrated. By reducing damage to the remaining stand and limiting soil compaction, RIL may provide economic advantages in long-term management, thus benefiting society and the landowner (Government of Indonesia). By adopting RIL techniques, concessionaires could avoid the need for enrichment planting and liberation thinning - an important economic incentive.

Biodiversity assessment

An understanding of biodiversity patterns can only come about by a careful, well planned survey. For this reason, basic physical characteristics of the environment (terrain, elevation, slope, aspect, soils, geology, landscape cover, landuse patterns, climate etc.) will be sought and spatially-referenced for GIS studies. This baseline information set will also be used for logging planning. Gradient-based survey design will provide the basis for stratified sampling of the Bulungan area. The data analyzed will facilitate the identification of indicators of biodiversity, and will be pooled with that acquired by sampling of animal groups (insects, birds, small and large mammals). From these studies, the environmental determinants of broad patterns of biodiversity should be readily identifiable. Mapping software (DOMAIN) can produce testable, extrapolated maps of specified sets of taxa. The models derived from these analyses will be used to build Land Allocation Models and Decision Support Systems to create management options for SFM with a focus on biodiversity. The data acquired from BRF will also be compared with data from parallel studies in other global eco-regional gradients.

Prospects for Rural Development

The problem is how to improve local people's livelihoods and forest management practices by anticipating economic development trends and policy needs. The research will explore possibilities for reconciling forest management objectives with local people's needs. Two questions are posed:

- How will changes in economic growth and rural development in the next 10-30 years affect the status and role of people in sustainable forest management?
- What kinds of policy options will be needed to meet local people's livelihood needs and forest management objectives in the next 10-30 years?

The research will focus on current rural development activities to improve equity, economic productivity and sustainable use of the forest and explore what form such development will take in the next 10-30 years. Data are being collected on existing household economic strategies and the forces of change affecting these strategies, including migration, rural industrialization, new opportunities and improved transportation. They will be examined in relation to patterns of forest use and the policy or institutional conditions affecting control of forest use and management. Findings will be disaggregated to identify differential geographic and social impacts (by ethnic group, age class or gender) as a basis for understanding the dynamics of forest people's livelihoods and the incentives and sanctions underlying their forest management. This information can then be discussed with stakeholders, including projecting trends, developing appropriate policy options and estimating their impacts.

Possible Future Actions
The first phase of this project is expected to last three years, during which we will gather and organise baseline information on the Bulungan Research Forest and its surroundings as an integrated base for component studies in later phases. GIS techniques will be used to develop a comprehensive spatially referenced database for the site. This will also be the basis for models to predict outcomes of different management interventions and to eventually develop decision support systems for wider application. RIL field experiments and assessment of both ecological and economic aspects will provide a first evaluation of the RIL feasibility on a concession scale. The first application of this RIL experiment will aim to improve the present Indonesian silviculture system (TPTI) by defining clear technical harvesting rules leading to long-term sustainable forest management. A major emphasis of the work will be on development and testing of incentive systems and policies which will promote the adoption of RIL technologies at all levels, from logging workers to concession holders.

The people of this area depend on the forests for their welfare and for employment. They are also the repository of a wealth of knowledge of forest systems. Recording this knowledge and applying it to the development of the area is an important objective. A major strategic element is to ensure that development in the region optimizes benefits to the indigenous population. The main beneficiaries are:

• The people living in the area who will benefit from improved livelihood options, enhanced conservation of the forest resources on which they depend, protection against inappropriate development, and better coordination with adjacent land users.
• Ministry of Forestry and policy makers: Improvement of the Indonesian forest management system (TPTI) by providing guidelines for RIL application on a concession scale.
• INHUTANI II who will acquire technical knowledge for RIL implementation as part of forest management planning and control.
• The global community through bringing one of the world’s most important forest wilderness areas under exemplary management, and the conservation of both its biodiversity and of its global environmental functions (carbon sequestration etc.).

In the context of the approaching timber eco-certification deadline, and as a state-owned company, INHUTANI II must achieve sustainable forest management practices by the year 2000 as required by Indonesia’s MoF in the framework of ITTO’s year 2000 objective. Since RIL is an essential component of those practices, INHUTANI II is eager to cooperate with CIFOR, to test the feasibility of RIL techniques and, more importantly, to acquire new technical knowledge for RIL implementation.

A special effort will be made to encourage scientists from biological, forestry and social science institutions in other countries to work at the site. South-South cooperation will be promoted especially by involving scientists from other tropical developing countries at the site.

The following risks have been identified as having potential to interfere with the satisfactory development of a model of SFM at this location:
• There is a very small risk that change in the designation of the land away from permanent forest estate could occur if mineral resources or other major development options were discovered which could cause the government to reallocate the land out of production forestry. There are no indications at present that this could happen although coal exploration is expanding in the area.
• In the past attempts to reduce the impact of logging have been hampered by post logging invasion of forests by shifting cultivators. However, the general tendency is for the population to move away from the research area and we see this as an improbable development. However, any major declines in economic activity in the cities of the region could cause a movement of population back to the countryside with a possible increase in the risk of agricultural encroachment. However, at present it seems that it is unlikely that this would constitute a significant risk in the Bulungan area.

The following partners are included in specific elements of the BRF program:
USFS and USAID for research and training support
FAO and NORDFOR for training on RIL techniques
MAPINDO and INTAG for topographic maps, aerial photography and satellite imagery
Herbaria of Bogor and Leiden for plant identification

The main goal of the research in BRF is to achieve long-term forest management for multiple-use. This objective cannot be reached within the first phase of the project. The main output of the first phase will be a collection of baseline information regarding the area and starting cooperation and training in the logging operation with INHUTANI II. The BRF site is foreseen as a long-term research site, where CIFOR and the Government of Indonesia will identify further partners, to maintain research and development activities in the medium-term (10-20 years).

Literature cited

FACT SHEET

Criteria and Indicators for Sustainable Forest Management

by Forest Resources Division
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FACT SHEET: CRITERIA AND INDICATORS FOR SUSTAINABLE FOREST MANAGEMENT

Forest management encompasses administrative, economic, legal, social, technical and scientific action which affects natural forests and plantations. It implies varying degrees of planned human intervention aimed at safeguarding and maintaining the forest ecosystem and its functions, while favouring given socially, environmentally or economically valuable species for the improved and sustained production of goods and environmental services. In technical terms, forest management implies the formulation and implementation of forest management plans which help control and regulate harvesting and sustainable use of specified goods and/or which promote and maintain the environmental functions of the forest. This is achieved through silvicultural and protective measures applied in varying intensity to sustain or to increase the social, ecological and economic value of present-day and subsequent generations of the managed forest stand.

Sustainable forest management is commonly viewed as one of the most important contributions which the forestry sector can make to programmes aimed at the sustainable development of nations. In this regard Chapter 11 of UNCED, "Combating Deforestation" and the "Forest Principles", strongly emphasised the need to reconcile the productive functions with the protective, environmental and social roles which all types of forests fulfill.

Prior to UNCED, guidelines for the sustainable management of natural tropical forests had been elaborated in 1990 under the auspices of the International Tropical Timber Organization (ITTO), followed by the definition of ITTO criteria for monitoring of sustainability in tropical moist forests, published in early 1992. In 1993, these were supplemented by guidelines for the establishment and sustainable management of planted tropical forests, and by guidelines on the conservation of biological diversity in tropical production forests.

Following UNCED a number of national, regional and ecoregional initiatives have been taken to develop common criteria by which sustainable forest management can be defined, and to specify related indicators which can be quantified or described and regularly monitored to evaluate the overall effects of forest management interventions, with a view to their gradual improvement. Inter-Governmental activities in this respect have been conducted mainly within the framework of a number of major international processes. These include:

C The "Helsinki Process", which focuses on the development of criteria and indicators for the sustainable management of forests in 38 countries in Europe and which, in principle, thus includes boreal, temperate and Mediterranean-type forests. The mandate of the process was laid down in two Ministerial Conferences on the Protection of Forests in Europe (Strasbourg 1990, Helsinki 1993). The European countries have agreed upon six common criteria, twenty-seven quantitative indicators, and a number of descriptive indicators for sustainable forest management.

C The "Montreal Process", which is implemented in follow-up to the Seminar of Experts on Sustainable Development of Temperate and Boreal Forests, organized in Montreal, Canada in 1993, within the framework of the Conference on Security and Cooperation in Europe (CSCE). The initiative deals with criteria and indicators for sustainable forest management in temperate and boreal forests outside of Europe. The 10 originally participating countries, recently increased to 12, have agreed on a set of seven, non-legally binding criteria and sixty-seven indicators for sustainable forest management, identified for national implementation.

C The "Tarapoto Proposal of Criteria and Indicators for Sustainability of the Amazon Forest", was adopted in February 1995 in Tarapoto, Peru, in a meeting held under the auspices of the Amazon Cooperation Treaty. Within the framework of this initiative, seven criteria and forty-seven indicators were identified and proposed for national level implementation in the 8 participating countries. Criteria and indicators were also identified for the levels of forest management unit (additional 4 criteria and 22 indicators) and of global concern (one additional criterion and 7 indicators). The recommendations and conclusions of the meeting have been subsequently submitted to the Governments of participating countries for their approval and ratification.

The UNEP/FAO Expert Meeting on Criteria and Indicators for Sustainable Forest Management in Dry-Zone Africa, held in Nairobi, Kenya 21-24 November 1995, identified seven criteria and forty-seven indicators for sustainable forest management, subsequently submitted for consideration to the 10th Session of the African Forestry and Wildlife Commission (South Africa 27.11 to 1.12.1995). They were also submitted by FAO to the Secretariats of the 3 sub-regional groupings which cover the 27 countries concerned (CILSS, IGAD, SADC) for review, comments, agreement and subsequent implementation. A follow-up workshop was organized by UNEP/FAO in November 1997.

In the FAO/UNEP Expert Meeting on Criteria and Indicators for Sustainable Forest Management, held in Cairo, Egypt 15-17 October 1996, experts from 30 countries identified seven criteria and sixty-five indicators for sustainable forest management, which were subsequently submitted for consideration and endorsement to the 12th Session of the Near East Forestry Commission (Cairo 21-24 October 1996). A follow-up workshop was organized by FAO in July 1997.

An FAO/CCAD Expert Meeting on Criteria and Indicators for Sustainable Forest Management in Central America was held in Tegucigalpa, Honduras 20-24 January 1997, resulting in the Lepaterique Process of Central America. The experts from the 7 CCAD countries identified four criteria and forty indicators at the regional (Central American) level; and eight criteria and fifty-two indicators at national level, for consideration of countries in the region. An expert from Cuba attended the meeting, providing links to possible future action in the Caribbean. The Expert Meeting elaborated a seven-point Declaration, each point referring back to the criteria defined, for the consideration of the Heads of State of the seven CCAD countries at a forthcoming Summit (March 1997). The regional meeting will be complemented by two FAO/CCAD supported sub-regional meetings and 7 national seminars on country-level implementation.

FAO's Forestry Department has been involved in, or instrumental in catalyzing and helping pursue, all the above international initiatives on criteria and indicators for sustainable forest management in accordance with its mandate and priorities, and in line with the Organization's role as Task Manager for Chapter 11 of Agenda 21 of UNCED and focal point for the issue among UN Agencies in the work of the Inter-Governmental Panel on Forests (IPF) of the Commission on Sustainable Development.

In an FAO/ITTO Expert Meeting held in Rome from 13 to 16 February 1995, a review was made of possibilities and desirability to harmonize on-going initiatives related to criteria and indicators for sustainable forest management. While there was general agreement on the need to ensure exchange of information, knowhow and experience between on-going initiatives to ensure comparability between them and to avoid wasteful duplication of efforts, the meeting stressed the need to allow on-going initiatives to pursue their aims unimpeded, reflecting the different environmental and socio-economic conditions from which they have sprung.

The above, general conclusion, was also reached at the Inter-Governmental Seminar on Criteria and Indicators for Sustainable Forest Management, organized by the Government of Finland in support of the work of the IPF, known as the ISCI Seminar (Helsinki, Finland 19-22 August 1996). Participants in the ISCI Seminar, held in collaboration with FAO, included representatives of the on-going initiatives on criteria and indicators for sustainable forest management and of implementing countries, as well as other concerned Governmental and non-Governmental organizations. The meeting helped further international dialogue and advance related issues in preparation of the final sessions of the IPF in September 1996 and February 1997.

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1 Main organizers: the Council for Forests and Protected Areas (CCAB-AP) of the Central American Commission for Environment and Development (Comisión Centroamericana de Ambiente y Desarrollo, CCAD); and FAO, within the framework of TCP Project RLA/5611.
CASE STUDY

- FINLAND -

THE TAIGA MODEL FOREST

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A paper presented at the
International Workshop on Model Forests for Field-Level Application of
Sustainable Forest Management
Tokyo, 10 - 12 March, 1998
The aim of the project is to study economic, ecological and social effects of forestry on a local level in Matroisy forest area to meet the requirements of sustainable forestry.

The project can be divided into the following subtasks:
- to study economic sustainability of forestry and to develop forest management and harvesting methods for local conditions;
- to study social sustainability of forestry and the interaction between local people and forestry and to organise multiple use of the local area;
- to study ecological sustainability of forestry and to analyse biodiversity of the model area and its neighbouring areas;
- to study and compare different forest certification systems and
- to develop an efficient information system for the project as a part of the strengthening of institutions involved with the project and improvement of forest education.

The Taiga Model Forest has been established in Pryazha district at the village of Matroisy, 40 km West from Petrozavodsk. The Petrozavodsk State University has leased from the State Forest Committee a forest area of 2.465 ha for 20 years (1.2.1997-31.12.2016) for research and educational purposes. The field station of the University is already located in the area. In the area there will be launched a large scientific experiment, where different forest management regimes and their effects on economical, ecological and social sustainability will be followed. The used management approaches are the Russian practice (Russian forest legislation, Russian forest certification system), the Finnish practice (Silvicultural recommendations of Enso Ltd, national certification), the Swedish practice (international certification by Swedish FSC) and the control i.e. natural development. The used experimental design is so-called BACI-method (Before-After-Control-Impact).

The Taiga Model Forest -project is executed by the University of Joensuu (Faculty of Forestry, Karelian Institute), Petrozavodsk State University (Faculty of Forest Engineering), Harne Polytechnic (Evo Forest College), Karelian Science Center (Forest Research Institute, Biological Institute, Institute of History) and the Karelian Scientific and Research Institute of Forest Industries. The technical co-ordination of the project is in Forest and Environment Group - FEG Ltd.

In the Steering Committee of the project there are representatives from the State Forest Committee of the Republic of Karelia, the Ministry of Ecology of the Republic of Karelia, United Nations Environment Programme (UNEP), the Ministry of Environment of Finland, the Ministry of Agriculture and Forestry of Finland, WWF Germany and Enso Ltd.

More information of the Taiga Model Forest can be obtained from http://www.karelia.ru/psu/Structure/Faculties/Forest/taiga_e.htm
1. Introduction

In the Russian Karelia forests and forestry play a major role in the economy of the Republic. At the same time they render ecological influence on the North-Western region of Europe and Russia, and they are the key factor in regulating the climate and ecological systems of this region. Therefore it is especially important in Karelia to construct the rational forest utilisation on the basis of principles of sustainable development and on the balance of economic, social and ecological functions.

During the last few years the concept of sustainable forest management has been accepted as a natural objective of forestry throughout the world. At many international conferences the indicators and criteria of forests and forestry have been evaluated and a great emphasis has globally devoted to this development work. Without taking these criteria and indicators into account, we cannot develop the appropriate logging system, neither any other ways of forest utilisation nor the export-import operation system. In the long term all these activities connected with the forest exploitation bring about harm both to forests and to the economics of those countries if the criterias and indicators for sustainable forest management are not being developed and followed.

The aim of the Taiga Model Forest project is to study economic, ecological and social effects of forestry on a local level in Matrosy forest area to meet the requirements of sustainable forestry. The project is divided into the following subtasks:

- to study economic sustainability of forestry and to develop forest management and harvesting methods for local conditions;
- to study social sustainability of forestry and the interaction between local people and forestry and to organise multiple use of the local area;
- to study ecological sustainability of forestry and to analyse biodiversity of the model area and its neighbouring areas;
- to study locally suitable criteria for the sustainable forest management and to develop a list that is comparable to the principles and criteria of proposed by the FSC.
- to develop an efficient information system for the project as a part of the strengthening of institutions involved with the project and improvement of forest education.

2. Management, planning and co-ordination of the project

The Steering Committee consists of the following organisations: the State Forest Committee of the Republic of Karelia, the Ministry of Ecology of the Republic of Karelia, United Nations Environment Programme (UNEP), the Ministry of Environment of Finland, the Ministry of Agriculture and Forestry of Finland, Ministry of Foreign Affairs of Finland, World Wide Fund For Nature WWF and Enso Ltd. The Taiga Model Forest -project forms a part of the Finnish-Russian Development Programme on Sustainable Forest Management and Conservation of Biological Diversity in Northwest Russia (NWRDP).

The Taiga Model Forest -project is executed by the University of Joensuu (Faculty of Forestry, Karelian Institute), Petrozavodsk State University (Faculty of Forest Engineering), Hame Polytechnic (Evo Forest College), Karelian Science Center (Forest
Research Institute, Biological Institute, Institute of History) and the Karelian Scientific and Research Institute of Forest Industries. The University of Joensuu and Petrozavodsk State University together with the FEG Ltd. are in overall charge of the practical part of the project.

The project is divided into 6 subprojects:

1. Establishment of the Taiga Model Forest Area
2. Social sustainability
3. Economic sustainability and appropriate technology
4. Ecological sustainability
5. Environmental acceptability of forestry
6. Institutional strengthening, education and training.

The Taiga Model Forest has been established on a forest area in Pryazha district, close to the village Matrosy, 40 km West from Petrozavodsk. Pryazha district is situated in 61°10'-62°11' latitude north and in 32°46'-33°57' longitude east. By a leasing agreement the Petrozavodsk State University will lease from State Forest Committee the forest area of 2.465 ha for 20 years (1.2.1997-31.12.2016) for research purposes. A University field station is already located in the area.

According to the working plan the project will be carried out in three years, between 1997-1999. During the first year the forest area in Matrosy has been inventoried and an integrated forest and ecological plan is being developed. In the second year the participants of the project will focus on research work. Different methods and techniques will be widely tested and the gained results analysed. New field experiments will be also established. Demonstration activities of different methods and techniques will be started. In the last year the main emphasis will be devoted to providing final reports and presenting results. On the basis of the results, recommendations for operations will be established. The decision regarding possible continuation of the project will be made after this phase.

3. Material and methods

The effect of alternative management options will be studied experimentally. We are using the so-called Before-After-Control-Impact design in which the relevant areas will first be thoroughly inventoried before management and then both types of areas will be inventoried after forest harvesting. The experiment requires that no action will be taken in the experimental areas before all the necessary inventories are completed.

The experiment is designed to show the management impacts both in thinnings and final cut of the forest. The management options represent the major currently available rules and regulations used in Russian and Scandinavian forestry. The treatments to be compared (both in thinning and final cut) follow the rules and regulations according to
the following statements (these represent the treatments, i.e. forest management approaches to be compared):

1. Russian Forestry Law
2. Silvicultural recommendations of Enso Ltd
3. Standards set by WWF-Sweden in their forest ecosertification procedure
4. Control (no treatments)

To obtain more general results it is probably necessary to add one more factor representing the major forest site types. Initially we planned to include two categories (fertile vs. non-fertile) but this will be decided only after the forest inventories are completed. The size of the experimental units should preferably be 9 ha squares (300 x 300 m). This allows an edge of 100 m as a buffer zone against other treatments if the size of the actual impact area is 1 ha. Five replicates per treatments will be used.

Based on the results of the experiment we will be able to evaluate the ecological, economic and social consequences of alternative management options. The research of social sustainability at local level consists of the study of the local economy, living conditions, social security networks, survival strategies, and the level of dependence of the population on forests, including the employment issues. This part is done in the whole Pryazha district.

The experimental forest area will provide information on the economic, social and ecological consequences of four different management strategies. Based on this information and combining the results of different sub-projects we will be able to simultaneously look at the three different categories that determine the sustainability of the forest management.

To ensure a high efficiency of forestry and to organise sustainable/inexhaustible management of forest resources on the model area GIS-technologies will be used. A special emphasis is given to the information dealing with the goals, tasks, ways of realisation and results of the project and it is mainly being developed through the internet.

4. Finnish-Russian Development Programme on Sustainable Forest Management and Conservation of Biological Diversity in Northwest Russia (NWRDP)

The main objective of NWRDP is to promote and provide assistance for the balanced development of the forest sector in Northwest Russia. The focus of the programme is on sustainable forest management and the conservation of biological diversity. On the Finnish side the programme is planned and funded primarily by the Finnish budgetary funds for the neighbouring areas, namely by the Ministry for Foreign Affairs, the Ministry of the Environment and the Ministry of Agriculture and Forestry. NWRDP is planned and implemented according to the needs and priorities set by the Russian Federation and her appropriate federal and regional authorities. The programme acts in a consensus way, namely all the projects implemented follow the guidelines and principles accepted all the relevant parties. The main objective is to integrate sustainable forest management and the conservation
of biodiversity to each other also in practice. This is being developed in various projects in the programme such as the Taiga Model Forest.

NWRDP is designed in such a way that it supports the activities funded by the Russian Federation and her authorities, other bilateral projects in the region and the ones funded by the multilateral organisations such as the World Bank, the European Bank for Reconstruction and Development, the United Nations organisations and the European Union development programmes like TACIS. The programme is planned and implemented in coordination of the above mentioned programmes and projects.

The main components and issues tackled by and in NWRDP comprise: Taiga Model Forest, Forest certification, Seed and Nursery activities, Forest Education and Forest Research. There has been a tendency that the segmental/functional activities are being replaced by more comprehensive approaches such as the Taiga Model Forest and in the process of forest certification.

5. Development aspects for the Future

According to the experiences gained through the Finnish-Russian cooperation in the forest sector during decades and especially during the last project oriented years, it is likely that more model forest areas will be established with the Finnish assistance, especially in our neighbouring countries. The main reason being that it is from the development impacts point of view the most efficient way to create development in and by the forest sector if one concentrates all the main means on a certain area and develops it taking into account, for instance, all the dimensions of sustainability. By promoting functional projects one can primarily support certain development objectives usually set by technical experts and often in conflict with some other development objectives in the same area instead of having an aim at holistic development with integrated and merged objectives. In addition in Model Forest type of projects the pragmatic, educational and research components or projects can be designed in such a way that they support in practice each other and, for instance, the results gained by the research, can be directly used in pragmatic development activities.

At present all the Russian regions dealt with under NWRDP have expressed their deep interest for having a Model Forest type of project in their regions and thus shown strong prioritised support on this type of activities. At present there are experts analysing the possibilities to create similar types of projects in Murmansk, Leningrad and Archangelsk regions. It is evident that the probable projects will emphasize different issues and that the priorities set in different regions vary, but also that such a comprehensive approach is gaining success and creating results and impacts.

From the Finnish point of view it is essential to coordinate these projects and project ideas with other donors and other projects planned and implemented in the regions and areas discussed and to have cooperation in all the phases of the project cycle: identification, (pre)feasibility studies, planning, implementation and evaluation. The co-financing is the key topic; more and more projects should have more than one financer and additionally, a phase in a well designed project should lead to and temptate other financers as well. The most probable combinations of co-funding with the Finnish one include a bilateral donor like Sweden, a Nordic financing institution such as the Nordic Investment Bank (NIB) or its Environmental
TAIGA Model Forest

facility (NEFCO), the World Bank or with an EU programme like TACIS. It is evident that the Model Forest projects need vast financial resources especially in the means of investments and infrastructural development and thus single bilateral donor agencies cannot act alone in this type of development activities.

Finland is also very interested in following experiences gained within these issues in other regions and vegetational zones as at present the approach in Model Forests contain internationally perhaps the most advanced and holistic approach of sustainability met in the sector.
COUNTRY REPORT

- INDIA -

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Sustainable Forest Management in India
Paradigm shift towards Local Initiatives & Partnerships

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New Delhi, India
1998
Sustainable Forest Management in India
Paradigm shift towards Local Initiatives & Partnerships

S. K. Pande & Bharat Lal

Introduction

The livelihood pattern of the people of any region and the nature and variety of occupations followed by them are conditioned by the stages of economic development and the extent to which the available natural resources are utilized. The wise use of resources provided by forests and the sustainable development and conservation of biological diversity of forest ecosystems lies at the heart of present policy and approach in India. In spite of cultural, lingual and regional diversity, such policies derive their mandate from the Constitution of India.

The Constitution of India

- Provides for forest and wildlife as Concurrent subject under Schedule VII, List III, entries 17-A & 17-B.
- The Directive Principles of State Policy under Articles 48-A, Part IV provides thus; the State shall endeavour to protect and improve the environment and safeguard the forests and wildlife of the country
- The Constitution also enjoins citizens to protect nature, further the cause of forest & wildlife conservation as one of the Fundamental Duties.

Forests are a vital component to sustain the life support systems on the planet Earth and play a critical role in the socio-economic development of people of India. They have been an important source of subsistence and provide employment opportunity to a vast majority of marginalized and tribal people residing in and around forests. These forests are also source of revenue and provide raw materials to various industries. Role of forests in maintaining ecological balance, environmental stability, biological diversity, food security and sustainable development has been well recognized. Due to increasing pressure of growing population and the consumptive lifestyle, forests are dwindling and have touched a critical low.

Mahatma Gandhi, the Father of Nation, wrote long back that 'the earth has enough for everyone's need but not for anyone's greed'. It needs to be emphasized that the overall food security of a nation is inextricably linked to its ecological balance, in which forests play a crucial role. Human greed resulting in over-exploitation of natural resources and unplanned development have reduced the once rich and life sustaining habitats to a fraction of their former wealth. Drought, scarcity, desertification and associated degradation are a few problems indicative of an overall malaise of degradation resulting in disruption of the water cycle. Eco-restoration programme, therefore, need to focus on recharging of water resources through an integrated watershed development.
India – country profile

India is the second most populous and seventh largest country in the world. It is the most populated and largest country in the South Asia with an area of 32,87,263 sq. km. and population of 846.3 million (1991 census). It has a land frontier of 15,200 km., and coast length of 6,100 km. The main land extends from 8° N to 37° N and from 68° E to 97° E. It measures 3,214 km between extreme latitudes and 2,933 km between extreme longitudes. India’s rich forests are the resultant of diverse physiographic conditions.

The Himalayas, which extend over an area of nearly 100 million ha., provide a highway for living species. The Himalayas also deflect the rain-bearing clouds into the region, determining rainfall regime, environmental conditions and life in the subcontinent. The rainfall pattern is also influenced by the Western Ghats. The Annual rainfall varies from as low as 10 cm in the hot desert areas of Rajasthan, Gujarat, and the cold desert areas of the Laddakh plateau, to high rainfall (1,100 cm.) along the West Coast and some areas in the North–East. Of the total 400 million-hectare meters (mham) annual precipitation that India receives, approximately 150 mham percolates into soil, 180 mham joins the surface flow and 70 mham evaporates. Based on physiography, ecology, soil type, rainfall and the duration of the growing season, the country has been divided into 21 agro-ecological regions, which are further divided into 52 sub-regions.

Population Pressure

India is a highly pressured land with human population currently estimated at 960 million. Over the last four decades there has been a large increase in human population. In 1951 population of India, which was 361 million, rose to 864.3 million in 1991 at the exponential growth rate of 2.14%. It is likely to reach 1,041 million by the end of this millennium. India has 16.1% of world’s human population and 15.1% livestock population while it occupies only 2.47% of the world’s geographical area and just 1% of the world’s forests. Nearly 70% population continues to live in rural areas. Around 62% of the domestic energy needs in the rural areas and 35% in the urban areas are met from wood.

Table – A: Projected Population of Livestock in India

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>196.69</td>
<td>216.78</td>
<td>228.36</td>
<td>242.06</td>
</tr>
<tr>
<td>Buffaloes</td>
<td>75.97</td>
<td>96.32</td>
<td>110.97</td>
<td>128.71</td>
</tr>
<tr>
<td>Sheep</td>
<td>45.70</td>
<td>48.83</td>
<td>50.66</td>
<td>52.57</td>
</tr>
<tr>
<td>Goats</td>
<td>110.21</td>
<td>133.11</td>
<td>147.84</td>
<td>164.25</td>
</tr>
<tr>
<td>Total</td>
<td>431.57</td>
<td>495.02</td>
<td>537.83</td>
<td>587.59</td>
</tr>
</tbody>
</table>

Similarly livestock population which was 292 million in 1951 increased to 429.6 million in 1987 and is expected to cross 500 million in 2000 A. D. (Table–A).

It is estimated that 90 million cattle graze in the forests for long periods, particularly the scrub animals, which not only adversely affects the natural regeneration but also
leads to compaction of soil. This, in turn, hampers the root growth as well as percolation of water.

Issues: dependence & pressure on forests

India's forests are continuously under pressure due very low per capita forest cover (0.070 ha.) and to supply forest products to a growing population in a land scarce situation. The rural poor people living in and around the forests depend heavily on them for subsistence needs and income from gathered forest produce. Further, these forests are not evenly distributed. Above all there is tremendous pressure on forestlands for non-forest uses especially agriculture and other developmental needs. Forests are also the only remaining source of agriculture land and encroachment, shifting cultivation is quite prevalent. During the interregnum 1950–1980, approximately 4.5 million ha. of forestland was diverted for non-forest uses. To check this diversion, Government of India promulgated Forest (conservation) Act, 1980, which inter alia requires prior approval of the Central Government for diverting forest land. This has brought down, the annual rate of diversion from 150,000 ha. before the promulgation of the act to about 25,000 ha. (Table-B). The other novel provision of this act, stipulates compensatory afforestation on equivalent extent of non-forest land.

Table-B : Diversion of Forest land for Non-forest Use

<table>
<thead>
<tr>
<th>Year</th>
<th>Area (ha.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950–1980</td>
<td>Approx. 4.5 million</td>
</tr>
<tr>
<td>1981</td>
<td>2,672.04</td>
</tr>
<tr>
<td>1982</td>
<td>3,246.54</td>
</tr>
<tr>
<td>1983</td>
<td>5,702.01</td>
</tr>
<tr>
<td>1984</td>
<td>7,837.59</td>
</tr>
<tr>
<td>1985</td>
<td>10,608.07</td>
</tr>
<tr>
<td>1986</td>
<td>11,963.11</td>
</tr>
<tr>
<td>1987</td>
<td>72,780.95</td>
</tr>
<tr>
<td>1988</td>
<td>18,765.35</td>
</tr>
<tr>
<td>1989</td>
<td>20,365.05</td>
</tr>
<tr>
<td>1990</td>
<td>138,551.38</td>
</tr>
<tr>
<td>1991</td>
<td>625.21</td>
</tr>
<tr>
<td>1992</td>
<td>5,666.94</td>
</tr>
<tr>
<td>1993</td>
<td>11,785.64</td>
</tr>
<tr>
<td>1994</td>
<td>13,527.69</td>
</tr>
<tr>
<td>1995</td>
<td>46,158.52</td>
</tr>
<tr>
<td>1996</td>
<td>8,764.79</td>
</tr>
<tr>
<td>1997</td>
<td>16,313.20</td>
</tr>
<tr>
<td>Total</td>
<td>395,353.18</td>
</tr>
</tbody>
</table>

The total fuelwood requirement (1996) has been estimated to be 201 million tonne, whereas it has been calculated that 17 million tonne of fuelwood is available from the forests of India every year on sustained basis. It has been found that nearly 86 million tonne of fuelwood is being extracted from the forests and plantations of India every year in excess of what they are capable of producing on sustained basis.

Fuelwood is the most important form of household energy in rural areas and represents 90% of the demand for wood.
Fuelwood Requirement & availability in India

- The total household requirement of fuelwood (1996) is estimated to be 152 million tonne for only the rural areas. Around 10 million tonne of fuelwood is required (1996) for the household needs of the urban population.

- It is estimated that 51% of fuelwood comes from forest areas and 49% from non-forest areas.

- Requirements of firewood other than household needs are cottage industries (25 million tonne), Rituals (4 million tonne), Hotel & Restaurants (10 million tonne).

Primary in the rural India and also in the urban and industrial sectors, there is a demand and use of timber for various purposes viz. agricultural implements, fencing, hutment, housing, furniture, scaffolding, mine props, etc. The timber used in fencing of agricultural lands, hutment, most of rural housing, scaffolding, mine props, and most of the agricultural implements is small timber while for many other uses it is large timber. As calculated by the Forest Survey of India, the demand and production/source of timber is given Table-C.

Table-C : Timber Requirement & Availability in India

<table>
<thead>
<tr>
<th>Year</th>
<th>Total requirement</th>
<th>Production source</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Forests</td>
</tr>
<tr>
<td>1996</td>
<td>64.0</td>
<td>23.0</td>
</tr>
<tr>
<td>2001</td>
<td>73.0</td>
<td>26.0</td>
</tr>
<tr>
<td>2006</td>
<td>82.0</td>
<td>29.0</td>
</tr>
</tbody>
</table>

The demand for timber is a problem. It has been calculated by the Forest Survey of India that there is excess removal from the forests, to the extent of 85 million tonne of firewood and nearly 11.8 million cum of small timber every year, causing decrease in current level of growing stock. These removals meet the sustenance need of the people and are of critical importance. It has also been found that of the total removals from the forests around 70% is used as fuelwood and 30% is used as small timber and timber. The great paradox is that trees produce 70% timber and 30% fuelwood and therefore the accentuated demand for fuelwood very considerably exacerbates the situation leading to depletion of forests.

Table-D : Import of Wood & Timber in India

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantity in CMT</th>
<th>Value (in Rs. crore)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993-94</td>
<td>479,477</td>
<td>421.66</td>
</tr>
<tr>
<td>1994-95</td>
<td>468,886</td>
<td>640.94</td>
</tr>
<tr>
<td>1995-96</td>
<td>735,062</td>
<td>755.52</td>
</tr>
<tr>
<td>1996-97</td>
<td>668,799</td>
<td>875.71</td>
</tr>
</tbody>
</table>

A very large part of livestock population freely grazes in the forests causing serious damage to regeneration and young plantations without any realistic management
alternatives. It is generally agreed that nearly 30% of fodder requirement is met from forests. Estimate of fodder production and availability has been calculated by the Forest Survey of India on the basis of livestock population of 1987. Projected population of livestock in India is given in the Table-A. Considering 30% to be the contribution from forests towards fodder, it would mean that 178 million tonne of green fodder and 145 million tonne of dry fodder comes from the forest areas.

Table-E : Estimates of Annual Requirement of Green & dry Fodder for Livestock in India

<table>
<thead>
<tr>
<th>Category</th>
<th>1996</th>
<th>2001</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Green</td>
<td>Dry</td>
<td>Green</td>
</tr>
<tr>
<td>Cattle</td>
<td>383.27</td>
<td>305.08</td>
<td>446.28</td>
</tr>
<tr>
<td>Buffaloes</td>
<td>209.53</td>
<td>150.02</td>
<td>252.27</td>
</tr>
<tr>
<td>Sheep</td>
<td>-</td>
<td>7.13</td>
<td>-</td>
</tr>
<tr>
<td>Goats</td>
<td>-</td>
<td>19.43</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>592.80</td>
<td>481.66</td>
<td>698.65</td>
</tr>
</tbody>
</table>

Forests in India

Authentic data on forest area of past is not available but at the time of independence in 1947, the recorded forest area of the country was reported to be about 40 million ha. The Government owned forest was about 26 million ha. and community (ownership resting with clans, councils etc.) and privately owned forests were about 14 million ha. The area increased to 68.02 million ha. in 1950-51 with the addition of ex-princely and ex-proprietary forests. Out of this, 53.82 million ha. was government forests and 14.20 million ha. community and private forests. By the early eighties, the forest area further increased to 75.16 million ha. mainly due to consolidation. Of this government and community owned forests were 66.65 and 8.53 million ha., respectively.

Presently, the recorded forest area is 76.52 million ha. In terms of legal status, the forest areas have been classified, depending upon the legal rigour, into Reserved, Protected and Un-classed forests which constitute 54.44, 29.28 and 16.38% of recorded forest area respectively. Whereas the forest cover is around 19.27% of country's total geographic area, good forests cover exists over 11.7% only. The status of forest cover in the country, as brought in the State of the Forest Report–1997, is given in Table-F.

Table-F : Forest Cover in India

<table>
<thead>
<tr>
<th>Class</th>
<th>Area (Sq. km.)</th>
<th>% of Geographic Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dense forest (density &gt; 40%)</td>
<td>367,260</td>
<td>11.17</td>
</tr>
<tr>
<td>Open forest (density 10-40%)</td>
<td>261,310</td>
<td>7.95</td>
</tr>
<tr>
<td>Mangrove</td>
<td>4,827</td>
<td>0.15</td>
</tr>
<tr>
<td>Scrub (density &lt; 10%)</td>
<td>57,211</td>
<td>1.74</td>
</tr>
<tr>
<td>Non-forest</td>
<td>2,596,655</td>
<td>78.99</td>
</tr>
<tr>
<td>Total</td>
<td>3,282,263</td>
<td>100.00</td>
</tr>
</tbody>
</table>

The growing stock of the country has been tentatively estimated to be about 4,740 million cum with an average volume of 74.42 cum / ha. The total annual increment of growing stock has been estimated at 87.62 million cum (FSI, 1995). It is estimated
that nearly 1,600 wood species are being harvested and of these, nearly 200 species have commercial/industrial value and specific end uses. Under various afforestation, reforestation, rural employment, poverty alleviation and eco-development programmes in the country, large-scale tree planting has been done even outside forest areas.

Forest Types

Champion & Seth (1968) have classified the Indian forests into 16 major forest types as given in Table-G.

Table - G : Forest Types in India

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Forest Types</th>
<th>Area</th>
<th>% of total forest area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Tropical Evergreen forests</td>
<td>4.5</td>
<td>5.8</td>
</tr>
<tr>
<td>2.</td>
<td>Tropical Semi-Evergreen forests</td>
<td>1.9</td>
<td>2.5</td>
</tr>
<tr>
<td>3.</td>
<td>Tropical Moist Deciduous forests</td>
<td>23.3</td>
<td>30.3</td>
</tr>
<tr>
<td>4.</td>
<td>Littoral &amp; Swamp forests</td>
<td>0.7</td>
<td>0.9</td>
</tr>
<tr>
<td>5.</td>
<td>Tropical Dry Deciduous forests</td>
<td>29.4</td>
<td>38.2</td>
</tr>
<tr>
<td>6.</td>
<td>Tropical Thorn forests</td>
<td>5.2</td>
<td>6.7</td>
</tr>
<tr>
<td>7.</td>
<td>Tropical Dry Evergreen forests</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>8.</td>
<td>Sub-tropical Broad-leaved Hill forests</td>
<td>0.3</td>
<td>0.4</td>
</tr>
<tr>
<td>9.</td>
<td>Sub-tropical Pine forests</td>
<td>3.7</td>
<td>5.0</td>
</tr>
<tr>
<td>10.</td>
<td>Sub-tropical Dry Evergreen forests</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>11.</td>
<td>Montane Wet Temperate forests</td>
<td>1.6</td>
<td>2.0</td>
</tr>
<tr>
<td>12.</td>
<td>Himalayan Moist Temperate forests</td>
<td>2.6</td>
<td>3.4</td>
</tr>
<tr>
<td>13.</td>
<td>Himalayan Dry Temperate forests</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>14.</td>
<td>Sub-Alpine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Moist Alpine Scrub</td>
<td>3.3</td>
<td>4.3</td>
</tr>
<tr>
<td>16.</td>
<td>Dry Alpine Scrub</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>77.00</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

Forest Cover in the Hills

It has been widely acknowledged that forests play an important role in maintaining ecological balance and environmental stability, especially in the hill regions. The National Forest Policy, 1988 envisages to have a minimum of one-third geographic area of the country under forest/tree cover. The policy also emphasizes maintaining two-thirds of the area in hills under forest cover to ensure stability of the fragile hill ecosystems. In India, the Planning Commission has classified hill states, districts and talukas having an elevation of more than 500 meters above the mean sea level. However, the existing forest cover in the hill areas of the country is only 36.8%, which is far below the goal stipulated in the National Forest Policy.

Forest cover in Tribal Areas

Forests play an important role in the socio-economic conditions and development of tribal people. Since time immemorial, these forests have been a source of subsistence and livelihood to them. It is a common belief that tribal communities have lived in harmony, nay symbiotically, with nature and customarily, even culturally, protected forests for their wellbeing. The tribal communities, which constitute about 8% of total population of India, are distributed all over the country. Government of India has identified 149 tribal districts, where the forest cover is
417,174-sq. km. Although this constitutes 66% of the total forest cover of the country, but forest cover within the tribal districts comes to only 35% of the geographical area.

**Biological diversity in India’s forests**

India is a land of physical, ecological, biological, social, cultural and linguistic diversity. Over the centuries, the people of the country have shared close links with forests and nature. They believed that each individual life form is part of a cosmic system. India’s immense biological diversity encompasses ecosystems, populations, species and their genetic varieties. This diversity is due to vast variety of ecological habitats ranging from tropical, sub-tropical, temperate, alpine to hot and cold deserts. Bio-geographically, India represents two of the major realms (Palearctic and Indo-Malayan), and three biomes (Tropical Humid Forests, Tropical Dry / Deciduous Forests, and Warm Deserts / Semi Deserts). These include 12 bio-geographic regions.

India is one of the 12 identified mega-biodiversity centres and also two of the 18 identified hot spots—the Eastern Himalayas and the Western Ghats. The number of identified plant species is estimated to be over 45,000, representing about 7% of the world’s flora including over 15,000 flowering plants. Estimates for the lower plants are: 64 gymnosperms, 2,843 bryophytes, 1,012 pteridophytes, 1,940 lichens, 12,480 algae and 23,000 fungi. Some 4,900 species of flowering plants are endemic to the country (141 genera distributed over 47 families corresponding to about 30 % of the total). Among the endemic species, 2,532 species are found in the Himalayas and adjoining areas, followed by 1,782 in peninsular India. About 1,500 endemic species are facing varying degrees of threat.

**Legislation for Conservation of Biological Diversity**

India is a party to the Convention on Biological Diversity [CBD]. Efforts to formulate a law on biological diversity to regulate access and to secure equitable sharing of benefits arising out of utilization of genetic resources are in progress.

The scope of the proposed legislation, broadly states, is to formulate the structure and process to ensure conservation, sustainable utilization of biological diversity and equitable sharing of benefits, in specific terms, if *inter alia* proposes to regulate / govern:

- Access to biological resources and information related thereto, including traditional uses of medicinal and other economically plants.
- Benefits sharing with people conserving biological resources, holders of knowledge and information relating to its uses.
- Notification of biological diversity heritage sites and threatened species.
- Protection of threatened species.
- Involvement of local bodies in sustainable management of biodiversity and the preparation of biodiversity register.
Fauna! diversity is equally remarkable and total number of identified species is estimated at 81,000, representing about 6.4% of the world's fauna. It includes over 5,000 mollusks species and about 57,000 insect species, besides other invertebrates. There are 2,546 species of fishes, 204 amphibian species, 428 reptile species, 1,228 species of birds and 372 species of mammals. Sixty two per cent of recorded species are endemic. In fact, the full richness of flora and fauna is yet to be explored. India being a signatory to the Convention on Biological Diversity, is firmly committed to conservation of its biological wealth, and is presently engaged in drafting a legislation for its conservation.

At present, we have 80 National Parks and 441 sanctuaries covering an about 148,849 sq. km. area, which is 4.5% of the total geographical area of the country. The area covered under National Parks is 114,164.5 sq. km. and under sanctuaries 34684.53 sq. km. All these areas have very high biodiversity.

Historical perspective

Since time immemorial, the lifestyles of people of the sub-continent have been in consonance with the ethos of forest and wildlife conservation. Ancient Indian philosophy, nature of worships, sacred groves, tree and animal worship, and related festivals bear testimony to the traditions and values laid down by the contemporary religious and social leaders. Possibly the first record of conservation measures dating back to 3rd century BC is found inscribed in the rock and pillar edicts, constructed during the reign of Emperor Ashoka the Great. Evidence of scientific forest management is also found in Kautilya's *Artha Shastra* (321 BC), indicating that forests were managed as state reserves for timber and *lokavan* (people's forests) for recreation and public use.

In the past, the subsistence lifestyles of various groups of people were shaped by their natural surroundings and people adopted different ways of sustainable use of forest resources. The cultural diversity of the Indian people helped to maintain a range of forest ecosystems, and also increased the diversity by the introduction of selected species. In doing this, the people in different parts of the country have evolved appropriate conservation and management approaches based on their culture, religion, ethics and traditions. In the early period of Indian history, forests were venerated as the holy abode of sages, philosophers and saints. In some parts of the country, still there is a unique tradition of maintaining sacred groves, which were source of food, fodder, medicines and recreation.

Later, during Mughal period and also in early British regime, very little interest was shown towards forest conservation. In fact, during this period, unregulated clearing of forests for agriculture, good quality timber had very adverse impacts on the forests. During the late 18th century and first half of the 19th century, again forests were heavily exploited for timber. The situation got aggravated due to continued lack of interest of the then rulers to regenerate these forest areas.

In the year 1800, a Commission was appointed to look into the availability of teak in the forests of Malabar, in Kerala. This led to certain regulations and scientific management. Felling of young teak trees below specified girth limit was banned. In 1805, a Committee was constituted to measure the capacity of forests and the status of proprietary rights. As a result, a proclamation was made declaring royalty rights
over teak trees in the South and unauthorized felling was banned. While the depletion of teak in Malabar continued, serious efforts were initiated to regenerate these forests and after several attempts successful teak plantations were raised from 1842 in Nilambur, Kerala. In 1855, the Government of India issued a Memorandum outlining rules for the conservation of forests in the whole country.

Scientific Management – Working Plans

Systematic management of forests in the country began in 1864 with the appointment of Dr. Dietrich Brandis, a German forester, as the first Inspector General of Forests. He recruited trained personnel for forest management in the country and regular forest service was constituted. By 1870, forest service became functional and principle of sustained timber yield was introduced as against the ad-hoc commercial felling. During the period 1871-1900, the preparation of Working Plans commenced in different parts of the country and treatment of the forests on scientific considerations was prescribed to ensure removal of incremental yield only and regeneration of forests. A lot of efforts were put in during this period in carrying out various forest settlements, preparation of record of rights, demarcation and survey.

Forest Legislation

Simultaneously, with the initiation of scientific management of forests, the Government decided to treat forests as a state property by enacting the Indian Forest Act, 1865. This was the first serious attempt at forest legislation in India. It provided for declaring land under trees, brushwood or 'jungle' within the ambit of the act without abridging or affecting any existing rights of individuals or communities. Under the Act of 1865, the local Governments were empowered to make local rules for enforcement in their respective regions. Necessary steps were taken accordingly to prevent such acts, which cause injury or destruction to the forests / trees. Between 1869 and 1878, while drafting forest laws for different provinces it was ensured that the long standing, customary rights of the people were protected. All the forests of British India were covered under the Indian Forest Act, by 1882.

<table>
<thead>
<tr>
<th>Legislative Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservation and Development efforts are facilitated by the following legislative measures;</td>
</tr>
<tr>
<td>• The Indian Forest Act, 1927.</td>
</tr>
<tr>
<td>• The Forest (Conservation) Act, 1980.</td>
</tr>
<tr>
<td>• Various State’s Acts.</td>
</tr>
</tbody>
</table>

A revised Indian Forest Act (Act VII of 1878) was passed in the year 1878 and it was extended to most of the States. It provided for the constitution of reserved forests where most of the rights were extinguished, and protected forests where most of the customary rights were allowed to continue. The Indian Forest Act was re-enacted in
1927 to consolidate the laws relating to forests and forest produce. This Act is still the principal legislation, which regulates the management of forests by the States. In some States, the Act has been brought into force as it is, while some have framed their own act, essentially, in conformity with the principal act.

During the first quarter of the 20th century, scientific aspects of forestry began to receive greater importance. The Imperial Forest Research Institute was established in 1906. Chief Conservator of Forests began to be appointed for each Province by 1907. In 1910, a Board of Forestry, comprising representative of the states under the chairmanship of the Inspector General of Forests, was set up which met once in three years to discuss the forestry related issues. Re-enactment of the Indian Forest Act in 1927 gave further impetus to forest protection and management. The two World Wars, however, took a very heavy toll of India's forests. Basic tenets of scientific forestry were ignored and forest management was oriented to meet the timber requirements of the British Crown.

Forest Policy

India is one of the few countries in the world, which initiated a national forest policy during the 19th century. The first forest policy of the country was formulated in 1894 based on the report of Dr. J. A. Voelcker on the Condition of Agriculture in India. The report (1893) however gave overriding importance to the expansion of agriculture in the country, thereby subordinating forest conservation to the promotion of agriculture. The objectives of the 1894 policy were:

- Promotion of the general wellbeing of the country.
- Preservation of climatic and physical conditions of the country.
- Fulfillment of the needs of the people.
- Subject to the above, permanent cultivation was to come before forestry. Forests were to be managed to meet the needs of local population at low prices, if not free of cost, and only thereafter realization of revenue was to be sought.

After India's independence, in the context of new priorities and to built modern India, in 1952, a new forest policy was formulated and as per this policy, forest and wildlife management was carried out till 1988. In India, the era of 70's can be termed as consolidation phase and conservation of species and rich biodiversity areas took firm roots. This was the period, when to conserve forests, flagship species like tiger, elephant, Asiatic lion were given a very high profile. Many projects like Project Tiger, Project Elephant, Gir sanctuary Project was launched to not only protects these flagship species but also to preserve their ecosystem. Also, Protected Areas network, today, which is about 18% of total forest cover and 4.8 % of total geographical area of the country, was expanded and given a new direction. In fact beginning right from 1950 to 1988, many new initiatives were taken to strengthen forestry and wildlife sector management including formation of a separate Environment & Forest ministry in the Government of India to deal with the subject. During this period, many institutions to cater the need for research and training were established. In 80's, it was realized that time after this consolidation phase, time has
come to redesign forest policy especially in fast changing local, national, regional and international scenario.

National Forest Policy, 1988 and the Paradigm Shift

The National Forest Policy, 1988

Over the years, forests in the country have suffered serious depletion. This is attributable to:

- The relentless pressures arising from ever increasing demand for fuelwood, fodder and timber.
- The inadequacies of forest protection measures.
- The diversion of forestlands to non-forest uses, and
- The tendency to look upon forests as revenue yielding resource.

In 1988, a new National Forest Policy was formulated and it is a single piece of policy statement, which brought a paradigm shift in the management of forest and forest related resources.

The principal aim of the this forest policy is to ensure environmental stability and maintenance of ecological balance including atmospheric equilibrium, which is vital for sustenance of all life forms, human and plants. The derivation of economic benefits is to be subordinated to this principal aim. The National Forest Policy, 1988 also gave primacy to participation of local people in the conservation, development and management of forest resources.

Policy Objectives

- Maintenance of environmental stability and restoration of ecological balance
- Conservation of natural forests and biological diversity.
- Soil and water conservation.
- Checking desertification.
- Increasing forests and tree cover.
- Meeting the forest produce needs of rural and tribal population.
- Creating a people's movement for forest conservation.
- Forests not to be treated as a source of revenue.
Local Initiatives & Partnerships – JFM

Local people’s participation, in collaboration with local voluntary organizations in regeneration of degraded forests has become an important aspect of current forestry practices in India. In this approach, there is synergy of action between the State and the people to the mutual advantage of both, leading to cost-effective rehabilitation of the degraded forests.

To implement this important policy initiative, the Ministry of Environment and Forests issued guidelines on June 1, 1990 to involve the local village communities in the development and protection of degraded forests on usufruct sharing basis. As a result, so far in 17 States about 2.0 million ha. of degraded forests are being managed under JFM programme through approximately 15,000 Village Forest Committees. The felt needs of the local communities are ascertained through participatory rural appraisals and incorporated in micro-plans. The local communities are encouraged to implement various activities of the micro-plans in close collaboration with state forestry officials.

The Village Forest Protection Committees (VFC) are entitled to 100% intermediate forest produce from thinning, lopping and collection of minor forest produce. Their share from timber (final harvest) generally varies from 25 to 75% in different States. However, in the State of Andhra Pradesh, 100% sale proceeds from final felling of trees is also being given to the VFCs. This experiment of joint natural resource management is being keenly watched not only within the country but also internationally. This could be the harbinger of a new paradigm in the field of natural resource management based on empowerment of local communities, gender sensitivity and equity.

Judicial Interventions

In the 90’s, judiciary has evinced keen interest, often referred to as judicial ‘activism’, in the conservation of forests and this has provided a new impetus to forest conservation. The judiciary has evolved a novel and effective instrument, in the form of public interest litigation (PIL), by which any individual or organization can approach higher judiciary for intervention in the protection and management of environment, forests and wildlife. Although this brought forestry sector under intense judicial scrutiny, it however, proved to be the proverbial shot in the arm to the foresters in performing their tasks without fear and favour.

Recent Constitutional Amendments & its Implications

In India, recently amendments were made in the Constitution and in the form of 73rd Amendment; Local Governance has been given a well-defined place in the Constitution. This three-tier system of Participatory Governance has become the cornerstone of Panchayati Raj Institutions. Under this Constitutional amendment, Panchayat Acts have been formulated in all States. Now, social forestry has been transferred to these Panchayats and they are supposed to raise plantations for fulfilling local needs. For this purpose, as per recommendations of Finance Commission, funds are made available.
To strengthen the Panchayati Raj Institutions (PRIs), in Government of India, Department of Rural Development under the Ministry of Rural Areas & Employment coordinates all efforts. Under this Ministry, now funds are made available to these PRIs under different schemes for Watershed Development. To implement, these Watershed Development Programme, in 1995, a highly decentralized, highly transparent and people-oriented Guidelines for Watershed Development have been issued. Under Watershed Development Programme, 80% of total fund is directly given to local people, who form Watershed Association. This body is responsible for planning, execution, monitoring and management of Watershed Development Projects. At present, funds are made available to PRIs and NGOs for taking up such works and also setting up model Watershed Development Projects. There are many schemes viz. Drought Prone Areas Development Programme, Desert Development Programme, Integrated Watershed Development Programme, Employment Assurance Scheme etc. In all these schemes, development of forest resources in the form of afforestation, pasture development, sand dune stabilization, soil & moisture conservation works are the key component. The main aim under Watershed Development is to improve the forest & tree cover, in turn reduce the pressure on natural forests.

**Watershed Development Programme**

**Process**

- For effective decentralization of planning, implementation and peoples' participation elaborate institutional arrangements at different levels have been designed. At the district level the DRDA / ZP is in overall charge of implementation of the programmes.

- The DRDA / ZP is advised regarding selection of PIA, approval of Watershed Plans, training, publicity etc., by a district level Watershed Development Advisory Committee under the chairmanship of Project Director, DRDA / CEO, ZP.

- The DRDA / ZP selects the Project Implementation Agencies (PIAs) which could be besides DRDA / ZP itself, other line departments, autonomous organizations, public sector undertakings, voluntary organizations, cooperatives, banks, etc. The PIA remains in-charge of implementation of the Watershed Projects. A multi-disciplinary team designated as Watershed Development Team (WDT) assists each PIA in the implementation of these WPs.

**Transparency**

- Planning and implementation of the Watershed Project is done with the technical support of WDT by the Watershed Association (WA) comprising all adult members of the village(s) in the Watershed area. 80% of the project fund is spent directly by the Watershed Association. The Watershed Committee comprising 10-12 nominated members by the WA from amongst the users groups, self-help groups, with representation from Gram Panchayat, WDT, women, SCs and STs forms the executive body of the WA.

**Capacity Building**

- High emphasis on training and community organization work. 5% of the total Project Cost is earmarked for Community Organization work, another 5% for training to people associated with the implementation of Watershed Projects and 80% for Works.

**Participation of PRIs**

The ZP at the district level may remain in overall charge of implementation. The Panchayat Samiti and Gram Panchayat will have the right to monitor and review the implementation of programme. They can also take the responsibility of implementing the projects as PIAs.
The Vision Statement

Concerned with the need to address the twin objectives of reversing the rate of degradation of the forests as also increasing the forests / tree cover to 33% as enjoined in the forest policy, the Government of India constituted a committee to recommend a suitable plan of action. The committee has inter alia identified the following issues:

- The biotic pressure on India's forests is way above their sustainable capacity.

- The industrial and other wood demands, part of which is being met by imports will continue to rise while environmental concerns may reduce the availability of wood in the international market.

- Unregulated harvesting of non-wood forest products may result in loss of biological diversity and even extinction of certain species in great demand.

- Involvement of all stakeholders may be necessary to achieve the goals of regeneration of existing forests, community forestry, rehabilitation of degraded land.

- Resource mobilization from institutional and other sources may be necessary to supplement the government budgetary support to the forestry sector.

- There is a vast scope of tapping wood growing potential in agro-forestry and community forestry through appropriate credit and land tenure incentives as also involvement of corporate sector, including State Forest Development Corporations.

- There is a considerable scope for forestry development in 200,000 villages situated in and around forest areas under Joint Forest Management and various rural development programme.

Strategy framework

- Out of the areas with good forest cover (38 million ha.), about 15 million ha. Will continue to remain under Protected Areas (PAs) network as biological diversity and gene pool reserves.

- Remaining 23 million ha. of high forests would be required to be managed silviculturally for maximizing productivity for meeting the local and national needs.

- Out of the estimated 25 million ha. of open forests, about 15.5 million ha. have natural rootstock and are ideally suited for JFM.

- About 15.5 million ha. of forest area (6.0 million ha. totally degraded and another 9.5 million ha. approaching this condition) will require substantial investments and technological inputs. Since most of these areas are situated near the human
settlements, rehabilitation of such areas would need to be carried out in close consultation with, and involvement of, local communities.

- Bringing additional 30 million ha. of culturable waste, fallow and marginal agricultural lands, under permanent tree cover, silvi-pasture, agro-forestry etc. to achieve the stipulated goal of having one-third of the land surface under tree/forest cover.

If these targets are to be achieved within a span of next 20 years, it will call for annual target of 3 million ha. of land to be brought under reforestation/afforestation/assisted natural regeneration, as against current annual level of about 1.2 million ha. Planning Commission of India, in its Approach Paper for the 9th five-year Plan (1997–2002), taking note of this fact, has, as a first step, suggested that the districts which have less than 1% area under forest/tree cover, should increase it to at least 2% during this plan.

**National Forestry Action Programme**

Realizing the need for a concerted action for undertaking this enormous task, the Government of India is preparing a National Forestry Action Programme (NFAP), for sustainable forest resource management with well-defined inter-sectoral linkages as also dovetailing it with national development plans. The primary outputs of this exercise are:

- Preparation of 26 State forestry action programme (SFAP), identifying and quantifying investment opportunities, technical assistance requirements and perspective plans for achieving short, medium and long-term goals.

- Synthesizing NFAP from SFAPs at national level for identifying the sources for investments, including international donors, to implement the development strategies.

- Strengthening the country capacity for forestry sector planning.

The exercise is likely to result in agenda for action not only in technical matters but also addressing the needs for human resource development, newer initiatives on policy and legislation, institutional restructuring, greater people’s participation, research and technology development.

**Case study of Girnar Forest in Gujarat**

Gujarat is a forest deficient State and only 0.03 ha. per capita forest cover is available as against the national average of 0.7 ha. Recorded forest is 9.89% of total geographical area against 23.28% for whole country, whereas good forest cover is only 6.4% of total geographical area against the national average of 19.27%. In Gujarat, to arrest the process of deforestation, few remarkable works have been carried out and it has given results beyond our imagination. Such works include mangrove regeneration programme in coastal areas and ecorestoration of Girnar forests in Junagadh district. Girnar forest is a 18,000-sq. km. compact block of dry deciduous forest–dry teak forest, located at the doorstep of Junagadh City. As study carried out in 1991 reveals, during last few decades once a very rich forest degraded
due to illicit removal of wood, illicit disteallary, mining, illegal grazing and other associated problems. Annually more than 1.6 million people visit this forest as there are many religious places located in the forest area. Twice a year, on each occasion, an average 4-8 lakh people come to perform parikrama and offer their prayers during Shivratri, local festival. This forest is the only source of water to about 39 villages located on the periphery and also to Junagadh City, which has a population of more than 2.5 lakh. This being a sensitive area, requires skilled management as number of stakeholders is high and very diverse. In managing and developing such area, interest of all segments is required to be integrated and their participation is to be ensured for the sustainability of efforts.

Starting with 1992, a highly innovative and well planned efforts were made to not only reverse the process of degradation but to regenerate the highly degraded area through integrated watershed development and improved habitat protection by enlisting participation of local people. This programme was a local initiative in response to ecological problems and carried out by forging partnerships between various stakeholders.

In this region, occurrence of drought is quite frequent and severe. During the severe drought and scarcity of 1986 and 1987, forests of Girnar along with Gir, the 1,400 sq km PA became the last refuges to a very large population of livestock. After drought, people of the region understood the necessity of preserving their forests and started putting higher value on conservation and started contributing their mite in ecorestoration programme, which resulted in improvement of Gir forests, and substantial increase in canopy density, making it one of the best patches of dry deciduous forest of the country.

A long standing problem of Kathiaras [wood-cutters], numbering more than 1,000 person were illegally entering in the forest, cutting trees and selling the fuelwood, bamboo’s and small timber, was solved by creating alternative employment opportunities and providing them works for livelihood. Simultaneously uncontrolled, rampant grazing was also controlled and villagers along with maldharis (local graziers) were provided the option of cutting grass and taking it away free of cost. Dead, dry and wind fallen wood and also material available in the naturally regenerated forest areas after silvicultural operations, were made available to local people to meet their fuelwood requirement. Different afforestation works carried out in the past under community forestry and other programmes, also helped in improving the fuelwood and small timber availability in the region. A large number of biogas plants, crematoria have been installed in the surrounding villages, which helped in saving the fuelwood. Due to well-planned, large-scale soil and moisture conservation works, control on fire and availability of grass increased manifold. Availability of non-timber forest produce increased so much that it is now providing an alternate livelihood to people of the region and it has increased the sustainability of the programme. Reduced siltation of reservoirs, the major source of drinking water to people of Junagadh city and neighbouring villages attracted the attention of a large number of people which ensured their participation.

This ecorestoration programme resulted into remarkable recovery of forest. Vegetation along with wildlife flourished beyond imagination. According to the Asiatic lion census carried out in 1995, there are more than 13 lions in this regenerated forest area and after Gir National Park, it has become an alternative home of Asiatic lions. In 1996, there are 5 new born cubs, which are seen in the
The ungulate population especially of sambhars, spotted deers, blue-bulls and wildboars have increased manifold. The whole of Girnar has naturally regenerated into a mixed dry deciduous forests also increasing the availability of water to Junagadh city and neighbouring villages by reducing run-off and increased percolation. Now all around Girnar forest, people are converting their fallow lands into mango orchards, which substantially enhances their income.

It also provided food security to local people, as fruits and other non-timber forest produce (NTFP) are available to poor, downtrodden, children and women for whom these forest produce are the only source of protein, vitamins and other growth factors. Data collected during 1995-96 and 96-97 revealed that annually NTFPs more than worth Rs. 30 lakhs are being collected by the people in Girnar forests, thus providing sustained livelihood to ecosystem people. In fact, under joint forest management, emphasis has been given on these NTFPs, grass and water which goes well with the ethos of conservation instead of timber as a final product. The success of the programme in Girnar was mainly due to complete understanding of the problem and strong will power along with self-motivation of people involved in the programme. The active support and participation of local people in the conservation programme ensured the sustainability.

### Table-H: Change in Dense Forests

<table>
<thead>
<tr>
<th>Name</th>
<th>1993</th>
<th>1995</th>
<th>1997</th>
</tr>
</thead>
<tbody>
<tr>
<td>Junagadh</td>
<td>+ 35</td>
<td>+ 104</td>
<td>-</td>
</tr>
<tr>
<td>Gujarat</td>
<td>+ 77</td>
<td>+ 68</td>
<td>- 32</td>
</tr>
<tr>
<td>India</td>
<td>+ 568</td>
<td>+ 180</td>
<td>- 17,777</td>
</tr>
</tbody>
</table>

According to the State of Forest Report-1995, in Junagadh district 104 sq. km open forest [density 0.1 to 0.4] got converted into dense forest [density 0.4 and above] whereas, during the corresponding period, in rest of the country only 76 sq. km open forest got converted into dense forest (Table-H).

### Table-I: Change in Mangrove Forests

<table>
<thead>
<tr>
<th>Name</th>
<th>1995</th>
<th>1997</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gujarat</td>
<td>+ 270</td>
<td>+ 302</td>
</tr>
<tr>
<td>India</td>
<td>+ 277</td>
<td>+ 294</td>
</tr>
</tbody>
</table>

It clearly shows that despite increasing anthropological and other biotic pressures, the process of degradation has been reversed. In semi-arid and arid region, the strategy adopted in Girnar forest could be one of the models, which need to be emulated with suitable modifications according to local condition.

### Table-J: Change in forest Cover

<table>
<thead>
<tr>
<th>Name</th>
<th>1991</th>
<th>1993</th>
<th>1995</th>
<th>1997</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gujarat</td>
<td>- 14</td>
<td>+ 137</td>
<td>+ 276</td>
<td>+ 258</td>
</tr>
<tr>
<td>India</td>
<td>+ 560</td>
<td>+ 22</td>
<td>- 507</td>
<td>- 5,482</td>
</tr>
</tbody>
</table>

Further, as The State of Forest Report-1995 reveals, in Gujarat there is an increase of 270 sq. km of mangrove forests whereas in the rest of the country, only 7 sq. km. area have been added into mangrove forest during this period. Similarly, the State
Forest Report—1997 also revealed that there is further increase of 302 sq. km. of mangrove forest, whereas in whole country 294 sq. km. mangrove forest increased (Table—I). It clearly shows that in Gujarat, process of degradation has been reversed to a large extent but it still requires continued efforts to increase the forest cover (Table—J).

Conclusion

In India, emphasis has been given to address current issues so that forest can be managed on the principle of sustainability and inter-sectoral interest can be accommodated. Sustainable management of forests is of paramount importance for ensuring the long-term productivity of these ecosystems. Unfortunately past efforts have not given desired results and the problem of deforestation and land degradation continues to worsen especially in tribal dominated north-eastern region and other such areas. Deforestation can only be reversed through profound changes in local behaviour and sustained efforts, which will ultimately lead to sustainable land use and ecological security.

The most important aspect of forest policy goal to be achieved during next decade is to improve forest protection and management with the help of people’s participation. Inspite of unsustainable pressures on natural forests in India, the present conservation ethos needs to be strengthened although traditional approach are not likely to prevent deforestation. In this context it is important to enlist the participation of local people in the forest conservation and resource management. To accomplish this it is necessary to create an environment that encourage forests resource users especially farmers and tribal to participate more in forest development and management. A key issue in tribal areas is to develop strong institutional links between forest departments and tribal welfare and development authorities, which will lead into furthering common goals. We have to develop new ways to address inter-sectoral problems like agriculture, energy, livestock, industry, development and conservation.

References:


COUNTRY REPORT

- INDONESIA -

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COMMUNITY-BASED PRODUCTION FOREST MANAGEMENT
AN EXAMPLE OF BUFFER ZONE MANAGEMENT AT
GUNUNG PALUNG NATIONAL PARK
WEST KALIMANTAN - INDONESIA

By

Titus Sarijanto and Silver Hutabarat

Background

The Ministry of Forestry of Indonesia is responsible for managing Indonesia’s forests on a sustained yield basis for economic development while protecting the environmental values of its forests for the benefit of its people and in acknowledgement of the global importance of this resource to environmental well-being. We recognize that supplying forest products is only one of the multiple roles of forests. In addition to preserving biological diversity, acting as a carbon sink, and contributing to climate stability, forests also safeguard water resources, and are valued for their ethical, aesthetic and cultural worth. Therefore, forests need to be managed in the overall context of sustainable development.

Indonesia’s forests are divided into four categories based on function including (1) protection forests (mostly for water and soil protection), (2) conservation forests (mostly for nature preservation and genetic conservation), (3) production forests (mostly for timber production) and (4) convertible forests which can be converted into other purposes such as agriculture and resettlements.

The role of production forests for Indonesia in providing foreign exchange earnings and employment has been very substantial. The forestry sector has created millions of job opportunities since 1967. In fact, 2.5 million are employed in the timber industry and over 1.2 million work in forestry-related industry and other indirect activities. However, the use rights of production forests (concessions) have been primarily granted to large private and State owned companies. This is due to the scale of technical and capital requirements needed for the forest business activities which cannot be afforded by local communities.

People’s participation in forestry management is one of the major forestry development objectives in Indonesia in recognition of the importance of ‘local communities’ interaction with forests as a source of income and livelihood. Various programs to promote the involvement of local communities have been introduced by government, such as encouraging concessionaires to employ more local people in forestry activities, promoting of village development schemes, and promoting partnerships between big companies and cooperatives in forestry related activities.

However, in the past, these activities have tended to treat local communities as the object rather than as the subject in the forest management. The access of...
communities to concession forests for harvesting timber and non timber forest products is still restricted and, therefore illegal cutting activities in the production forests frequently occurs. Because of the extensive nature of forests, it is impossible to control these illegal cutting activities effectively, and there is even a tendency to have illegal cutting activities in the protection and conservation forests. One example of the pressure from illegal cutting activities on conservation forests is in the Gunung Palung National Park, West Kalimantan. Gunung Palung is one of the most important area for orang utan conservation. This area is also the habitat of the endemic Proboscis monkey (Bekantan, *Nasalis larvatus*).

Communities will not enter the National Park for cutting trees if they can get benefits from production forest adjacent to the Park. Based on this argument, the MOF in cooperation with Harvard University is trying to set aside an area of production forest adjacent to the National Park to be managed and utilized by local communities with the hope that this local community will safeguard the National Park from illegal cutting activities.

**Goals and objectives**

The ultimate goal of this project is to develop a model for community production forest management, where the community will be able to manage the production forest sustainably, while at the same time safeguarding the National Park from illegal cutting activities. The objective of the project is the integration of sustainable conservation benefits for Gunung Palung National Park with sustainable community development and welfare benefits for villagers living near the Park border.

**Key attributes/characteristics**

The major points of the model we would like to develop are:

1. Economic opportunities for poor villagers living near the National Park border. Agricultural encroachment, fires by local farmers or illegal logging by groups of villagers are the greatest threats to the park's western border. With this project, we will provide full or part time employment to these villagers, so that they do not feel compelled to participate in illegal logging crews or agricultural expansion into the park.

2. Additional forest adjacent to GPNP that would enhance wildlife conservation within the park. To serve its conservation function, GPNP requires additional adjacent forest area, especially for the rare and endangered peat swamp and lowland forest habitats.

3. Clear and strong relationship between park protection and community forest management. In return for the right to harvest and market forest products, the local villagers will follow strict management plans, initially written and supervised by the project staff and appropriate forestry agency.

4. Self-financing sustainable community organization. All operation and capital costs incurred by the community enterprise will be financed by a start-up loan provided to the enterprise. Revenues from the sale of sawnwood will be used to repay the loan. This establishes the project as a self-financing, sustainable model for conservation and community development.
Project Activities

1. Organization

Initially, the MOF will designate and transfer 8,000 ha of production forest to the jurisdiction of this project to begin implementation. Under coordination of MOF through Forestry Regional Office in West Kalimantan, the project will accept responsibility for monitoring this area according to the appropriate laws and regulations within the Republic of Indonesia. During the initial year of implementation, the project staff will cooperate with an Indonesian NGO to help the participating communities to form a legal body that can represent the communities in obligations with the Government of Indonesia and Ministry of Forestry. The project proposes to establish a Local Foundation to supervise the community production forest management enterprise and the distribution of net revenues to the community-at-large. While this is one possible model for the community organization, the final legal structure will be determined by the organizational needs of the community in accordance with Indonesian laws and regulations.

2. Training

It is critical that appropriate, skilled and committed individuals are identified for leadership positions and supported by the community members. The project will identify and train community members to occupy the various positions, business and financial management, and various research and development positions. Short-term consultants available from the public or private sector in Pontianak (capital city of West Kalimantan province) will be hired to train at the field location so that training is more relevant and reaches a greater number of community members.

3. Forestry operations

These will include a sustainable forest harvest plan, reduced impact logging, efficient milling and effective marketing sawnwood, and conservation operations.

a. Sustainable forest harvest plan: Timber harvesting is planned to be restricted to 50 ha per annum, so that the rotation cycle would be 80 years. Application can be made to revise this plan after data is analyzed from the first few years of operation. It is expected that natural regeneration will be abundant in logging strips because of the nearby availability of bordering mother seed trees.

b. Reduced impact logging: Prior to logging, the proposed harvest area will be thoroughly inventoried and the trees will be marked by the project staff and trained community members. Skid trails will be planned in advance to minimize the damage to the residual stand during logging.

c. Efficient milling and effective marketing sawnwood: The project will include a used band sawmill, already existing in West Kalimantan. Sawnwood production will be monitored and documented at the mill by a licensed grader. Sawnwood would typically be marketed to Java island, where the enterprise will sell directly to end users such as wood processing factories.

d. Conservation operations: This community enterprise and forest management plan has the function of promoting conservation of wildlife and overall biodiversity for the Gunung Palung National Park. The direct costs of protection,
monitoring and enrichment planting will be borne as part of the operating costs of the community enterprise. Conservation will be enhanced in the following ways:
- decreasing the local threats to conservation
- conservation education
- extension of the park conservation area
- raise habitat carrying capacity of wildlife
- protection of watershed through maintaining standing forest.

Expected Results

We will evaluate some expected results from this project:

1. Evaluate basic forest management model in terms of sustainable production:
   a. Logging limited to an annual area consistent with a rotation cycle of about 80 years by demonstrating that sawnwood yields from 50 ha generate sufficient community welfare benefits, in terms of jobs and profitability, so that community members have incentives and accept obligations to manage the forest for sustainable production.
   b. Growth and yield studies of the residual stand that forecast sustainable production for subsequent rotation cycles in the logged areas.
   c. Results of enrichment planting that forecast the contribution of replanting options to future production.

2. Evaluate project activities for their contribution to increased conservation benefits for GPNP:
   a. Shifting employment of villagers from illegal logging to wage labor in the community forestry enterprise, lowering the rate of habitat destruction within GPNP
   b. Organizing and financially supporting regular patrolling of GPNP and community forestry area borders by joint teams of Regional Forestry Office staff and community members.
   c. Lowering the incidence of and damage caused by illegal logging and / or agriculture along the north and west sides of GPNP
   d. Protecting the community forest area from non-project activities.
   e. Demonstrating that orangutans and other vertebrate species use the community forest area as habitat.
   f. Demonstrating that tree diversity within the community forest area is increasing because of protection and forest management within the logging areas.
   g. Increasing habitat quality for plant and animal life in degraded burned areas through protection from fire and natural regeneration processes.
   h. Increasing awareness of conservation benefits of the project and support for the obligations to follow regulations of use in GPNP and in the community forest area.

3. Evaluate the community enterprise in economic and social welfare terms:
   a. A community organization has been created that functions to represent community members in decision making regarding the community enterprise
b. The community enterprise has an effective administrative staff trained or in training to carry out the necessary forest management and business functions of the enterprise.

c. The community enterprise model for producing and marketing sawnwood generates a net profit after repayment of its obligations for loan repayment, taxes, costs of operations, research and development and conservation activities.

d. Net profits from the enterprise have been used for general community welfare projects, such as in health services, educational facilities and opportunities and public works that benefit all community members, regardless of participation through wage labor in the enterprise.
WORKSHOP REPORT

- INTERNATIONAL TROPICAL TIMBER ORGANIZATION -
INTRODUCTION

The International Tropical Timber Organization (ITTO) commenced operational activities in 1986 under the International Tropical Timber Agreement (ITTA, 1983) amidst increasing worldwide concern about the fate of the tropical forests. The ITTA, 1983 was negotiated under the United Nations Conference on Trade and Development (UNCTAD).

ITTO is an intergovernmental organization consisting of more than 50 countries which account for most of the world’s tropical forests and the bulk of the trade in tropical timber. The member nations meet twice a year during sessions of the International Tropical Timber Council (ITTC) which is the highest authority of the Organization, and guide its work through decisions made in consensus.

The objectives contained in the agreement (ITTA, 1983) fall into three broad groups. Firstly, ITTO is to provide a framework for effective consultation and cooperation between its members on all aspects relevant to the global timber economy. Secondly, there follows a set of objectives concerned with the promotion, expansion, diversification, and strengthening of trade in tropical timber and a more equitable distribution of the proceeds between producers and consumers. Finally, a set of objectives are directed at the encouragement of reforestation and better forest management as well as the sustainable utilization and conservation of the tropical forests and their genetic resources and the maintenance of the ecological balance in the regions concerned.

In 1990 at its Council session in Bali, Indonesia, the ITTO adopted the historic Year 2000 objective whereby all member countries are committed to ensure that all internationally traded tropical timber would originate from forests under sustainable forest management (SFM) by the Year 2000 through international cooperation.

ITTO seeks to achieve its objectives through policy dialogue, the publication of information material, and through field oriented projects and other activities as decided by the Council.

In 1994 a new successor agreement was adopted to take account of the rapidly changing scene in the Tropical Forests where sustained yield production of timber has been expanded to include a sustained production of all the goods and services provided by tropical forests and the necessity to further ensure the conservation of the resource. The 1994 Agreement (ITTA, 1994) came into force on 1st January, 1997.

With particular reference to the theme of the Workshop, the ITTO has published a series of documents providing guidelines and criteria for the sustainable management of tropical forest both natural forests and plantation forests. These documents are directed at providing the general framework in order to develop more specific guidelines and criteria at the national level.
During the first decade of ITTO's existence, the field oriented projects have steadily increased and presently more than 120 projects are under implementation in the member countries in the three tropical regions. Several of these projects assist governments to formulate policies and regulations according to ITTO guidelines and criteria for sustainable forest management. Other projects are oriented towards practical field testing on a pilot scale of sustainable forest management. Some of these projects may be considered as being model forests, where the different guidelines are implemented at the operational scale.

In addition, ITTO is also promoting the establishment of model forests that could be developed into a network of models for different tropical forests in the three tropical regions. ITTO is still in the process of assessing the proposed forests to be included in the network.

ITTO projects are not only implemented by government organizations such as Forest Departments but also by non-governmental organizations. ITTO projects often have an important element of training. International experts are usually engaged for short term assignments only to assist with specific tasks and knowledge transfer. Full responsibility rests with the local implementing agency thus ensuring a high degree of active involvement and pride to see the projects are brought to a successful conclusion. In many cases such projects are followed up by new project proposals in order to benefit from the acquired skills and experience to expand the scope and area of sustainable forest management.

AN ILLUSTRATION

The illustration of a field project being implemented as a model forest is: "The Model Forest Management Area" (MFMA) in Sarawak, Malaysia.

ORIGIN, OBJECTIVES AND CONTEXT OF THE MFMA

ITTO Project PD 105/90 Rev.1 (F): "The Model Forest Management Area" (MFMA) Phase I 'Preparation', 1993-1995. The specific objective of Phase I of the project was to select a suitable site for the preparation of programmes on training, research and development (R&D) and demonstrations in sustainable management of hill forests in Sarawak under field conditions. The area of 162,500 ha was selected in 1993 and approved by the State Government.

The area is located in the centre of the State, of reasonable access and entirely included in the Permanent Forest Estate. Terrain varies from gently sloping at elevations of below 100 m.a.s.l. to steep mountainous at over 1,000 m.a.s.l. Four Timber Company camps are operational in the MFMA under two approved Timber Licenses and related Forest Management Plans. About half the area had been harvested by 1992/93 under selection fellings on a 25-year cycle basis. Limited areas on the boundaries of the MFMA were affected by shifting cultivation in the past.

Recent increasing awareness by the general public of serious environmental impacts from harvesting with heavy, ground-based machinery in interior hill forests has resulted in the urgent need for skill training in forest planning and operations with improved harvesting methods. In 1993, log extraction by helicopter was introduced in selection fellings in Sarawak. Design and construction of bridges on major forest streams for permanent access continued to be improved.
THE RESOURCES OF THE MFMA

During 1994/95, surveys were carried out to collect data on all aspects of forest management in the MFMA, including climate, geology, soils, topography and hydrology, wildlife, forest inventory, flora and ethno-botany, commercial timber yields in current operations and socio-economic aspects of local populations in and near the MFMA.

Results of forest inventory and growth studies including assessments on re-measured continuous inventory plots in the MFMA, confirm the appropriateness of the current management plan prescriptions of a 25-year felling cycle and minimum diameter limits for cutting of 60 and 45 cm DBH. The eco-system of the Mixed Dipterocarp Hill forest is shown to be considerably robust with regeneration of commercial timber species re-establishing itself on areas cleared and fire-affected by shifting agriculture in the MFMA. In harvested forests, fellings have been patchy with about one-third of areas heavily logged and about one-quarter lightly logged or not harvested at all. This is due to terrain limitations for the heavy, ground-based machinery (e.g. caterpillar-tractors).

Diameter growth rates of superior and good quality trees in harvested forests are relatively high at around 1 cm per year and their mortality rates are low at less than one-half of a percent in numbers per year. Commercial net volume growth is assessed on average at 2.4 m³ per ha per year. Yield in log volume from this growth is estimated at 75% or 1.8 m³ per ha per year, or 45 m³/ha on the 25-year felling cycle.

Current operations in four Timber Camps are well organized for regular production of a combined output of about 300,000 m³ of logs annually, under approved quotas for each company area. Improvements are required in road construction to reduce negative environmental impact and in harvesting operations to reduce extremes of heavy felling within the logging blocks. Appropriate training programme does not currently exist and planning as well as on-site supervision of all operations is inadequate for the difficult terrain. The total workforce is about 650 persons, with the number of all types of machinery about 300.

Local populations in and near the MFMA making periodic use of MFMA resources, comprise about 5,800 persons in about 50 longhouses, of which only 7 longhouses are actually within the MFMA. The area affected by shifting agriculture in the past amounts to about 8,000 ha or 5% of the MFMA. The practice of shifting agriculture is declining as many adult males are being increasingly employed in wage-earning jobs. Areas used for shifting agriculture are practically always found on the more fertile soil types.

FOREST MANAGEMENT PROBLEMS AND OPTIONS

Harvesting in sustainable management has to address three main problems:

1. The negative environmental impacts caused by heavily-mechanized operations.
2. The conservation of biological diversity of the original forest.
3. The rate of harvesting ensuring sustained regeneration, growth and timber yields.
The impact of truck-road access building and ground-skidding of logs along skidtrails can cause a 20-fold increase in sediment loading of the river systems and a 10-20% loss in productive forest area. The increased sediment loading leads to reduced fish catches, lower water quality and consequently higher costs of water treatment for consumption and increased frequencies and higher levels of flash floods downstream.

The current ground-based harvesting system is considered inappropriate in circumstances of high rainfall, shallow skeletal soils and highly dissected terrain of steep slopes of over 20° (36%). The option is aerial harvesting methods in difficult terrain classes, e.g. over about two-thirds of the MFMA.

Priorities for the Ten-Year Plan are listed as:

1. **Terrain Analysis** for decisions on extraction methods and road access alignments, e.g. helicopter-extraction and combinations with tractor-logging.
2. **Workers Skill Training** to minimise damage, e.g. in tree-felling, tractor skidding and road construction.
3. **Tree Planting** in experimental plots and expanding schemes with timber company and local community, in abandoned shifting agriculture areas.
4. **Reservations** of virgin jungle reserves, streambank buffer reserves and local watersupply reserves.
5. **Monitoring Tree Stock** in continuous forest inventory plots and experimental (research) plots.
6. **Monitoring Stream Water Quality** in a network of river gauging stations.

**PLANS FOR PROTECTION FORESTS**

Ten Virgin Jungle Reserves are foreseen to have a total area of 4,000 ha. A schedule for boundary demarcation during 1996-2000 is given as well as the setting up of 20 permanent ecological plots during the period, 2000-2004.

Streambank Buffer Reservations are planned on 17 streams over a total length of 300 km, strip width of 20 m on both banks. Local Watersupply Reservations number seven for longhouses and two for the MFMA facilities (base camp and nursery) with the total area reserved being 700 ha. A schedule for demarcating the boundaries during 1996-1998 is specified.

**PLANS FOR SELECTIVE TIMBER EXTRACTION IN PRODUCTION FOREST**

Because of restrictions in staff and labour availability in Sarawak, for both Forest Department and timber companies, a marked intensification of management in these natural forest is not expected in the plan period. Priority is therefore given to training in annual coupe planning, road construction...
and to improvement trial exercises in forest blocks selected in accessible locations of the relatively short-distance trucking zone - less than 50 km to log-delivery points. The approved annual coupes under the existing license agreements and the work specifications in the related management plans will be followed.

Harvesting methods used include ground-base tractor logging and helicopter-logging. No cable logging is planned. Tractor logging is prohibited in Class IV and steep (>30°) Class III terrain. The Code of Harvesting Practice (due in Phase II) shall be complied with at all times. A 100% inventory, with detailed position maps, will be included in Detailed Plans for all helicopter-logging. The minimum cutting girth is 60 cm DBH. The Forest Department policy on helicopter-logging, included in the Ten-Year Plan, shall be adhered to.

The maximum limit for number of harvestable trees, given the cutting limits and variation in logging intensity, is given at 9 trees/ha. This condition can be waived if the overcut patches are small or helicopter-logging is practised. The 100% inventory to mark harvestable trees is desirable for all virgin coupe areas, as a primary control mechanism, but only in trial blocks of more accessible zones.

The minimum felling diameter shall be maintained at 60 cm DBH. Further reduction is not justified for ground-based extraction due to potential increased damage to residual stands. But, for the lower impact helicopter-logging (only 2-5 trees/ha removed) this may be justified.

PROPOSED TRAINING PROGRAMMES

All training is foreseen as a joint effort by private timber based industry (companies represented in the Sarawak Timber Association-STA) and the public sector (the Sarawak Timber Industry Development Corporation and the Forest Department). The STA has initiated in 1996 a tree-fellers skills training programme, which in the first year will cover a number of major timber camps and for which the MFMA serves as staging area. Similar training programmes are planned for tractor-operators in log skidding and road building. A Skills certification will be introduced by STA. Skill training will emphasize reduced impact logging practices with benefits to the companies from reduction of wastage, higher safety and productivity and lower worker turn-over rates from a job performance grading incentive system to be developed.

DISCUSSION

As the MFMA is worked under commercial license one of the main problems have been to fully involve the licensees. As they have to protect their economic interests and their labour force, they are often not concerned with the environmental aspects of the MFMA since there is no provision for subsidizing activities that may have an immediate negative effect on the earnings of the company. A few of the companies are large with international operation in many parts of the world. Continuous efforts are needed to penetrate the top of such companies and to make decision makers comprehend the importance of sustainable forest management so that to their subordinates will adhere to the guidelines provided.

For sustainable forest management to succeed, it is extremely important to convince the company management and the shareholders that sustainable forest management is not only to the
benefit of the forest and the environment, but certainly also to the benefit of the company. Most research and practical testing of sustainable forest management including low impact logging, has shown a significant higher profit margin due to improved operational efficiency and reduced timber waste. These more than offset the initial higher costs needed for proper planning and marking of roads and trails and of trees to be felled and trees to be retained. Before that message is efficiently delivered and accepted at the company management level, SFM is difficult to attain.

Logging training programmes for the work force, both tree fellers and tractor drivers have not been very successful because they were not preceded by the much more important training of company executives. Even the most skillful tractor driver will fail if he does not get the full backing of his supervisors. On the other hand, if management and supervisors understand the benefits of SFM and instruct their operators to follow simple rules for low impact logging, the work force will be more motivated and quickly learn the needed skills even without sophisticated training programmes.

Through projects involving model forests, such as exemplified by the MFMA above, ITTO aims to develop demonstrations at the field level to be able to show that SFM is both environmentally acceptable and economically viable.

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COUNTRY REPORT

- JAPAN -

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Project of model forests in Japan

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Objectives of the project

Conservation and sustainable management of forests have been widely recognized to be the paradigm for forest management. Various processes and initiatives of international criteria and indicators for the implementation of sustainable forest management have been established and forest management should take into consideration the criteria and indicators. Japan is a member of the Montreal Process for criteria and indicators for the conservation and sustainable forest management of temperate and boreal forests.

In Japan, forests have been managed sustainably to a satisfactory level. We are making efforts to achieve sustainable forest management under the present forest planning system under the Forest Law, but as the present system does not cover all the aspects of our proposed sustainable forest management, we are establishing model forests to be used as a reference for the new system in the future. In Japan, the latest revision of the Forest Law in 1991 updated the forest planning system by introducing the River Basin Management System in order to advance cooperative forest management between private forests, public forests, national forests, forest products industries, and others. One of the objectives of the model forest project is to improve and develop the River Basin Management System.

How to achieve sustainable forest management must be discussed between various sectors of society based on reliable data on the forests and their functions. Therefore, a monitoring system to obtain the criteria and indicators is required. In Japan, we must set criteria and indicators at the national level and local level. The model forest project will devise and test the indicators at the local level in relation to the national level.

The ten year project was started in 1996 by two local governments (Hokkaido and Kochi Prefectures) under the sponsorship of the Forest Agency in cooperation with national institutes and regional forestry offices. At present, the work is focussed on developing indicators, but the consensus building between various sectors of society in each area needs to be confirmed in the next stage.
Outlines of the model forests

Model forests have been established in two sites. One is the Ishikari-Sorachi model forest in Hokkaido Prefecture which is representative of northern Japan, and the other is the Shimantogawa model forest in Kochi Prefecture in Shikoku which is representative of southern Japan (Fig. 1).

Ishikari-Sorachi model forest

This project is being undertaken by Hokkaido Prefecture under the sponsorship of the Forest Agency in cooperation with the Hokkaido Research Center, Forestry and Forest Products Research Institute and Hokkaido Regional Forestry Office. This area was selected for the model forest because forests are required to have various functions in this area.

This model forest is managed under a management committee of representatives from institutes, universities, forestry organs and administrative organs. Representatives of local inhabitants and natural conservation organs are not yet involved in this committee, but the committee recognizes that they should be included in the near future.

The Ishikari-Sorachi model forest covers 806,000 ha and 30 municipalities, including the large city of Sapporo whose population is 1,790,000, with a total population of 2,390,000. There are only 1,860 forestry employees (Table 1). The ratio of forestry employees to the total number of employees in this area is 0.2% which implies that forestry activities are not active. On the other hand, the forests in this area are important sites for water yield and recreation for the citizens in this area.

The model forest area was divided into three blocks by forest type, land ownership and the needs of society (Fig. 2). Water yield is emphasized in the Ishikari area, recreational function in the Kabato mountainous area, and timber production and mountain conservation in the Yubari mountainous area. In each area, intensive research (monitoring) areas were set up.

Monitoring has been done by the Hokkaido Research Center, Forestry and Forest Products Research Institute and Hokkaido Prefecture Research Center in cooperation with the administrative division of Hokkaido Prefecture and Hokkaido Regional Forestry Office.

Shimantogawa model forest

In the same way as the Ishikari-Sorachi model forest, this project is
being undertaken by Kochi Prefecture under the sponsorship of the Forest Agency in cooperation with the Shikoku Research Center, Forestry and Forest Products Research Institute, and Kochi Regional Forestry Office. This area was selected for a model forest as an example of a forestry area and the area where nature has not been affected by exploitation other than forestry (Fig. 3).

The Shimantogawa model forest covers 297,000 ha and 17 municipalities, with a total population of 190,000. 86% of the area is forested and the ratio of private forest to total forest area is 56%, the ratio of plantation to forest area is 69%. The number of forest owners is 18,000 and the average forest land area of the owners is 9.2 ha (Table 2).

The management committee of the model forest consists of representatives from national, prefectural and municipal administrative organs and institutes, university, forest owners' cooperatives, local inhabitants, and nature preservation groups. The research committee is involved in the management committee and is composed of Shikoku Research Center, Forestry and Forest Products Research Center, Kochi Regional Forestry Office and Kochi Prefecture.

Future Subjects

The concept of sustainable forest management has not been well understood by many people, thus hindering the project. Repeated awareness activities such as seminars and producing publications are required.

There are many forest land owners with small forest area, and it is not easy to reach agreement among them. A system for discussion and getting consensus building among different sectors of society has not been established, so a system needs to be set up in the project of the model forests.

Scientifically reliable and applicable indicators need to be established that can be measured no only by scientist but also administrators, volunteers and so on. Basic studies on indicators for the model forest project have been started by the headquarters of Forestry and Forest Products Research Institute. The integration of the indicators at the local level and national level is important, although it a difficult tasks. Promoting the model forest project will be the best way to achieve it.
Table 1 Outline of Ishikari-Sorachi model forest

<table>
<thead>
<tr>
<th>Place</th>
<th>Area (ha)</th>
<th>Number of municipalities</th>
<th>Total population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hokkaido</td>
<td>National forest 319.000</td>
<td>City 15</td>
<td>2,390,000</td>
</tr>
<tr>
<td>43° N,</td>
<td>Public forest 75,000</td>
<td>Town 11</td>
<td></td>
</tr>
<tr>
<td>142° E</td>
<td>Private forest 114,000</td>
<td>Village 4</td>
<td></td>
</tr>
<tr>
<td>Other than forest 298,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>806,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the Ishikari-Sorachi area, natural forests, plantations, and other areas represent 64%, 27%, and 9% of the forest area, respectively. The natural forests are composed of hardwood forests, mixed conifer-hardwood forests, and coniferous forests. The coniferous forests which belong to the boreal forest zone are located at higher altitude. Main tree species of plantations in this area are Abies sachalinensis and Larix kaempferi.

Table 2 Outline of Shimantogawa model forest

<table>
<thead>
<tr>
<th>Place</th>
<th>Area (ha)</th>
<th>Number of municipalities</th>
<th>Total population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kochi</td>
<td>National forest 54,000</td>
<td>City 4</td>
<td>190,000</td>
</tr>
<tr>
<td>Prefecture</td>
<td>Public forest 32,000</td>
<td>Town 7</td>
<td></td>
</tr>
<tr>
<td>33° N</td>
<td>Private forest 167,000</td>
<td>Village 6</td>
<td></td>
</tr>
<tr>
<td>133° E</td>
<td>Other than forest 43,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>296,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the natural forests, broad-leaved evergreen species dominate in the low and middle elevations, and mixed forests of broad-leaved deciduous species and conifers such as Abies firma, Tsuga sieboldii and Chamaecyparis obtusa dominate in the high elevation. Coniferous plantations account for 69% of the forests in this area.
Figure 1 Location of the model forests in Japan

Figure 2 Map of the Sorachi-Ishikari model forest

Figure 3 Map of the Shimantogawa model forest
COUNTRY REPORT

- KENYA -

by Ben Otieno Wandago
District Head
Forestry Department
Ministry of Environment and Natural Resources
COUNTRY REPORT

INTERNATIONAL WORKSHOP ON MODEL FOREST

FOR

FIELD LEVEL APPLICATION OF SUSTAINABLE FOREST MANAGEMENT

TOKYO
10-12 MARCH, 1998

BY

BEN WANDAGO
1.0 INTRODUCTION

1.1 Background

Kenya covers an area of 582,600 km² which includes about 10,700 km² of lakes. Its most noticeable geological feature is the great Rift Valley, which runs the length of the country from Lake Turkana in the North to Lake Magadi on the Tanzanian Boarder.

The land rises from sea level to the highest plateau, which forms the central highlands. The altitude of the highlands ranges from 1500m to 2500m with five main massifs rising above the plateau: These are Mt. Kenya, Aberdare Ranges, Mau Escarpments, Cherangani Hills and Mt. Elgon. This rather simple land form has dictated the present drainage system. All the big rivers flow radially from the dome of the central highlands or from the foot hills of the Ethiopian highlands.

The land form also controls the climatic pattern, with inland rainfall and temperatures related to altitude. The rainfall pattern is characterized by a relatively wet belt (1000mm) extending along the Indian Ocean and another (1400mm) covering Western Kenya, to the east of Lake Victoria.

Rainfall ranges from less than 255mm in the north east to more than 2000mm on the upper slopes of Mt. Kenya. It is strongly seasonal predominantly bimodal to the East of Rift Valley, with a unimodal pattern along the coastal strip and to the west of Rift Valley. Mean temperature patterns are closely linked to altitude. The highest temperatures are in the regions of north east Kenya (34°C) and the coldest areas are in the mountains where night frost occurs above 3000m.

1.2. Forest: Areas of Woody Vegetation (48,604 000 ha)

(i) Indigenous Forests

They cover about 1.3m ha, comprising the coastal forests, dry forests, montane forests, western rain forests and the mangroves.

(ii) Woodlands, Bushlands & Wooded Grasslands

Wood biomass 176m³/ha over all types these areas cover about 37.6m ha and are spread mainly in the arid and semi arid lands, but they are also found in the high and medium potential areas. Wood biomass 15.2m³/ha - Annual increment of 0.2m³/ha/yr.

(iii) Farmlands and Settlements

These cover about 9.5m ha. They are located mainly in the high potential and medium potential areas of the country. Average wood biomass inventory is 7.9m³/ha and annual increment 0.4m³/ha/yr.

(iv) Forest Plantations
Government owned forest plantations cover 170,000 ha (currently the area is approximately 110,000ha) of which over 20,000ha, are open lands awaiting planting. They are distributed in high and medium potential areas of Kenya in 17 districts with growing stock of 347 m$^3$/ha. There are also approximately 70,000 ha of privately owned plantations mainly under eucalypts and wattle.

Kenya has lost and is continuing to lose most of its forests with indigenous forests being the most threatened. In its early stages deforestation was beneficial as there was plenty of forests and the population was low also land use for agriculture was more profitable. Currently deforestation has ceased to be beneficial to the society. A brighter picture will result from a number of policy interventions, which will be implemented by a set of programmes and management of the forests and tree resources.

2.0 PROBLEM AREA: CONSERVATION AND MANAGEMENT OF INDIGENOUS FOREST (Case Study: Aberdares Natural Resources Dev. Project)

(a) Introduction

Most of the closed canopy forests are in areas of high potential and medium potential land, where human population is high. In the extensive arid and semi arid regions closed forests are found mainly on isolated mountains and along some river banks. There are a few remnant forests in the coastal belt and extensive mangroves. The main forest zones are as described below:

(i) Coastal forests: The area of closed forest covers approximately 66,700ha, with another 15,900ha of other woody plant associations - woodlands, thickets, wooded grasslands and bushlands.
(ii) Dry forests: Closed forest covers approximately 163,800ha with approximately 47,000 ha of other woody plant associations.
(iii) Montane forests: Closed forest cover 387,000ha with approximately 361,300 ha of other related associations.
(iv) Western rain forest: Closed forest cover approximately 43,000 ha with another 5,800ha of other related associations.

(b) Project Area

The Aberdares range and the Kikuyu Escarpment located 120km Northwards from Nairobi, cover an area of 227,700ha. Altitude varies from 2000m on the eastern forest boundary to 4000m at the peak, north of the range. Farming households within 3km of the proposed fence amount to 23,000 units. The Aberdares forest and park are located in Nyeri, Mungange, Kiambu and Nyandarua Districts, which are part of the Central Province.

Annual rainfall is normally between 1400mm to 1600mm. Soils on the eastern slopes have a high fertility, while those on the western boundary are of medium to high inherent fertility. About 72 species of large mammals have been identified, together with elephants, bonjos, rhinos, wild dogs, jacksons mangroves (endemic), and giant forest hogs, notable for their conservation value.
Present uses of the forest by the population are water, fuelwood, grazing and tourism within the park. Potential uses are exotic plantation exploitation, fuelwood collection, bamboos exploitation and grazing. The Aberdares ecosystem was chosen as it is part of the tropical moist forest systems which govern large scale essential life process. The forest catchment supplies four of the five main water systems of the country and includes 15,000 ha of exploitable plantations.

The Aberdares National Park is one of the famous mountain parks of the country. Areas adjacent to the forest have a good potential for rainfed and irrigated horticulture development. Milk production could be developed by the improvement of access roads and cooling centres. There is also a considerable potential to increase livestock services to farmers and agroforestry activities.

The main problems affecting the Aberdares forest are:-

- Agricultural encroachment, squatters
- Over cutting, illegal grazing in the park, fires, increasing conflict between wildlife and adjacent agriculture. In addition any protection and development of the ecosystem will face the following problems:-
  - existing utilization of natural resources by the adjacent communities
  - the need to associate communities
  - to proposed fence maintenance
  - insufficient rural infrastructure
  - poor forest management
  - high fuelwood demand and
  - the lack of overall ecosystem management

Main Activities of the Project

The project area will comprise the Aberdares National Park and Forest Reserves (180,000 ha) Kikuyu Escarpment, Kipipiri and Ndaragwa forests (42,700 ha) would be excluded from the fence area. About 23,000 households (143 communities) are living up to 3km from the proposed fence.

In line with the draft Forest Policy, the objectives of the project would be the conservation and development of the natural resources of Aberdares by an integrated Management of all activities within the protected areas, with the support and involvement of adjacent communities.

Experience in Kenya and elsewhere has shown that any forest under population pressure cannot be protected by legal prohibition alone but requires the collaboration of adjacent communities in forest management and realization of the importance of sustainable benefit.

Following proposals made in the identification report, the following activities will be supported by the project:-

(a) Development of an Aberdares Ecosystem Management Plan and setting up of a Project Coordination Unit (PCU)
(b) Rehabilitation of protected areas through:-
- Confirmation of fence alignment and completion of fence construction
- Forest protection
- Exotic plantation management
- Ecotourism development, ecosystem information centre established.

(c) Rural development activities:

- Impact assessment on communities of existing fence
- Establishment of a rural development fund for micro-activities (that emphasize on soil and water conservation measures, on farm tree planting and agroforestry, livestock and fodder production)
- Establishment of adjacent communities committees at village and district level for local planning
- Improvements of rural infrastructure (access roads, rural electrification, marketing centres)
- Support through a line of credit to small entrepreneurs for off farm activity.

Total costs for the 6-year project duration would be approximately 1,597 million (US$35.5 million) of which foreign exchange would be 42%.

The main environmental ecosystem benefits will consist of the regulation of water flow, protection of plant and animal species, protection of the forest cover, reduction of the pressure on natural forest areas, and the development of the local populations interest in protecting the forest.

Main financial benefits will be an increase in the supply of water, forest produce, exploitation of exotic plantations and of bamboo and ecotourism development.

Main risks relate to the authority of the ecosystem organization during the after implementation, the innovative community development activities, fence (maintenance, management of activities), ecotourism activities, plantation forests and diseases, and to the possible population attraction to adjacent areas.

Main issues to be addressed by the government are:- status of draft forest policy, possible forest excisions, agreement of the management plan, institutional ecosystem management, and funds for fence maintenance.

CONCLUSION

The basic idea of the new forestry strategy is that the ways in which forests have been exploited and managed in the past are no longer adequate. A complete change of forest policy must therefore take place towards promoting partnership with farmers, rural communities and the private sector.
COUNTRY REPORT

- THE REPUBLIC OF KOREA -
International Workshop on Model Forests
for Field-Level Application of
Sustainable Forest Management
Tokyo, 10-12 March, 1998

Country Report

The Republic of Korea

Forestry Administration

March, 1998
Application of Sustainable Forest Management in Korea

1. Introduction

The forests are one of the most important natural resource in Korea. Forest land is about 6.5 million ha, occupying 65% of total land area. Of them, 71% is privately owned by over two million people so that 96% of owners possess less than 10 ha. Overall the forest land per capita is very low at mere 0.2 ha, which imposes the difficulty in effective and intensive forest management in Korea.

Though reforestation has been successfully accomplished, harvestable forest resources are extremely limited because about 90% of forests are under 30 years old with little economic value. With the increasing concern for environmental conservation in the society, however, forests in Korea are required to provide a variety of benefits including clean air and water, scenic beauty, recreation opportunities, and biological diversity. To incorporate the spirits of UNCED into forest resource management, the major objective of forest policy has been changed from increase of economic potential of forests to integrated forest ecosystem management pursuing the harmony between development and conservation of the forests.

To accomplish sustainable forest management, reflect the global forest initiatives, and fulfill the various socioeconomic demand for forest management, the existing laws and regulations were recently amended and new forest-related law was formulated. Through the amendment of the Forest Law in 1994, enforcement regulations were revised and included the assessment of sustainable forest management implementation. The regulations explicitly listed the criteria for assessment of the progress in implementing sustainable forest management in Korea.

Various efforts at national level are under way but initiatives for application of sustainable forest management at field level or management unit are yet to be studied in more active ways. In this report, therefore, the long-term forest planning scheme will be analyzed as the most important framework for the pursuit of sustainable forest management in Korea.
2. Long-Term Forest Planning

The most important turning point in Korean forestry was the initiation of the First 10-year Forest Development in 1973 of which main goal was the reforestation of denuded forest lands. Reforestation of one million ha was the goal with objectives of implementing the national tree planting movement through the public participation and of achieving rapid reforestation of fast-growing tree species.

The Second 10-year Forest Development Plan was to establish large scale commercial forest zones in order to develop long-term timber resources and thus to meet the demand for timber products. To achieve the objectives, various forest policies initiated by the government, including improvement of reforestation plan, strengthening of forest protection, foundation of forest development funds for supporting private forest management, grouping and enlarging of national forests, and strengthening of forest conservation programs.

The third long-term forest plan, Forest Resources Enhancement Plan started in 1988 to harmonize the goals of increasing economic development of forests and improving public benefits from forests. Through the first and second long-term forest plans, the denuded forest lands were successfully reforested across the country, but forests were largely too young to be used commercially for various forest products, especially timber production. Due to social and economic changes, there was an increasing demand for conservation of forests and for outdoor recreation opportunities mainly provided by forests.

In accordance with the Forest Law, which was enacted in 1961 and amended in 1994 to reflect the recently emerged challenges and opportunities in forest resources management including especially sustainable forest management, the Fourth 10-year Forest Plan starting this year is just formulated. The Plan would provide the basic framework of forest policies and objectives, and overall management directions on conservation and development of forest resources. The goal of 4th Forest Plan is to establish the foundation of sustainable forest management in Korea. Major targets are to build valuable forest resources, to strengthen competitiveness of forest industries, and to enhance healthy and enjoyable forest environment across the country. The strategies include forest land management system, sustainable management of forest resources, strengthened international cooperation, competitiveness of forest industries, private forest management, environmental values and recreation, forest culture, and comprehensive development.
3. Perspectives of Sustainable Forest Management in Korea

(1) Forest Land Classification System

As emphasized at the Intergovernmental Panel on Forests (IPF), national land use is one of the important factors affecting the implementation of sustainable forest management. In Korea, forest lands had been classified into two categories of reserve and semi-reserve forests until recently. The two-type forest land classification had hindered more efficient and rational forest land development mainly because of lacking suitability for conservation and utilization of forest lands. For more efficient use system, therefore, of forest lands and more comprehensive management of economic and environmental values of forests, forest land use system was revised into three categories including production, protective, and convertible forest lands through the amendment of Forest Law in 1994.

The production forests were mainly for production of various forest products to meet the social demand and would serve as stock base for timber production. The protective forests would be managed primarily for the values of environmental and recreational functions for public benefits. The convertible forests would be available for development of rural community surrounding the forests, and utilized to meet the land demand for multiple purposes including housing projects and industrial sites, while forest conversion would be limited more or less. In production and protective forests, forest conversion into other uses would be strictly restricted to maintain the necessary forest cover and silvicultural activities would be carried out according to their functional purposes which would be identified for specific details and in accordance with technical forest management guidelines.

(2) Forest Resources Management

The major objective of sustainable forest management has been to harmonize the balance of conservation for environmental benefits and economic utilization of forest resources. The economic utilization of forests usually came from timber and other forest products which were largely dependent on commercial species. The plantation forests would be sustainably managed to increase the economic and environmental values. In Korea, therefore, forest policy and planning emphasized on enlargement of commercial forests and thus tried to raise the self-sufficiency ratio of forest products. According to long-term estimates, commercial forest lands would occupy about 44% of all forest land, totalling 2.9 million ha by 2007 and up to 55% of all forests totalling 3.5 million ha by 2050.

To advance the forests for more valuable economic and environmental resources, various
planted methods would be introduced and adopted through enlargement of plantation of
timber species, of large trees in environmental forests surrounding human settlements, and of
fruit bearing species for income raise. The silvicultural practices would be intensively applied
to produce high quality timber through consistent thinning of conifer forests, silvicultural
works of broad-leaved forests, and timely tending including understory removal and pruning.
Due to insufficient management of most private forests, national forests expected to play
major role in conservation and development of forest resources in Korea.

The forest policy emphasized the enlargement of a national forest unit because small size
and spatial distribution of national forests interlaced with other ownerships posed a great
difficulty in intensive and efficient silvicultural practices. Since the enforcement of
decentralization of governmental systems, the balanced development across the country has
become an important factor in every sector including forestry. The enlarged national forest
units would be spatially distributed in balanced way nationwide for equitable benefits among
rural communities. To pursue more productive forest development projects, national forests
would be classified into large-scale mountain and regional areas which would be considered
as a management unit for forest planning and developed for multiple purposes.

The application and implementation of sustainable forest management should be supported
by forest researches on forest ecosystems and forest technologies. The forest researches
would focus on improvement of forest productivity and practical technology applicable in sites.
Also to identify new income sources and solve technical problems in rural communities,
researches have been carried out and results and experiences have been distributed as
extension services. In particular, researches on biotechnology have been focused on
development of new materials for medicinal and other uses. In this context, systems for
incentives and intellectual properties would be established, and information and experience
sharings with other institutes and organizations would be encouraged in forestry sector.

The latest technologies such as geographic information system (GIS) have been utilized for
forest resources assessment, planning and other purposes. To achieve sustainable forest
management, comprehensive information system would be devised by combining geographic
information on forest resources and management information on forestry. Included in
geographic information on forest resources could be growing timber stock, characteristics of
natural environments, and informations on forest ecosystems. The data on production,
technology, labor forces, distribution, and administrative information would be included in
management information on forestry. Based on the comprehensive information system,
specific management systems for forest fire detection and control, service road, and ecosystem
management could be developed. The channels for information exchange and search among
related agencies and organizations would be established for sustainable forest management.

(3) Forest Products and Forest Industries

Due to the mountainous areas and geographical characteristics of forests, development of
forest roads and application of mechanical equipment have been very difficult tasks in forest
management. To manage forest sustainably, forest road network should be expanded for
better accessibility of mechanical equipment and low overall cost for forest management, up
to 10 m per ha by the year of 2010 from 1.1 m per ha of 1995. Forest road would be
concentrated in the production forests for mechanized silvicultural works and expanded
through advanced and environmentally sound construction techniques which could minimize
the damage to forest environment. To increase the productivity, a variety of forest
mechanical equipment would be developed to be adaptable in mountainous forests in Korea.
Also, regional mechanical equipment center would be established for forest owners and forest
products producers to rent them in cases.

The wood processing facilities including plywood manufacturing would be equipped with
the latest technologies to be more competitive and efficient. The technology for timber
quality enhancement including antiseptic treatment techniques would be improved to high
quality forest products. The researches and development projects in the field of forest
products utilization would be strengthened and more investments would be infused to develop
new materials, to broaden the scope of utilization including thinned small size timber, and to
identify highly value-added forest products.

The forest products Processing Marketing center would be established and enlarged for
more effective collection, storage, processing, and sales of forest products. The private
investments in timber distribution structure would be induced through incentives and
 provision of information on production and distribution to ensure their safe and profitable
operations.

(4) Institutional Arrangements

To accomplish sustainable forest management, reflect the global forest initiatives, and
fulfill the various socioeconomic demand for forest management, the existing laws and
regulations were recently amended and new forest-related law was formulated. Through the
amendment of the Forest Law in 1994, enforcement regulations were revised and included the
assessment of sustainable forest management implementation. The regulations explicitly listed
the criteria for assessment of the progress in implementing sustainable forest management in Korea.

Included in the regulations as criteria were conservation of biological diversity of forest ecosystems, maintenance of productive capacity of forest ecosystems, maintenance of forest ecosystem health and vitality, conservation of soil and water resources in forest ecosystems, maintenance of forest ecosystem contribution to global carbon cycles, and other internationally agreed criteria to assess the implementation of sustainable forest management. These criteria were very similar to the criteria which were developed and adopted by the Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests (Montreal Process), because Korea is member country of the Working Group with other eleven countries.

Recently the Forestry Promotion and Advancement Law was formulated to promote the intensive management of private forest which is occupying 71% of all forests in Korea. The management of private forests has been negligible because of shortage of labor force in rural communities, sharp increase of wage level, and low price of timber. Its major goals, therefore, are to induce private forest owners to active participation in managing forests and to strengthen the governmental subsidy systems in order to increase the timber resources through strong governmental support and assistance.

The main objectives of the Forestry Promotion and Advancement Law are; improvement of private forest ownership structure through achieving economy of size by joint management system; establishment of forest management cooperatives consisting of forest managers including model forest mangers, forest successors, and entrepreneurs; enhancement of productivity in forestry sector through enlarging infrastructure for forest management, promoting mechanization, and maintaining forest labor force; improvement of distribution channel for forest products; strengthening of support system including procuring forest investment funds and improving financial assistance and tax incentives; establishment of review committee on forestry promotion and policy.

To achieve sustainable forest management in Korea, changes in organizational structure were made lately. These were; foundation of Bureau of Forest Fire at the Forestry Administration to effectively prevent and control forest fires in 1996; establishment of Forest Environment Division at the Forestry Administration to improve forest environment for the public benefits and management of wildlife in 1995; establishment of Biological Engineering Division at the Forest Genetics Research Institute to improve researches and development of new materials from forest genetic resources in 1995.
4. conclusion

Through the successful accomplishment of reforestation programs, forest resources became a valuable resource which was indispensable for sustainable development of the society with the various economic and environmental values in Korea. Since Korea is too populated compared to land area of which 65% is forests, there has been increased conversion of forest lands for other land uses, which included human settlements, industrial sites, road construction, and croplands. In the past decade, about 9 thousand ha of forest lands a year has been converted for these land uses. Recently the rate of converting forest lands has been decreased due to reduced population growth, increased uncultivated croplands, and strict restriction of forest land conversion. And it is intended that forest land conversion be kept to the minimum level in the future.

With the increasing concern for environmental conservation of the society, forests are now required to provide various benefits including clean water and air, scenic beauty, enjoyable forest recreation, protection of wild flora and fauna, and other ecological functions. To meet various demands for forest resources and achieve sustainable forest management in Korea, forest policies would put more emphasis on increasing growing potential and capacity to provide the various benefits to the society.

Recently demand for environmental benefits from forests has increased in the society so that the systematic and intensive forest management techniques including plantation, silvicultural practices and efficient management structures are required to meet the various demands, to maintain ecological health of forest resources, and to improve productivity.

To efficiently meet the changes in management conditions and improve forest productivity, Korean government has established the national forest plans such as National Forest Plan, Forest Resources Enhancement Plan, and forest stand management plannings. To incorporate the spirits of UNCED into forest resource management, the objective of forest policy has been changed from the increase of the economic development of forests to achievement of harmony between development and conservation of forests, for which related policies for sustainable forest management have been pursued in various ways.
COUNTRY REPORT

- LAO PEOPLE'S DEMOCRATIC REPUBLIC -

by Department of Forestry
Ministry of Agriculture and Forestry
Country Report

on

Community Based Forest Management and
Joint Forest Management in Lao P.D.R.

March 1998
I. INTRODUCTION

A. Background

Lao People's Democratic Republic (hereinafter referred to as "Lao PDR") is a mountainous land-locked country located between Thailand and Vietnam, with an area of 236,800 km² and an estimated population of 4,727,600 (Source: National Statistic Centre, 1996). A large percentage of the country is drained by the Mekong River, which forms most of the western border of Lao PDR. About 75% of the land area - mainly in the northern and eastern parts of the country - is hilly to mountainous, with altitude ranging from 500 to 2800 meters. The central and southern regions are occupied by the low-lying plains of Mekong River and its tributaries.

B. Forestry overview

Lao PDR has an estimated 11 million hectares of forest, comprising about 47% of the total land area. These forest areas are broadly classified as follows:

- evergreen forest (highland and lowland) 3.4 million hectares
- mixed deciduous forest (highland and lowland) 5.7 million hectares
- deciduous forest 1.7 million hectares
- others (pine and bamboo forests) 0.4 million hectares

It is well recognized that the forest areas of Lao PDR are under heavy pressure by people lacking subsistence alternatives other than shifting cultivation or encroachment on forest land. Presently, there are some 250,000 families - or about 1.5 million people - who are currently practicing this primary method of cultivation. These people are rapidly encroaching onto forest land as their numbers increase and soil fertility declines. It is estimated that each year about 300,000 hectares of forest land - including 100,000 hectares of "good forest" - are under slash and burn cultivation. Beside this, fire and improper logging operations are the major causes of forest destruction.

This ongoing degradation of land is a serious threat to a sound environment in spite of the fact that Lao PDR is less densely populated than most of the country in the region.

Already today it is being felt in certain areas, that water flow is more irregular and certain tree species and wildlife are on the verge of extinction.

In the long run continued degradation of the uplands will have serious implication for the lowland, reducing agricultural production and frustrating economic development designed to benefit all of people of Lao PDR.
II. TOWARDS A SUSTAINABLE FOREST MANAGEMENT SYSTEM

A. Policy for forestry development

The present strategy for forestry development of the Government of Lao PDR (GOL) is to rely on farmers, motivated by profit gains, to properly manage forest and forest land at village level in order to diversify their sources of income. GOL has also encouraged private business investment in forest plantation development.

The development of more appropriated forest policies has been underway since the First National Forestry Conference in May 1989 which provided the fundamental guidelines for the preparation of the Tropical Forest Action Plan (TFAP) in 1989 which has been adopted by the GOL in 1991. The TFAP identified six priority targets in forestry development such as:

1. Development process support
2. Strengthening the human resource base for programme implementation
3. Support for the development of sustainable alternatives for improving the livelihood of people presently engaged in shifting cultivation or encroachment on forest land.
4. Support to Water Catchment area protection.
5. Support to sustained use of forest products.
6. Support to plantation forest development.

The GOL has determined that forestry development can only take place in an environment of government decentralization of the sector. The central government’s role will be confined to policy-making, legal and research activities, human resource development and extension services.

In order to provide improved policies and incentives for forest development to proceed more effectively, Decree 169- "The Management and Use of Forest and Forest Land" was promulgated in November 1993. This new policy has allowed World Bank forest management and ADB plantation support projects to proceed. The Decree was developed to become the Forest Law and the Land Law since October 1996 and April 1997 respectively.

The GOL has initially designated 18 areas of reasonably good quality and fairly undisturbed forests as National Protected Areas for the preservation of indigenous flora and fauna and genetic diversity. These areas total some 2.5 million hectares, or 25% of Lao PDR's forest cover, comprising 12% of the area of the whole country. In 1996, the GOL has declared two more protected areas which are now under the management of the Forest Management and Conservation Project (FOMACOP), a co-funding project supported by WB/FINNIDA. Presently, Lao PDR has a Biodiversity Conservation Area with a total area of 3 million hectares.

Harvesting of the natural forest is restricted to under 500,000 m³ annually through the year 2000. Most of this harvest is expected to come from salvage logging in development project zones such as hydroelectric reservoirs and highway construction sites. Only small harvesting quotas are provided to each province and increase cutting to support the present development of greater processing capacity are prohibited. Harvesting has taken place under management plans that were designed to provide a sustainable yield; however, these plans have been found to be flawed. New sustained yield management plans have been developed by
FOMACOP, and now two natural forest areas have been selected as demonstration pilot areas for this new project. The project has already implemented and expected to be carried out over a 15-year period, during which it is hoped that 500,000 ha will be brought under management of the programme.

The GOL objective is to establish 40,000 ha of plantations by the year 2000 through private sector investment and small-scale farming. To support the forestry plantation investment, GOL has approved the implementation of the Lao-ADB Forestry Plantation Project which is committed to provide technical assistance by establishing demonstration plots and credit facilities support to assist small farmers through the Agricultural Promotion Bank (APB) since 1994.

In order to contribute to the implementation of the above target, a Japanese Technical Cooperation project namely "The Forest Conservation and Afforestation Project (FORCAP)" started its planning phase since July 1996. Its purpose is to prepare a concrete action plan for the forest conservation and afforestation which will be implemented by the local people and the local government at model villages in Nam Ngum Dam Watershed Area.

The protection of forests, sustainability of wood yields, and development of plantations are very much dependent on the achievement of GOL's highest priority policy: to stop shifting cultivation by promoting stable, more intensive agriculture land use practices. Until current and future programmes to implement structural changes in land use practices are fully effective, the protection and effective management of of natural forest areas and the plantation development will continue to be hampered. Many external support projects will provide assistance in policy formulation and planning through the establishment of demonstration models and database to facilitate development and extension services in the government, corporate, and private sectors.

B. Community Based Forest Management as a key sustainable management systems for remaining tropical forests.

As mentioned above, the major causes of deforestation in Lao PDR are: the shifting cultivation practiced by rural people and highlanders, uncontrolled fire frequently provoked by slash and burn cultivation, inefficient management and use of forest, resources, including forest land etc...

By recognizing the importance of local management of forest, trees and forest land, the GOL has established demonstration projects in selected communities in selected water catchments, where probability of success and potential benefits are high.

Presently, GOL is in process in adopting community based forest management as one of the key sustainable management systems because of its participatory characteristics. The ongoing projects in forestry development are almost experiencing their activities at village level, and the term "Village Forest" becomes now very popular in Lao PDR. However, management systems and related regulations of village forest are not formulated yet. As a consequence, projects on forest management performed their implementation differently.

Therefore, the Department of Forestry is now preparing to formulate the Draft strategy on Village forest. Recently, a workshop on this issues was held to gather related initiatives/suggestions. Taking in account the different benefits/incentives for villagers living in or nearby each forest category, the outlines of the Draft thus will include the appropriate management systems for each forest categories described in the Forest Law, e.i. protection forest, conservation forest, production forest, rehabilitation forest and degraded forest.
Some projects have been performing their activities in such orientations for more than three years. So, accumulated experiences will be used as base of the future development of village forest strategy.

1. **Pilot Models for sustainable management of natural forest at village level.**

   Since 1994, two different models have been tested in the field by *The Joint Forest Management Project* (Lao-Swedish Forestry Programme).

   1.1- *The Joint Forest Management at Dong Kapho, Savannakhet Province.*

   The needs for sustainable management of natural resources have been increasingly recognized by the Lao government during the 1990's. The participatory approach for natural resource management was recognized and applied as method for sustainable management of natural resources. It is in this context that during the third phase of the Lao-Swedish Forestry Programme a forest management model for *Dong Kapho* in Savannakhet province was developed. The partnership concept or the so-called Joint Forest Management (JFM) which involves villages within and around the forest in the implementation of the plan was put into practice.

   Two models of JFM were developed and implemented in three villages of Phin and Atsaphangthong districts (presently Phalanxay district of Savannakhet province) since 1994, with the overall objective to test a sustainable forest management system adapted to Lao PDR ecological, social and economic conditions.

   Dong Kapho State Production Forest (SPF) is a natural high forest with the extent of 9,581 ha comprising of a productive forest area of 5,900 ha and divided into three compartments. The management plan developed is aiming at sustainable of this SPF with three specific objectives:

   1. Sustainable yield production of valuable timber and non-timber forest products,
   2. Maintenance of the ecological, conservation and protective capacity of the forest, and
   3. Involvement of the local people in the management (Joint Forest Management).

   To meet these objectives, a management plan was elaborated on the basis of growth and yield model ensuring a 50 years felling cycle. For the purpose of management, the whole forest area was divided up into 72 compartments of size 50-200 ha distributed in three management areas: Dong Kapho North West (DKNW), Dong Kapho North East (DKNE) and Dong Kapho South (DKS).

   The annual coupe area (118.5 ha) is equal to the total productive forest area divided by 50 (the number of years in the felling cycle). In order to distribute activities in all the three management areas, annual coupe areas were specifically calculated for each of them which is equal to about 29 ha, 48 ha, and 41 ha for DKNW, DKNE and DKS respectively. Within the annual coupe, through a yearly pre-logging survey followed by the elaboration of cutting regime and tree marking survey, annual logging volume is determined for each of the management areas.

   It was decided as per the third objective to implement the plan through villager's involvement. Since the experience in involving people in the management of State Production...
Forest is still lacking a partnership approach or the so-called Joint Forest Management (JFM) which originated in India was modified and tested with the purpose of developing appropriate methodologies for implementing forest management plan in different types of forests. Two models of JFM were developed and tested for this purpose in 3 villages out of the total 14 found within and around Dong Kaphor SPF (one in each management area).

Model 1.

**a.) JFM Agreement**

The JFM Association, which has to be formed to represent the village, shall be given a contract with full rights and responsibilities to implement the whole management plan for DKNE. This includes rights to do logging and sell logs and/or process logs and sell sawn timber. In exchange to these rights, the villagers should commit themselves to protect the Management Area, and pay royalty to the Government per logged volume as per official regulation. The whole profit from the management shall go to the JFM Association. 70% of the revenues shall go to a village development fund and 30% will be reserved for the following year operations (salaries of board and management team, per diem for District Agriculture and Forestry Office (DAFO) staff, payment for forest work by villagers,...). The money shall be placed at the closest bank and bank book is to be kept by the village. Disbursement of the account and village development fund shall be managed by village under the supervision of DAFO.

The DAFO shall give various extension support to JFM Association to enable it to undertake the JFM contract. Training of JFM Association staff shall be arranged in aspects which need to be strengthened. The District shall provide a start-up credit for the initial forestry operations in the village. This credit shall be reimbursed without interest to the district development fund. DAFO shall also assist the village in carrying out the participatory land use planning of the village outside the area of Dong Kapho, identifying village forest and drawing up management plan for these forests.

The Provincial Agriculture and Forestry Office (PAFO) shall be overall responsible for the whole SPF, shall plan the forest management, undertake related forestry surveys, and control and monitor the implementation of the plan by the JFM Association. PAFO has two representatives (rangers) in the field and one overall coordinator working at the province.

**b.) Implementation plans**

The JFM Model 1 was contracted to Ban Nathong in 1994. A JFM village enterprise called Joint Forest Management Association (JFMA) owned by all families living in the village was established. The JFM board, which is distinct from the village committee, comprising of 11 members was formed through election in December 1994. The role of the JFM board and duties and responsibilities of Ban Nathong JFMA were also worked out.

In the forest management plan, several operations are prescribed which different parties involved should carry out. However, after two years of implementation, the main forestry operations (which include logging, nursery, enrichment planting, log transportation, track clearing, pre-logging inventory, and tree marking survey) conducted under JFM agreement model 1 are quite effective, except for follow up planting and forest protection.

Although the PAFO is the responsible party in some operations, villagers always assist the work. Particular attention is paid to customary rights. Villagers involved in forestry operations are paid for their work. Money to finance forestry operations comes from the part of the village revenues.
To undertake the work they are responsible for, villagers have the support from DAFO and the rangers, mainly as regard organizational issues. They are also supported through numerous explanatory meetings and courses of basic technical training such as basic management, logging and felling techniques by hand saw, and basic financial training.

With the revenues from logging, Ban Nathong has invested in village development activities such as: construction of 4 tube wells and the 10 m large all weathered road linking the village to the main asphalt road No. 9. This investment amounts to about 34 to 35 million kips.

**Model 2**

a.) JFM Agreement

In this model, villagers shall organize and commit themselves to protect part of forests that is inside the village borders and refrain from encroaching other parts of Dong Kapho SPF. The village should form a committee that will manage a Village Development Fund to which the Province will transfer the protection fee.

DAFO shall support the village through forestry extension and training to make the villagers able to undertake the JFM contract, but also to develop better land use and sustainable village forestry on the land outside of Dong Kapho.

PAFO shall plan, implement, control, collect royalties/taxes and monitor all activities in Dong Kapho. The Province will however contract out the protection of the forest to the Village and in exchange pay a protection fee to the Village. PAFO shall arrange annual logging and hire labour from the villages when doing this work.

In this model, the land use status and border shall be defined. A participatory land allocation process shall then be conducted and this shall be followed by provision of extension services from DAFO upon the needs identified during the first two exercises.

Community forestry plans shall be developed for the sustainable management of the village forests, on the basis of actual village management rules. Villagers shall be organized around a forest volunteer to carry out protection and improvement activities.

b.) Implementation plans

Model 2 is being tested in the remaining two management areas of Dong Kapho SPF (Ban Xienglekhok in DKNW and Ban Khamnoi in DKS). Although the test started in 1995, the contract has not been signed.

Unlike Model 1, no particular structure has been set up for the implementation of the agreement. However, a village development committee has been established in both villages, mainly from the existing village committee, as interlocutor for carrying out the JFM related work as well as to administer the village development fund.

In undertaking forestry operations, especially logging, sawmills were selected by the villagers under PAFO supervision through a bidding process, for buying logs by paying a fix amount per cubic meter felled. Out of this sum, money is used for paying the work of the villagers, services of DAFO officers, log transportation to second landing, track clearing, and to pay the protection fee. Royalties are paid directly by the sawmill to the province. In 1996, a provincial rule attributed 600,000 kip/ha planted after logging to the districts. Training support was also given on certain technical aspect such as safety tree felling techniques.

Forestry operations carried out under JFM agreement model 2 are also quite effective, except the two operations follow up planting and forest protection. As in Model 1, particular attention is paid to customary rights in selecting areas and trees for felling.
In both Ban Xienglekhok and Khamnoi, funds from the protection fee have been used to construct tube wells as well as material for school. In both villages, the remaining funds are invested in construction of a new school. In addition to revenue to the village, JFM also generates income to individual families which involve in different operations. According to the socio-economic surveys in Ban Xienglekhok during January and February 1997, it has been found that the amounts directly disbursed to individual households (38) amounted to 1,116,967 kip from which the income ranges from 10,000 kip to 40,000 kip per household involved (in 1996). If compared with other sources, JFM comes third after livestock and non-timber forest products (NTFP). In Ban Khamnoi, the average income from JFM is about 30,000 kip per individual who participated to the logging activities. At household level, the revenue varies from 30,000 kip to 140,000 kip for a total of 3,369,806 kip in 1996.

In the agreement, it is stipulated that DAFO shall help to develop better land use and sustainable village forestry on the land outside Dong Kaphor SPF. In view of this, a land use status and border of the village have been defined during a six days participatory exercise at Ban Xienglekhok in September 1996.

Experiences:

(1) There is lack of in-dept understanding of the JFM concept at the provincial and district levels. The main efforts during the last two years of implementation have concentrated on logging and enrichment planting related issues. Other aspects like real participation from the villagers through the group strengthening, innovative approaches to village development and community forestry efforts are actually considered as secondary.

(2) JFM implementation gives new roles to both villagers and forest officers. For forest officers, their technical support is only part of their work, when the promotion and support to village self reliance, analytical decision making and village empowerment are important aspects of their responsibilities. Training and development of the staff on these aspects have not been sufficiently supported. Also the implementation takes place in a quite conservative forestry environment where innovative ideas are slow to pass through the provincial and district structures. On the part of villagers, they are also put in a new position, from passive to active players in the development of their village. It implies both responsibilities and benefits for villages. If JFM has to be sustainable, villagers have to be able to stand for themselves, not individually, but as an organized and structured group, being informed properly and understand the various plans and development activities. That is not yet a reality and villagers mainly act upon the impulse of officers.

(3) Implementation has taken place under various institutional changes that slowed the work and confused the officers in charge. In addition, the supportive administrative structure is rather heavy and does not allow the requested flexibility for carrying out interactive structure village based development models.

(4) Revenue regenerated by JFM activities has mainly been invested in useful infrastructure micro-projects. However, the idea that such money could support directly extension activities (for example purchase of fertilizer, better agricultural crop varieties, fruit trees, rural credit fund) has not gained ground.

(5) The management concept seems to be appropriate, although final assessment has not been made. The reasons being that:
a.) The production forest would be more effectively protected by the surrounding villagers as they have strong incentives to do it. This will maintain and develop the production forest, generate good profit for both the government and the local people.

b.) The villagers carry out timber harvesting activities in the dry season at a small scale with appropriate technology which have low negative impact on the forest and the soil. The future timber yield of the forest would also increase as a result of the enrichment planting carried out by the villagers.

c.) The living standards of villagers would be gradually better as they get paid work during the dry season, better village infrastructure is developed, and agriculture yields would be improved through proper land use and extension support.

d.) The villagers built up their own village development fund that is used for the improvement of socio-economic conditions and of natural resources in the village. Such a management concept helps to start a rural development process that is almost independent of external financial resources.

However, there is a needs which has to be considered. This includes:

1.) Presently, only three villages get benefited from the management of Dong Kapho SPF. The forest has to be well protected in order to achieve long term sustainability. Certain actions have to be taken to involve the remaining villages, as protection fee that could be used for community development, in the management and protection of this SPF. One of the possibilities would be to consider the distribution of revenue from the logging of this SPF to the remaining villages as protection fee. In this way, all the villages around will get some revenue every year, even though logging does not take place in the area within their village boundary. In addition to this, land use planning and land allocation or village planning should be carried out in order that more effective protection of these forest could be achieved.

2.) There is needs to improve and strengthen the capacity of DAFO (who will be the main executing body under the decentralization policy) in aspects concerning community development, project management, and technical issues related to agriculture and forestry. Special attention should be focused on Phalanxay District. Support from the Centre (DOF) is necessary.

3.) There is needs to improve and strengthen village institutions to implement the program as well as to undertake different agreements. Extension services support should be thoroughly planned.

4.) There is needs strengthen the technical capability of PAFO to implement the SPF Forest Management Plan to meet the sustainability objective.

5.) As rural credit, formal and informal, is on the agenda of the extension component of the Lao-Swedish Forestry Programme (LSFP), it would be useful to explore possibilities and feasibility of using revenue generated by the forest management activities as potential fund for rural credit in the concerned villages.

6.) So far, the documentation is mainly done by the advisor who is also having several other advisory tasks to perform. There is needs to appoint a researcher specially responsible the JFM trials to ensure proper documentation on all details of activities and observations during the course of actions.
7.) Presently, NAWACOP, FOMACOP and FORCAP are also working on the development of village forest management planning model. The coordination is so far very weak. Experience sharing among these programs is necessary, so as to avoid unnecessary duplication of certain efforts. This is particularly for the LSFP and FOMACOP which have the activities taking place in the same province (Savannakhet).

Anex 1: Revenue generated through Joint Forest Management

Table 1: Revenue from forestry operations under JFM model 1 (Ban Nathong) in kips.

<table>
<thead>
<tr>
<th>Year</th>
<th>Volume logged (cu.m)</th>
<th>Royalties (kip)</th>
<th>Total revenue for village (kip)</th>
<th>Amount disbursed to families (kip)</th>
<th>Expenditures in forestry operation (kip)</th>
<th>Expenditures in administration (kip)</th>
<th>Amount available for development (kip)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994/95</td>
<td>589,027</td>
<td>26,694.757</td>
<td>36,684.757</td>
<td>1,992,470</td>
<td>7,058,324</td>
<td>2,700,000</td>
<td>24,599,005</td>
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<tr>
<td>1995/96</td>
<td>384,810</td>
<td>23,300,390</td>
<td>4,938,022</td>
<td>2,725,423</td>
<td>13,631,974</td>
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<td></td>
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</tbody>
</table>


Table 2: Revenue from forestry operations under JFM model 2 in kips.

<table>
<thead>
<tr>
<th>Village</th>
<th>Year</th>
<th>Volume logged (cu.m)</th>
<th>Royalties (kip)</th>
<th>Village revenue (kip)</th>
<th>Amount disbursed to families (kip)</th>
<th>Expenditures in forestry operation (kip)</th>
<th>Expenditures in administration (kip)</th>
<th>Amount available for development (kip)</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nienglekhok</td>
<td>1994</td>
<td>824,160</td>
<td>54,260,040</td>
<td>800,000</td>
<td></td>
<td></td>
<td></td>
<td>800,000</td>
<td>The work was conducted by PAFO</td>
</tr>
<tr>
<td></td>
<td>1995</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1995</td>
<td>456,122</td>
<td>52,352,600</td>
<td>11,185,928</td>
<td>1,116,985</td>
<td>1,116,985</td>
<td>652,644</td>
<td>240,445</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1996</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Khmnoy</td>
<td>1994</td>
<td>520,228</td>
<td>39,547,834</td>
<td>670,000</td>
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<td>Conducted by PAFO</td>
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<td>1995</td>
<td>612,692</td>
<td>50,515,670</td>
<td>14,704,608</td>
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<td>1,225,384</td>
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1.2- The second project namely the *Forest Management and Conservation Project*-FOMACOP with WB/FINNIDA/GET support is on the development process for a sustainable management of forest in the community based.

The project has the target area of 170,000 ha, located in 2 provinces: Khammouane and Savannakhet. The project started its activities in 64 villages with total population estimated for some 19,000 people. At the end of 1999, the village forest activities will cover up to 200,000 ha of 95 villages or involve some 30,000 villagers.

During the planning period, necessary works related to land use management and land and forest allocation for village have been implemented in the participatory way. Such works include: demarcation of village boundary, land use map of the village; future land use plan, management and allocation of land and forest and making management contract with village forestry organization; survey, mapping and certifying the right to use different land categories paddy field, farm land, settlement, etc. to individuals; survey, mapping and certifying the right to use necessary lands to community.

Notable achievements have been observed, including:
- produced 11 sets of training manuals in Lao and English
- provided 3,200 man-day training to provincial and district foresters
- provided 3,500 man-day training to villagers
- established 61 forestry groups comprising of 320 members; 15 of these groups become village forestry organizations.
- completed the demarcation of village boundaries which are certified by provincial and district authorities for 61 villages
- land use map for a total area of 145,000 ha and forest inventory of 80,000 ha were made by villagers,
- villagers completed 72 sheets of land use map covering the area of 61 villages and 7 sets of land use plan for the area of 15 villages,
- presently, villagers in 15 villages are making forest management plan for 7 management areas which are included in the area of 15 villages.

According to the outputs of the recent workshop, useful experiences on community based management of natural resources are drawn as below:
- The participatory land and forest management and use is easily understood and accepted by villagers. The outputs such as: land use map, village development plans, will be more actively implemented by planners (villagers) based on the needed data.
- Through the experience, the implementation of project activities by well trained villagers is much more effective than the government staff because they know better the reality of the locality. This approach can save many resources: time, labour and funds.
- To develop appropriate forest management systems at village level, training of local trainers is crucial. Foreign experts can train a very limited number of local staff due to many restrictions: language, period of assignment, socio-economic backgrounds, etc. (4)- To enhance villager participation, social readiness has to be prepared. Project staff need to confer with people about the importance of forest management and the necessity of forest management planning by themselves.
- To implement the village forest management plan, a specific organization needs to be set up. An existing organization appointed by village leader seems not to be suitable for this specific work. Therefore, villagers should decide about the size and the function of this new organization, then request for approval from authority concerned.
- Forestry activities are very spread out widely in localities which are different by natural, socio-economic and cultural conditions. The forestry administration should be
organized accordingly. In addition of institution strengthening, related policy and legal framework need to be improved.

1.3- A German technical cooperation project namely: The Nam Ngum Watershed Conservation (NAWACOP) assisted by GTZ has been operating in two District of Xiengkhouang Province (source of Nam Ngum river) since 1995. This project also applied the participatory approach for its project cycle management during its Phase I (1995-1997). The project objectives are:

- To create a basis for sustainable management of natural resource in selected villages, with active participation by the target groups.
- To develop and promote adequate gender-specific income options in selected villages.
- To improve the ability of district and province level institutions to implement a participative sustainable form of resource management.
- To inform the target groups about methods of family planning and the services offered by the government.
- To improve the capability of national institutions in developing a strategy for the management of watershed and implementation of the land allocation program.

During two years of the first phase, the above objectives have been mostly achieved. The outputs of the first phase become a solid base for future development. These are the followings:

- Staff training in participatory approaches and selected technical issues,
- Selection of 16 pilot villages within the project,
- Undertaking an intensive, gender specific situation analysis in the pilot villages applying PRA (Participatory Rural Appraisal) methods,
- Assessment of the current land condition and use using aerial photos (1:5000) and negotiation for changes to a more sustainable patterns of use. The finished plans, including village regulations submitted and approved by District authority.
- Studies and trials with farmer into sustainability of different upland agricultural systems, and a marketing analysis of different products,
- Establishment of village based revolving micro-loan fund to enhance income generation, based on the above studies,
- Information, training and exchange opportunities provided to target groups and government officials,
- At the national level, DOF capacity strengthening to provide planning and data acquisition/processing for watershed management.

Followings are main lessons drawn from the first phase implementation:

- PRA is a good method for understanding the situation of communities and information collection, but has to be complemented by in-depth technical analysis.
- The village is the suitable unit for planning and management of natural resources and community development activities;
- A bottom-up is effective and leads to increased responsibility for natural resource management although the working process is relatively time and resource consuming.
- The role of the government authorities in conflict resolution and moderation is very important. Support of district and province authorities is crucial for the success of the project.
- Established village land used plans and regulations need to be followed up and constantly refined/monitored;
- Taxe incentives and benefit sharing systems are crucial instruments to increase sustainable resource management, but the legal basis is under review and not yet clearly defined and formalized;
- Village regulations developed in a participatory way by the village in collaboration with the authorities should be endorsed, supported and monitored by government institutions;
- Improved resource management and conservation is interrelated with income generation and community development which needs financial support preferably in the form of rural micro-finance. This system needs to be developed.

1.4 The Forest Conservation and Afforestation Project (FORCAP) is a Japanese Technical Cooperation project supported by the Government of Japan through JICA. The project focussed its target area in the Nam Ngum Dam Watershed area of Vangvieng District (the lower part of Nam Ngum watershed). The target areas are almost occupied by grassland or degraded forest due to short rotation of slash and burn cultivation practised by local people. FORCAP started its planning phase of 2 years period since July 1996 with the purpose to prepare a concrete action plan for forest conservation and afforestation which will be implemented by local people and local governments at model villages in the Nam Ngum Dam Watershed.

The planning phase is now close to the end. During the planning process, participatory approaches are applied based on the Project Cycle Management (PCM) training organized for Experts, counterparts and also for villagers. Taking in account the lessons learnt from other projects, FORCAP has also included two components necessary for the sustainable management at village level. These are: Forest management plan and Village development action plan. In addition to these two components, another technical issues has also same level of importance: the establishment of a demonstration forest for the development of appropriate forestry technology. Strengthening the capacity of district institutions has been taken in account for future development. Fortunately, FORCAP has another helpful support in elaborating the village development action plan and forest management plan at village level from the JICA Development Study project namely: Study on Watershed Management Plan for Forest Conservation in Vangvieng District. The results of the PRA exercise conducted in 29 villages in Somboun and Namon Areas provided additional data/informations necessary for the formulation of a comprehensive action plan.

Some field activities have been carried out aiming at enhancing local participation such as : establishment of a demonstration forest, basic training on fruit tree propagation techniques, drawing contest, school nursery and plantation, water supply in connection with forest protection and enrichment planting, demonstration of charcoal and hand made paper production, etc. All the above activities have been carried out in collaboration of DAFO and concerned sub-sectors. A system of cross-sector coordination is now under trials at Vangvieng district and a benefit sharing system for tree plantation will be experimented in near future.
According to the report of the Evaluation Team, the results of the project implementation are considered as very satisfactory and promoting. It is expected that the action plan formulated in the first phase will be successfully implemented in the following phase.

2.) Community Forestry Project

In Lao PDR, as in other countries, there is growing recognition that forest management and conservation strategies that do not seriously involve local people are very likely to fail. In the Lao PDR context, the relationship between local people and forest is of particular importance because the majority of the Lao population practices subsistence-level livelihoods and is directly dependent on forest, land and water resources for support. For this reason, the Lao government is increasingly involving local people in forest resource management. In addition, the Government of Lao PDR has provided a legal framework with the passage of several decrees and the new Forestry Law to safeguard communities' rights to use and manage traditional forest lands.

Since 1993, the Community Forestry Project (CFP) in the Department of Forestry (DOF) spearheads efforts to develop community forestry in Lao PDR. This is accomplished by training and supporting forestry workers at the provincial, district and local levels on the methods of demarcating different types of community forest lands and developing forest use and management plans at the community level. The process has been demonstrated in training through the establishment of model villages in which officials are trained in various technologies which will assist them in these processes.

The main objectives of the CFP are as follows:
1. to support government officials in each province, district and village with forest conservation and management;
2. to extend government resolutions, decrees and regulations on forest work to local level;
3. to explain valuation of forest and the effect of deforestation to local people;
4. to establish community forestry pilot villages in each province and compile and analyse community forestry information;
5. to train community forestry volunteers at the province, district and village levels.

The work of the CFP is supported currently by two projects:
the Community Forest Support Unit (CFSU), supported by CUSO (Canadian NGO), and the Community Forest Development Project (CFDP), supported by JVC (Japanese NGO).

The CFSU is located in the central office of DOF in Vientiane. The main objectives of the unit is to support community participation in the preservation and management of forest lands throughout the country. This is accomplished by providing information and training to provincial and district forestry officials which can assist them in establishing community forestry villages as part of the land allocation process.

The CFDP is located in Khammouan province. The main objective of this project is to promote an understanding of the importance of community forests and to provide training to government officials and community forestry volunteers so as to facilitate natural resource management at community level.

The achievements of the CFP since its beginnings in 1993 are laudable:
1. The CFI is recognized by all levels of governments as being an important means by which to educate all levels of government about community forestry issues vis-a-vis land allocation and forest management.

2. The CFI has developed a community forestry professional expertise that is capable of training and educating all levels of government on these issues.

3. Both projects have established community forestry villages that may serve as models for community-based forest land allocation schemes.

4. Data and experiences gathered from these model community forestry villages has been used to feed back into policy-making mechanism.

The CFP is a relatively new project and still faces many challenges. The scope of work covers the entire country and every province. Therefore, problems and restrictions to be overcome are still diverse e.g. limitation in number and capacity of existing staff, restriction of resources available for the follow up of work in province and district, lack of necessary time and resource for training and establishment of community forestry villages to more remote areas.

The weaknesses of the CFP need to be addressed in order to ensure the success of this project. Support for the project at the provincial and district level is best met by efforts to increase both human and capital resources and by strengthening the existing capacity of current staff. At the central level, the weaknesses of the CFP could be addressed through capacity building of the existing government staff. In addition, the work of the CFSU would be facilitated with capital resources, such as vehicles.

III CONCLUSION

The Government of Lao PDR (GOL) is trying to reverse the negative trends caused by the deforestation and degradation of natural resources and to bring the remaining natural forests under sustainable forest management. There appears to be a change in emphasis of the government policy from large scale state production forestry towards people-oriented forestry. The state has increasingly recognized that it does not have adequate resources to manage and protect all forests on its own, and that new participatory management approaches need to be promoted and developed.

For this purpose, several projects have been piloting participatory approaches to natural forest management, as well as other related natural resources such as land and water. Out of these projects, two projects have concentrated on systematic model development and field implementation for the sustainable management of natural forests. The Lao-Swedish Forestry Programme (LSFP) is piloting a Joint Forest Management (JFM) model, and the Forest Management and Conservation Programme (FOMACOP) has been developing and implementing a village forestry model. The testing (field implementation) of these models has been going on now for more than three years. These forest management models have been designed and implemented in isolation from each other. Even the evaluation of management models has been conducted separately, mainly by the funding agencies using their own criteria.

Although the final evaluation/conclusion from the experiences of the two above mentioned programmes is not formulated yet, following suggestions/recommendations would be useful for further consideration:
1. The management and use of forest resources by villagers (Village Forestry) is strongly supported by the GOL. Therefore, it is urgent needs to formulate Village Forestry strategy and related guidelines in order to facilitate the implementation at the field level. In elaborating strategy, experiences from pilot models should be taken in account.

2. In the context of Lao PDR where more than 80% of population live in rural areas with high dependence on natural resources (mainly land and forest), the community based management of forest and forest land is the most appropriate way to the sustainability. However, detailed advices and instructions will be very helpful for the local people and local government staff in the implementation at the field level.

3. Due to the participatory characteristic of the community based forest management, people has to be involved in the whole process, from planning to implementation and evaluation. Demonstration models are very effective for participation enhancement and full participation could be possible only if people understand clearly their responsibilities and benefits.

4. Working with local people, the government staff should have necessary skills; they need to be sufficiently prepared/trained on related technical and social issues. By experience, most of projects start the planning process (bottom-up planning) by holding trainings and workshops for local people using participatory methods such as: PCM, ZOPP, PRA or RRA, . . . where villagers identify and analyze their problems, express their needs to solve problems, propose possible solutions, formulate draft plans, etc. In this connection, the project staff or government staff should play the role of facilitator or moderator during the discussion. They will later analyze in dept the informations collected from the workshop with technical considerations.

It is also of high importance to establish model for sustainable management of degraded forest land at village level based on land use plan of the district and province. Presently, the total area to be reforested in the whole country is estimated more than 2 million hectares, including mostly mountainous and important watershed areas. For this issues, FORCAP is now trying to establish pilot model in Nam Ngum Dam Watershed Area.

Vientiane, March 1, 1998

References

TFAP 1990
Donor Meeting 1997
Village Forestry Workshop 1998
CASE STUDY

- MANITOBA, CANADA
MODEL FOREST -

by J. Mike Waldram
General Manager
Manitoba Model Forest
INTRODUCTION

The Manitoba Model Forest was established in 1992 as one of ten Model Forest sites (now eleven) set up across Canada as an initiative of the Government of Canada in accordance with the National Forest Strategy. The intent of this national program was to set up "working models" of sustainable forest management across the country to meet the following three objectives:

- Accelerating the implementation of sustainable development and integrated resource management in forestry;
- Applying new approaches, techniques and concepts in forest management; and
- Testing and demonstrating best forestry practices using the most advanced technology and practices available.

The opportunity to become a Model Forest site was announced by the Government of Canada. Land owners, local and provincial governments and non-governmental organizations were invited to submit proposals outlining specific goals and objectives and a plan of action they would undertake if chosen and given the designation of Model Forest. Along with the designation of Model Forest the Government of Canada would provide approximately one million dollars (Cdn) per year for five years as a contribution to the efforts and programs outlined in the proposal. Ten proposals were accepted by the Government of Canada with the submission of the proposed Manitoba Model Forest being one of them.

In some ways the Manitoba Model Forest proposal was inspired by controversy. At the time the Model Forest Program was announced a forest product company (now Pine Falls Paper Co.) was involved in the public defence of its forest management plan and environmental impact statement. Environmental NGO's and the Paper Co. were at odds over the potential impact and effects of planned logging and silvicultural operations. The Model Forest program provided an opportunity for the Paper Company, Environmental NGO's and others to work together to find answers to the potential impacts of forest operations and to improve practices in a way that would assure the sustainability of the forest and its many values. Over 30 organizations (government agencies, the Pine Falls Paper Co., environmental organizations, universities, private companies, First Nations, special interest and user groups and private citizens) participated in the development of the Manitoba Model Forest proposal.
LOCATION, SIZE and ATTRIBUTES

The Manitoba Model Forest is located in central Canada in the province of Manitoba, approximately 100 kilometres north and east of the city of Winnipeg, the provincial capital. It consists of an area of over 1 million hectares. Land ownership, settlement and use within the area is diverse. The area is made up of provincially owned Crown land licenced to Pine Falls Paper Co. to sustain its paper mill in Pine Falls, the reserve lands of four First Nations, three Provincial Forests, two provincial multiple use parks, one provincial wilderness park, numerous municipalities and townsites and privately owned agriculture land and woodlots.

The Manitoba Model Forest site embraces a diversity of forest ecosystems, environmental features and forest resource-based uses and values. It is located in the Boreal Forest Region and includes hundreds of lakes, rivers and streams. The area represents a complex multiple resource use area, on one hand serving as a major source of fibre to the Pine Falls Paper Co., other small timber users, mining and hydro development while also being used by Aboriginal people, cottagers, recreationists, tourists, hunters, trappers and fishermen.

The major tree species of the Model Forest area include Black Spruce (Picea mariana), White Spruce (Picea glauca), Jack Pine (Pinus banksiana), Balsam Fir (Abies balsamea), Tamarack (Larix laricina), Trembling Aspen (Populus tremuloides) and White Birch (Betula papyrifera var. Papyrifera). The current growing stock inventory is 25 million cubic metres of softwood and 10 million cubic metres of hardwood.

An average of 250,000 cubic metres of softwood and 70,000 cubic meters of hardwood is harvested annually. The major agent of change in the forest, however, is man and lightening-caused forest fire. Almost half of the Model Forest area has burned in the last 60 years.

PROGRAM MANAGEMENT

The Manitoba Model Forest is largely a volunteer-based organization with only two permanent staff employees. The strategic activities are controlled by a 22 member Board of Directors. These directors are appointed to the Board by their respective organizations. The organizations represented include: the Pine Falls Paper Co., the provincial and federal government, local municipalities, environmental NGO’s, fish and game organizations, universities, economic development groups and the provincial Metis organization. Negotiations are currently underway to include First Nation representation as well.

Detailed program and project development is accomplished through working volunteer Advisory Committees. The Manitoba Model Forest operates its Advisory Committees on an “open door” policy. In short, anybody who wishes to participate in the Advisory Committees is welcome. The Committees are structured around major Theme areas of the overall program. The Theme areas are Science and Technology, Education and Awareness, Social Issues, and Economic Diversification. While the makeup of the Advisory Committees is fluid with participants changing constantly under
this "open door" policy there is a core group of approximately 50 people who have been with the program since its inception. Day to day coordination, program management, administration and communications is managed by a full time General Manager and office assistant.

MAIN ACTIVITIES

As indicated the program is designed around four major theme areas each with its own major Goal. Since its inception in 1992 the Manitoba Model Forest has conducted or been involved as a partner in over 150 distinct projects across the four theme areas as well as numerous other initiatives. To better appreciate the Model Forest Program and in particular the program and activities of the Manitoba Model Forest it is important to realize that the Model Forest is an association or partnership of organizations and individuals that have agreed on a set of common goals and principles with the ultimate objective of attaining Sustainable Forest Management on a particular area of land. Sharing our knowledge, experiences and results with others, including our sister Model Forests in Canada and abroad and increasing our partnership base is central to all our activities. Some of the main activities undertaken since 1992 are as follows;

Science and Technology

Goal: To have forest management decisions developed and made within an ecosystem based management framework that focuses on the forest system and its processes rather than forest resources while utilizing sound science, traditional ecological knowledge and adaptive management techniques.

Between 1992 and 1997 much of the activities in the Science and Technology Theme area centered on obtaining baseline information about our forest. Inventories were conducted on birds and mammals and their specific habitat requirements. With this information, Habitat Suitability Index (HSI) Models were developed utilizing Geographic Information System (GIS) technology. These models will now be used in forest management planning to help ensure that essential habitat needs of locally important species such as moose or indicator species such as Woodland Caribou are maintained or enhanced.

The regeneration of Black Spruce after harvesting on lowland sites was a particular problem in the Model Forest area. In the first five years of the program much research and trials were conducted to address this concern. Different logging, site preparation and vegetation control techniques were tested. While the results of these trials are only preliminary at this point a number of promising techniques to help overcome the problem are emerging.

Perhaps the greatest accomplishment in the Science and Technology theme was the research and work done on Woodland Caribou. In the Model Forest area are a number of small herds of Woodland Caribou. It was generally accepted that logging and road construction were incompatible with Caribou and that operations by the forest company would result in the extirpation of the herds. For years planned logging operations in the suspected range of the Caribou were put on hold as the debate continued. Under the Model Forest banner a project partnership was formed between Pine
the movements of the Caribou and recommend acceptable logging practices. Experimental Global Positioning System (GPS) collars were acquired and placed on a number of Caribou. This allowed us to pinpoint the exact locations and movements of the animals. It was found that the Caribou were using previously logged cutovers to meet their habitat needs. The old cutovers were then studied to determine what attributes existed that were favouring their use. With this information the project Steering Committee with members from all partner organizations were able to design a logging chance that was accepted by the Provincial Government.

Now and for the immediate future the Science and Technology group are concentrating their efforts on the establishment of indicators. Using the framework of Canada's Criteria and Indicators of Sustainable Forest Management, local level indicators will be identified, measured and monitored over time. The Criteria and Indicators will form the basis of a new forest management plan due in the year 2000 prepared by the Paper company.

Social Issues

Goal: To have spiritual, social, cultural and economic values of all stakeholders effectively considered in forest management planning and decision making.

While some work was done in this Theme area during our first five years such as cross-cultural workshops, valuation of recreation and the identification of stakeholder legitimacy and values it became more and more apparent that we needed to concentrate more effort in this area. Clearly determining what people value in and of our forests and ensuring that forest management practices are conducted in a way that leaves those values at a sustainable level is now our major thrust. We know that work needs to be done on understanding each others values and having respect for them. Heritage resources such as archaeological sites need to be protected from adverse effects of forest operations such as logging, road and bridge construction and site preparation. We are building a computer based archaeological site predictive model to help us locate these areas and protect them. We are going to predict the likelihood of human occupation and use in our area as much as 5,000 years ago.

A major component of the Social Issues theme is acquiring greater participation in the program and projects by Aboriginal people. Efforts are being spent on community presentations and workshops. Involving Aboriginal people in project design and implementation is seen as a way of building trust and opening the doors for more collaborative efforts.

Education and Awareness

Goal: To have an educated, informed and involved public, particularly youth, about sustainable forest management, the value of forests and the results and activities of the Model Forest program in Manitoba and across the Network of Model Forests.

There is really two major components in this theme area. One is youth education and the other is public awareness about the program. We have and continue to support programs aimed at
educating young people. We sponsor local tree planting programs, outdoor education programs, merit and scholarship awards, and teacher training.

Our public awareness program is built around a Canadian Model Forest Network communication strategy. We publish newsletters, annual reports and the results of our projects and programs. We are just now revising our Web Site to include details about our programs and the people involved. We operate a radio message station welcoming people to the Model Forest area and providing them with information such as the fire hazard rating. We have established a number of interpretive trails in the area that are enjoyed by locals and tourists alike. Bye and far the most effective method of raising awareness is through personal presentations and tours. Our annual open house has attracted as many as 600 people and students. In the future we intend to mobilize our open house features in an effort to bring it into every community in the Model Forest area.

Economic Diversification

Goal: To have new sustainable forest economic opportunities and employment within the Model forest area.

Our major project in this theme area was the identification of marketable alternative forest products. We identified what kind of products could be sustainably gathered from the forest, where the markets and agents for the products are and where in the forest the different products could be found. Our next step will be the publishing of this information and its promotion through public workshops.

In the immediate future we will be joining a partnership of over 100 local businesses and agencies in the promotion of our area as a tourist destination. An overall tourism marketing theme has been developed and a strategy put in place to increase tourist traffic and employment.

LESSONS LEARNED

The Manitoba Model Forest has been in operation for over five years now and we have learned alot from our experience. There are things we would do differently if given the chance to do it all over again. First and foremost is to take the time and effort to ensure as many people and organizations as possible understand what the program is all about. Some people believed, and many still do, that we were a government sponsored “Green Shield” for the forest industry while others saw us as an environmental group out to shut down the forest industry. Some groups, such as the First Nations, saw us as a new land use regulator with powers over resource allocations and use and therefore a threat to their treaty rights.

By bringing together so many organizations and people our Model Forest sought to satisfy as many agendas as possible. Our “Open door” policy encouraged new and additional ideas. In many ways we were spread too thin and had difficulty managing all the initiatives we had going on at any one time. Volunteer burn-out began to happen and we lost a number of people who were with us in the formative stages. More time should have been taken to match adequate resources to realistic goals.
Finding ways to ensure effective communication within the organization has been and continues to be a challenge. With such a diversity of people involved in the program there is also a diversity in the level of information they desire and how they prefer to receive it. While the use of electronic mail systems has helped immensely to communicate with some of our partners and volunteers there is still a large number of people who must be reached by phone, mail or personal visitation. As a result, some people are more informed and up to date than others and this creates confusion and mistrust. Building effective and timely communications within the organization is essential.

CONCLUSION

While there are still many challenges ahead for us we are proud of our accomplishments and grateful to the Government of Canada for having the vision to create the program and to continue to support it. We measure our success not only through project achievements but through the continued dedication, effort and spirit of the people who are so much a part of it.

J. Mike Waldram RPF
General Manager
Manitoba Model Forest
March 3, 1998
MANITOBA MODEL FOREST
DATA SHEET

Location: Province of Manitoba, Canada

Forest Type: Boreal

Size: 1,047,070 hectares

Area Status and Ownership: Federal and Municipal..........................7,529 ha
Indian Reserve..........................................11,086 ha
Private....................................................96,649 ha
Crown....................................................870,330 ha
Water......................................................61,476 ha

Managing Partners: Pine Falls Paper Co., Province of Manitoba, Manitoba Naturalists Society, Time To Respect Earth's Ecosystems, University of Manitoba, University of Winnipeg, Manitoba Metis Association, North East Sustainable Development Association, LGD of Victoria Beach, LGD of Alexander, Town of Bissett, Town of Pinawa, Town of Lac du Bonnet, PFPC Unions, Winnipeg River Community Futures, Pinawa Fish and Game Club, Woodlot Association of Manitoba, Canadian Forest Service

Established: July 1992

Renewed: September 1997

Goals: 1) To have participation by Aboriginal people occurring on a regular basis in forest management planning and decision making.

2) To have forest management decisions developed and made within an ecosystem-based management framework.

3) To have spiritual, social, cultural and economic values of all stakeholders effectively considered in forest management planning and decision making.

4) To have new sustainable forest economic opportunities and employment.

5) To have an educated, informed and involved public, particularly youth, about sustainable forest management, the value of forests and the results and activities of the Model Forest program in Manitoba and across the Network of Model Forests.
COUNTRY REPORT

- MEXICO -

by Secretary of Environment
Natural Resources and Fisheries
MODEL FOREST PROGRAM IN MEXICO.

Model Forests in México are a compound of three different locations comprising 1,200 thousand hectare approximately and a direct /potential partnership of 930 thousand people, composed of "ejidatarios", farmers, pivates and public officials.

The main goals are:

1. To promote Sustainable natural Resources Management (SNRM), based on community participation in the decision making process.

2. To improve the utilization of the resource base and attributes, present in each and every location, based on a prioritizing process developed at the community level.

The specific objectives vary among locations, although there are a group of similar ones. They are:

1. Community organization through continuing education and training.
2. Specific projects resulting from community demands.
3. Projects and activities based on a strategic vision developed through workshops, training sessions and meetings with participants from the communities involved.
4. New specific projects aim at bringing up new public and private institutions, in addition to the originally involved.
5. Diffusion of the acquired experiences and results

Two MF's sites were established in 1993 and the last one in 1996, although the rate of development is different due to specific constraints present in each location.
Eighty percent of the forested lands in Mexico belong to local communities and ejidos, thus the MF approach has played a critical role in promoting community participation in managing forest areas.

Mexico now believes that establishing a national network would not only strengthen and expand the MF program in the country, but would also open ways to implement sustainable practices throughout.

Chihuahua Model Forest (CHMF)

This initiative created back in 1993 has the rationale to develop an Integrated Natural Resource Management at the ecosystem level including productive activities, planning and conservation actions and strengthen community organization.

CHMF is framed within the Mexico Forestry and Soils Program 1995-2000 which has the following objectives:

1. To secure forestry resources conservation as a basic component for an ecosystem balance.
2. To increase forestry sector participation in Mexico economic development thru strengthening sustainable utilization of forestry resources, promoting private and public investment, employment generation and internal savings.
3. To promote society recognition of the forestry environmental services looking for its contribution on the maintenance costs.
4. To improve quality of life amongst rural population that inhabits in the forestry regions of the country.
5. To offset soil deterioration and degradation by promoting financial strategies and a legal framework to cope with this severe problem in Mexico.
6. To restore gradually and develop the culture for a sustainable use of biodiversity, soil and water resources.
Derived from the Planning Workshops with a wide participation of interested institutions and the community, a mission was defined for the CHMF as follows.

"An NGO that coordinates partnership activities to develop techniques and practical solutions needed to have responsible management and environmental sustainability through community participation"

The general objective thus are:

. To promote sustainable management of natural resources originated through a decision making process carried out by the communities.
. To get better perspectives of the forests through forest planning and prioritizing at the community level.
. To preserve the biodiversity of the region.
. To promote different productive opportunities for timber forest utilization.
. To promote the population comprehension on environmental values and, as a consequence, its responsible participation in the sustainable forest management.
. To promote better technologies to study, manage and utilize natural resources.
. To promote a self-financing NGO.

CHMF is located in the Northern portion of the western Sierra Madre range and includes more than 47,148 ha. of productive forest lands at the commercial level. Some areas are dedicated to agriculture, fishing and hunting activities.

During the 1993-1997 period, 10 projects were developed and coordinated with different institutions and associations that has participated actively.

The main purpose has been to get a better sustainable management of forestry resources. The strategic lines were focused to promote alternate economic activities, promoting the comprehension of the environmental values and to introduce better technologies to study and manage natural resources.
The main projects developed thru the above mentioned period and the transitional working plan are:

- Ecological Classification.
- Sustainable management forest programs
- Riparian areas management and biodiversity protection.
- Communication, extension and dissemination of the projects.
- Ecotourism.
- Promotion of alternative economic activities.
- Development of indicators and evaluation exercises.

The development of CHMF was directed to establish research studies on the region that allow to develop an strategic vision to attain sustainability of the Sierra Tarahumara. Projects, like ecological and forest planning in the area, allow a close relationship and coordination with academic and scientific institutions in the region.

Projects also established were on biodiversity protection which gave rise to community participation into brigades to fight forest fires.

Environmental education has been an important activity to enhance community participation within and outside the region. It has also helped to develop ecotourism projects and other economic activities as traditional handicraft.

Social problem is another important constraint in the objective to get optimal results. This is specifically due to the lack of trust and rejection of whatever is proposed by people coming from outside the region. To attain confidence and acceptance is a difficult task that requires intensive community work and diversified means to become associated with local people.

Although linkages have been created and strengthened by the many workshops, tours and training sessions, a more wide scope and intense activities should be
developed in the coming future, particularly on riparian areas management, biodiversity utilization, communication and extension, and international cooperation.

**Calakmul Model Forest (CMF)**

Productive activities are central in this tropical site, such as beekeeper training, establishing or reconstructing agroforestry systems, training for intensive pasture management to reduce clearing for cattle grazing, and establishing nurseries to provide stock for community reforestation. CMF is also framed into the National Forestry and Soils Program 1995-2000 set up by the Mexican government.

With the fundamental premise of “strengthen the social participation to achieve a regional model of sustainable development in the tropics” CMF set the following general objectives:

1. To contribute to the regional sustainable development.

2. To promote alternatives of sustainable utilization of the natural resources to be both economically viable and socially acceptable.

3. To strengthen social participation in management actions, administration of productive infrastructure and operation of short, medium and long term projects.

4. To improve regional and international image, contributing to the conservation of biodiversity and cultural values in the region.

CMF created in 1993 is located in the Yucatan peninsula and at the community level, the area’s 16,000 subsistence farmers, mostly ejidatarios, have organized themselves from two different directive groups into a single organization. Important achievements have been made with the new set up, particularly on the awareness to develop sustainable forest and natural resources management, better ways for
land use and women inclusion in the community work through 12 projects now in progress.

**Monarch Butterfly Model Forest (MBMF)**

Just recently, in 1996 the MBMF was established on the border line of the States of Michoacan and Mexico, over an area of 795 thousand ha. with mostly temperate forest.

MBMF is also framed into the National Forestry and Soils Program 1995-2000.

The general objectives are similar to the other MF’s in the country but the importance of fruit trees and the Monarch butterfly in the region make activities to lean toward ecotourism, non-wood products, and other productive alternatives, such as horticulture, flower production, forest industries and local handicrafts. All this field work is now developed trough 14 projects now in process.

Achievements in organization based on the experiences in CHMF and CMF have been significant and thus the future of the MF’s in Mexico and the possible ones to be incorporated into the Mexican Model Forest Network (MMFN) is optimistic.

The SEMARNAP is committed to reach an optimal development of the MF Program in Mexico and its linkages with the international endeavors.
COUNTRY REPORT

- MYANMAR -

by U Kyi Maung
Director
Forest Department
Ministry of Forestry
FIELD-LEVEL APPLICATION OF SUSTAINABLE FOREST MANAGEMENT IN MYANMAR.

by

U KYI MAUNG
DIRECTOR, FOREST DEPARTMENT
MINISTRY OF FORESTRY

TOKYO, 10-12 March 1998
FIELD-LEVEL APPLICATION OF SUSTAINABLE FOREST MANAGEMENT IN MYANMAR.

U KYI MAUNG, DIRECTOR
FOREST DEPARTMENT, MYANMAR

DATA SHEET FOR INTENDED MODEL FOREST

1. Project Period - 3-years
2. Executing Agency - Forest Department
3. Location - In the midst of natural teak bearing forest in Oktwin Township, about 15km from Oktwin and about 280 km to the north of Yangon.
4. Size - 118150 ha
5. Landform - Model Forest is constituted in Bago Yoma range with an elevation not exceeding 650 meters above mean sea level.
6. Rainfall - Average annual rainfall ranges between 1500 mm and 2000 mm.
7. Forest Types - Teak bearing mixed deciduous forests.
8. Forests Status - Reserve forests 85,600 ha (73%), Unclass forests 32,550 ha (27%)
9. Management Category of Forests - Production Forests 48,500 ha (41%), Protected Forests 46,300 ha (39%), Community Forests 23,350 ha (20%)
10. Species Composition - Teak 9.7%, Other associate species 90.3%
11. Wildlife - Elephant, Bison, Sambur, Tiger, Panther, Deer, etc.
12. Population around the Model Forest - About 309000
13. Access Road - Bago Yoma Crossing Road across the Model Forest.
14. Project Goal - To manage, conserve and develop all productive forests of the entire country by applying core sets of tested C&Is for SFM.
15. Project Objectives - To implement the priority elements of SFM for the specially designated model forest.
- To develop a core set of tested C&Is for SFM.
16. Main Activities - Socio-economic survey: production of landuse land capability maps and GIS database: management level forest inventory: identification and application of C&Is for SFM: identification of priority elements of SFM: establishment of the Managed Resource Protected Area (MRPA) in the Model Forest; adoption of reduced-impact logging plans; introduction of agroforestry approach: and review on the model forest management towards SFM.
FIELD-LEVEL APPLICATION OF SUSTAINABLE FOREST MANAGEMENT IN MYANMAR.

U KYI MAUNG, DIRECTOR
FOREST DEPARTMENT, MYANMAR

1. INTRODUCTION

The Union of Myanmar has an area of 676,577 km\(^2\) out of which 43% is under closed forests and another 30% under woodlands. There exists wide variety of environmental conditions due to wide latitudinal and altitudinal ranges. The forest flora in Myanmar is diverse and forest types vary from sub-alpine through dry and moist mixed deciduous to tropical rain forest. The forest resources play a key role for the nation's economic development as well as environmental conservation.

Myanmar remains comparatively well endowed with forests and vegetation cover, while Teak the \textit{prima donna} of the tropical timber export trade is still the pillar of our forest economy. Teak forests have been managed systematically and scientifically since 1856 under the Myanmar Selection System (MSS). The fine teak bearing forests still standing today, after having been worked over 140 years, bear ample testimony to the commitment and efficacy of the MSS.

This country paper discloses some sustainable forest management initiatives and related issues and constraints and perspectives on how model forest would be formed and applied to achieve progress towards Sustainable Forest Management (SFM) at the field level.

2. THE PROJECT

A project with the title "Managing a Model Forest for the Development of tested Criteria and Indicators (C&Is) for SFM has been formulated and is intended to submit to the International Tropical Timber Organization (ITTO).

2.1 Rationale for the Project's Development

Myanmar's forest sector has been undertaking changes in policy and institutional framework and also in strategic and management planning and implementation in order to address the issues confronting the SFM. Intended Model Forest management essentially conforms with UNCED Forest Principles, ITTO Guidelines, and C&Is of Myanmar, developed on the basis of ITTO's C&Is. Moreover, existence of Model Forest will provide networking opportunity, integrating with other model forests of the region, to enhance information and technology exchange and regional cooperation.

2.2 Project Goal

To manage, conserve and develop all types of tropical production forests of the entire country by applying core sets of tested C&Is at both national and Forest Management Unit (FMU) levels for SFM so as to provide an essential but fundamental base for achieving sustainable development and also for eventual emergence of the voluntary certification of forest products.
2.3 Project Objectives

Objective 1
To implement pre-determined priority elements of SFM in the Model Forest.

Objective 2
To develop a core set of tested C&Is at the FMU level for the model forest in order to disseminate to other teak-bearing forests of the whole Bago Yoma.

2.4 Characteristics of the Project

(1) Representative of the natural teak bearing forest.
The project area is located in the midst of natural teak-bearing production forest in the eastern part of the Bago Yoma which has been managed for timber production since 1850s. Because of its geographical position the project area is assessed to represent the Bago Yoma natural teak production forests.

(2) Conservation of old-growth teak forests.
The model forest includes a special zone, which will be managed as Managed Resource Protected Area (MRPA) for conserving mosaic of old-growth teak stands and for ecotourism development. This MRPA is of national and regional significance in the sense of conserving gene pool for teak.

(3) Harvesting of Timber and Non-wood Forest Products (NWFP)
The Model Forest will be managed to document that the economic viability and social benefits can be achieved if SFM is fully realized by sustained harvest of timber as well as NWFPs.

2.5 Biophysical attributes
Elevation along the western boundary and in the north west is relatively high, but not exceeding 650 m. The underlying rock is either sandstones or shales. Yellow Brown Forest Soils are dominant major soils group, suitable for the growth of teak. Surface soils are generally deep, sandy well structured with a loamy texture to shallow, friable, shale soils. Annual rainfall ranges between 1500 mm and 2000 mm with about 125 rainy days commencing from mid-May. Dominant forest types are Mixed Deciduous Forests, where teak naturally grows very well. Also, patches of Evergreen Forests and Deciduous Dipterocarp Forests are occurring among them depending on micro-climatic conditions and edaphic factors.

Wildlife, recorded to have been found in the Bago Yoma natural forests, included elephant (*Elephas maximus*), rhinoceros (*Rhinoceros sondaicus*), bison, banteng, sambhur, pig, hog deer, tiger, panther, bear, wild dog, peacock, and pheasant.

2.6 Location and Size
The proposed project area is located in the eastern part of the Bago Yoma. It is located in Toungoo District of Bago Yoma Region with good access to other major
cities and towns. The Model Forest has an area of about 118,150 ha, of which Reserved Forests and Unclassed Forests constitute 85,600 ha and 32,550 ha respectively.

2.7 Resource

The Model Forest having about 94,800 ha of productive forests can yield about 108,000 m$^3$ of teak and about 17,440 m$^3$ of non-teak commercial hardwoods annually under the MSS. Nonwood forest products such as bamboos and rattans are also of high potential.

2.8. Main Activities

Main activities to be carried out in the Model Forest:-

1) To conduct socio-economic survey in and around the model forest.
2) To produce landuse and land capability maps and database using TM scenes.
3) To conduct management level inventory to estimate Annual Allowable Cuts (AACs) and assess advanced regeneration and NWFPs potential.
4) To review the district Forest Management Plan concerned and identify C&Is and priority elements of SFM for implementation.
5) To establish and manage the MRAP for biological conservation.
6) To adopt and implement annual reduced-impact logging plans.
7) To introduce agroforestry approach in accordance with "Community Forestry Instruction" issued by Forest Department.
8) To review on the adequacy, applicability and adaptability of ITTO's FMU Level C&Is to the model forest management.

3. CONTRIBUTIONS TO SUSTAINABLE FOREST MANAGEMENT

The project being in its planning stage, has no contributions to sustainable forest management. However, some fruitful achievements mentioned below are being materialized through national endeavours towards sustainable development of forests:-

1) New Forest Policy was promulgated in 1995.
2) Forest Act 1902 was replaced by new Forest Law 1992.
3) As stipulated in Myanmar Forest Policy, 1995, FD is undertaking to increase reserved forests to 30% from the present status 15.2% of the total land area and Protected Area System from the present 1.72% to 5% in the short term and 10% in the long term.
4) Ministry of Forestry has notified a list of endangered species in Myanmar.
5) "Community Forestry Instructions" are issued by FD in 1995 to promote people participation and the process of sharing the forest management responsibility. Uptill the end of 1997, some 3,200 ha of community forests have been established.
6) A total of 64 District Forest Management Plans have been reformulated.
7) Forest plantations are being established either to enrich or restore degraded forest lands. Some 616,200 ha of forest plantations have been established up till the end of 1997.
8) National Forest Inventory has been undertaken, covering the area of 22 million ha up to the end of 1997. This area represents about 65% of the total forest area of the country. Some 2450 and 110 permanent sample plots were established in natural forests and plantations respectively.
(9) To measure the progress towards SFM, C&Is were identified in 1997. A total of 100 activities for 5 criteria and 27 indicators at the national level, and 66 activities for 6 criteria and 23 indicators at the FMU level, were developed.

(10) Myanmar is in the process of formulating National Forest Programme, as a follow-up to National Forestry Action Programme of Myanmar.

(11) Towards the development of National Land Use Plan. Forest Department has been playing a leading role in generating land use maps by using RS/GIS technology and high resolution satellite data and photographic formats.

(12) In 1997, a Dry Zone Greening Department was newly formed to effectively carry out environmental conservation, with a focus on social well-beings.

(13) Forest Research Institute (FRI) has been evaluating the commercialization potentials of lesser-used species (LUS) for local and world markets and involvement of private sector in the utilization of these LUS is strongly encouraged.

(14) More than 10 million seedlings have been distributed annually at free of charge for planting in non-forest areas in the 1990s.

(15) Year 1995 was declared as the Fuelwood Substitution Year and a Committee on Fuelwood Substitution was formed to promote public awareness and alternate sources of domestic and industrial fuels. Fuelwood Substitution Programme is now being initiated based on the mass production of coal-dust briquettes.

(16) Forest Conservation Committees at various levels have been formed since September, 1993 to render political, administrative and legal support to environmental conservation.

4. SHORT-COMINGS AND CONSTRAINTS IN PURSUING THE SUSTAINABLE FOREST MANAGEMENT

Major short-comings and constraints are mentioned below:-

(1) land-use conflicts and competition between different sectors due to lack of overall land-use plan respected by all parties concerned;
(2) growing incidence of encroachment in various forms of marginal cultivation. illegal cutting of trees. and unplanned conversion of forest lands to other uses;
(3) deterioration of productivity of forests and erosion of genetic diversity;
(4) inadequate public awareness on environmental conservation;
(5) indication of decline of teak yield due to its better economic accessibility;
(6) increasing rate of forest degradation due to unwise use;
(7) absence of partnership between local communities and foresters due to lack of empathy and servicing role upon each other;
(8) inefficiency in the formulation of integrated management plan at the local level partly due to incompetent information and inadequate multi-sectoral co-ordination;
(9) low input of financial resources in forest management.
5. IMPLICATIONS IN FUTURE POLICY AND RESEARCH DEVELOPMENT

(1) Intended Situation after the Project Completion

At the end of the project, the model forest with an area of 118,150 ha will be permanently established and it will provide demonstration base for SFM incorporating production, conservation and social equity by analysing information provided by the Model Forest. Interdependent partnership between indigenous communities and the developers through community forestry will exist and thus promote the efficiency in managing the forests. Finally, a core set of criteria and indicators for SFM which is most appropriate to local conditions would have been developed for the model forest. Apparently, this core set of tested criteria and indicators could be expanded and disseminated to other forest areas. A networking would be established by linking the Myanmar Model Forest with those of other countries.

(2) Training and Research and Development

The model forest will serve as a training and R&D base. The outcomes of trainings and R&D activities will provide concrete information for improved policy formulation and management planning. Various training programmes at different levels will be conducted. Main participants including FD staff, Myanmar Timber Enterprise (MTE) staff, local communities, students from Institute of Forestry and the Forest Technical School will benefit from the exercise of the Model Forest. The NGOs both inside and outside the country will be invited to organize or participate in both training and R&D programmes.

6. CONCLUSION

Myanmar being a timber producing country, is fully committed to the SFM principles. It fundamentally sticks to its own principles of not only meeting the needs of today but also those of generations to come. In sum, it is confident that developing of Model Forest in Myanmar will be of high potential for achieving the progress towards SFM.
REFERENCES


Forest Department (1997). Report on estimate of resources needed and costs incurred for the implementation of ITTO Criteria and Indicators to achieve the ITTO's year 2000 objectives.
East Bago Yoma Region Map
Showing Proposed Project Area

LEGEND

- Agriculture (Al)
- Scrub Land, Forest (So)
- Teak Bearing Forest

Legend:
- Division Boundary
- District Boundary
- Township Boundary
- Project Area Boundary
- Railway
- Main Road/ Bago Yoma Crossing
- Secondary Road
- Stream
COUNTRY REPORT

- PAPUA NEW GUINEA -

by Papua New Guinea Forest Authority
THE PAPUA NEW GUINEA

FORESTRY SECTOR

COUNTRY REPORT

International Workshop on Model Forests
Tokyo, Japan
INTRODUCTION

Papua New Guinea is endowed with vast natural forest resources. These resources is being developed by the Government to enhance its economic, infrastructure and social advancement. This development is being within the broad objective of sustainable forest management.

In the forest sector, the Papua New Guinea Forest Authority (Forest Authority) intends to achieve sustainable forest management by pursuing an orderly development consistent with the Provincial and National Forest Plan as outlined in its "1997 - 2002 Medium Term Development Strategy".

Sustainable forest management as defined by the International Tropical Timber Organisation (ITTO) is -

"the process of managing permanent forest land to achieve one or more clearly specified objectives of management with regard to the production of a continuous flow of desired forest products and services without undue reduction of its inherent values and future productivity and without undue undesirable effects on the physical and social environment."

Within this broad objective of sustainable forest management, the Government through the Forest Authority will manage the forest resources of the country which is owned by the people for the broad range of commercial benefits and values for the present and future generations. This will entail specific objectives and policy initiatives underpinned by the following agreed approaches to proper forest management:-

➢ To undertake forest resource inventory to produce a national forest type classification;

➢ To acquire and maintain management rights for the country’s commercial forest resources, utilising Forest Management Agreements wherever possible, to ensure the sustainability of the resource;

➢ To effectively control and monitor harvesting and export operations to ensure compliance with the Forestry Act, 1991 (as amended) and associated Government policies and guidelines;

➢ To promote resource owner participation in the management and utilisation of forest resource;

➢ To provide advice to Government and potential investors on timber species and utilisation options;

➢ To undertake research programs and data collection which are aimed at developing the knowledge base for sustainable forest management and reforestation;
To promote the introduction and management of a forest revenue system that provides for fair returns to landowners, industry and government, and make provisions for adequate funding for the efficient operations of the Forest Authority;

To promote and facilitate sound natural forest management and plantation development, and through this, to promote rural employment opportunities;

To promote through public awareness an understanding of the multiple uses and values of trees and forest resources for income generation and livelihood;

To enhance organisational development through the optimum use of human resources of the Forest Authority;

To promote an effective marketing strategy in order to obtain maximum returns from the exports of timber and timber products;

To promote increased industrial wood processing to create employment opportunities;

To plan for adequate wood supplies to underpin viable domestic processing for local and international markets;

To promote uses of other forest products alongside the development of timber;

In collaboration with the Department of Environment and Conservation and other agencies identify priority areas that have significant environmental and ecological values which need to be protected.

**STATUS OF FOREST SECTOR IN NATIONAL CONTEXT**

1. **The Forest Sector:**

   The PNG Forest Sector represents a distinct sector within the Papua New Guinea economy. Its forestry policy is directed by the Ministry for Forests and the sector is administered by the Forest Authority, a statutory authority established following a major Commission of Inquiry which found major corruption and malfeasance rife within the industry during the mid-eighties.

2. **Contributions to the National/Local Economy**

   A comparative table showing estimates of the total of all sources of revenue from harvested logs is presented below in Table 1 and the total foreign exchange earnings from log exports compared to the log export tax paid is shown in figure 1.
Table 1: Source of Revenue from Harvested Logs

<table>
<thead>
<tr>
<th>Revenue Item</th>
<th>1994 (K$)</th>
<th>1995 (K$)</th>
<th>1996 (K$)</th>
<th>1997 (K$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log Export Tax</td>
<td>141.0</td>
<td>138.2</td>
<td>148.9</td>
<td>150.7</td>
</tr>
<tr>
<td>Reforestation Levy</td>
<td>3.5</td>
<td>2.6</td>
<td>2.8</td>
<td>3.2</td>
</tr>
<tr>
<td>Royalties</td>
<td>18</td>
<td>12.1</td>
<td>20</td>
<td>32.3</td>
</tr>
<tr>
<td>Other Landowner</td>
<td>22</td>
<td>19</td>
<td>21</td>
<td>25</td>
</tr>
<tr>
<td>Levies &amp; Premiums</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>189.3</td>
<td>174.9</td>
<td>198</td>
<td>211.2</td>
</tr>
</tbody>
</table>

Figure 1

ANNUAL REVENUE FROM LOG EXPORTS

The forest sector employs about 7,500 people, representing approximately 4 percent of total formal sector employment.

In many cases and in spite of quality, logging companies are responsible for providing road, infrastructure and welfare services to the landowners. In general, most companies have a poor record of meeting these obligations. Typically, buildings have been cheaply constructed from untreated timber and most roads amount to nothing more than standard logging roads.

On the other hand, the natural forest resources are important for providing local landowners with subsistence supplies of food, shelter materials and fuel-wood. The loss of these resources following some poorly managed forestry operations has caused some landowners to be worse off following logging projects than they were before. The implementation of the new Logging Code of Practice and the implementation of a new forest revenue system will go a long way to addressing such problems.
Appreciation of Contribution by Forest Sector:

There is a general level of understanding of the benefits of the natural forests for the long term welfare of the local people. However, where there is a rush for ‘development’ and monetary reward these benefits have often tended to have been ignored, especially prior to the Amendment of the Forestry Act in 1991, which now place much greater controls on the allocation of forest resources and which required a sustainable rate of log harvest. During the period prior to the Amendment there was a headlong rush throughout the country by landowners, under the Forestry (Private Dealings) Act repealed, to grant their forest resources for logging at totally exploitative rates. This has resulted in an approaching exhaustion of commercial forest resources in the New Ireland and West New Britain Provinces.

The benefits from these exploitive forestry operations have generally not filtered to the genuine landowners and have not been invested to ensure long term development. It is only once the money has dried up that the landowners begin to gain a true appreciation of the value of their forest resources.

With the new forestry controls and procedures administered by the Forest Authority, plus an on-going awareness program, there is growing empowerment of the true resource owners and a greater appreciation of the forest resources.

4 Main Players in the Sector:

Despite the gains being made in resource owner awareness and involvement, at least for new projects, the existing forest sector is still dominated by the foreign logging operators. In addition, three large Malaysian companies are responsible for over 60 percent of all logging activities. The other major players are the landowner companies, which are generally not representative of the true resource owners and are controlled by a few (often educated) bigmen, and the politicians. Many logging companies are able to use their financial strength to influence those in positions of power, both at local and national levels, to pursue their own self interests.

Through the 1993 amendment to the Forestry Act, the implementation of new Forestry Regulations (in the final stages of gazettal), the implementation of the log export surveillance project, and the development of stringent procedures (eg the Code of Logging Practice and Log Exporting Procedures), the Forest Authority is able to exert much greater control over the forest industry than it did previously. However, constant (and often concerted) political, resource owner and industry pressure is being placed on the sector control systems. To date, a number of forestry conditions associated with the World Bank/IMF Structural Adjustment Program have provided a counterveiling force to these pressures, particularly at the political level.

5 Key Issues and Constraints to be Addressed in the Short to Medium Term:

a) Sustainable Forest Development

It is still of great concern that the excessive level of permitted harvest remains as a carry-over from the pre 1991 days. None of the existing forestry projects within PNG are being managed on a sustained yield basis. Instead of a 35 year harvest cycle, most have only a 10 - 20 year harvest cycle. To bring these projects into line with the new requirements will require a substantial reduction in the permitted harvest levels, and
for smaller projects to be consolidated into larger sustainable projects. This is currently being tackled on two main fronts:

- As existing projects come up for review or renewal, they are being renegotiated to allow for a permitted annual harvest volume based on the 35 year sustainable logging cycle.

- All new projects are only being granted with an annual sustainable harvest volume. Originally it had been planned to review all existing projects promptly and to bring them quickly into line with the requirements of the 1991 Forestry Act (as amended). However, this proved to be a legal minefield and a huge drain on the Forest Authority's resources and so the process has now been wound back. Some of the problems involved include that there are no clear mechanisms established for project amalgamations and there is strong industry resistance to any moves to reduce allowable harvest volumes. The whole review process has also been hampered by the long delay in finalising the new forest revenue system.

Nevertheless, it is expected that all forestry operations within PNG will be operating under sustainable permitted harvest levels within 5 - 10 years.

b) Acquisition of Timber Rights

Land ownership in Papua New Guinea is vested with customary owners who comprise a large share of the rural population. Previous Governments have followed a policy of using the nation's natural resources, of which timber is one of the few that is renewable, to bring development to the rural sector. For this to happen, the Government must acquire or purchase timber rights from the customary owners.

Prior to the 1991 National Forestry Policy and Legislation, timber rights were acquired by a process referred to as Timber Rights Purchase (TRP), where various land owning clans or groups are identified, and at least 75% of the adult clan members agree to sign the TRP agreement. The rights acquired under this system is exclusive only to the harvesting of the merchantable timber, and does not allow the State or the concessionaire the rights to manage the forest.

Under the present forest policy and legislation, the system for acquiring timber rights is facilitated through a process of incorporation of all the various land owning groups. It is a form of land registration under the Land Group Incorporation Act. A Forest Management Agreement (FMA) is then entered into between the registered land groups and the Forest Authority. The rights acquired under this system empower the State or a concessionaire to harvest and manage the forest on a sustainable manner.

The Forest Authority has commenced applying the new acquisition system over potential forest areas. Some of the major constraints and problems that have been encountered with this system include:

- The procedures for incorporating land groups is lengthy, and coupled with the lack of manpower assigned to this Division of the Department of Lands & Physical Planning (DOL&PP), anticipated speed in land group registration is not being achieved. This slows down the acquisition process and subsequently, the resource allocation and development to keep trend with government project priority.
Incorporation of land groups can be conducted and presented to the DOL&PP for registration by any person. Due to the capacity problem of DOL&PP, land group documents may not be adequately assessed for compliance and hence, can become a serious problem for forestry during the stage of the resource allocation and development.

Defining land boundaries is an extremely difficult task given the lack of proper documentation. This undoubtedly leads to running land disputes which on many occasion calls for the judiciary to preside and rule on such disputes.

In realising the manpower problem of the DOL&PP, the PNGFA is assisting the Land Registration Branch of DOL&PP to expedite the registration of land groups destined for a forest development. The assistance provided are in checking and entering the applications for incorporation, preparing letters for gazetted, sending copies of gazetted notices to the land groups and preparing Certificates for Incorporation to be signed by the Registrar. In addition, it is planned that amendments be introduced to shorten and simplify the Land Group Incorporation Act, to be consistent with the understanding and knowledge of the landowners who are rural based and have no access to better understanding the legal requirements.

c) Landowner Companies

The landowner company (LOC) concept was developed with the 1979 National Forest Policy in order to increase national participation in the forestry sector. Since then the number of LOC’s has mushroomed, with many having been issued with Timber Permits, supposedly to develop their own resources.

Whilst the concept is good in theory, the practical reality has not been so good. Most of the LOC’s have been plagued by mismanagement, corruption, and in-fighting between different landowner factions. The result has been that the LOC’s become alienated from the people that they are supposed to represent, the majority of the monetary benefits have ended up in the pockets of the few directors, with most of the LOC’s becoming closely linked to the foreign logging companies.

The main problems are a lack of education and business knowledge by the majority of the landowners, difficulties in successfully structuring the LOC’s due to the complex land tenure system and proliferation of land-owning groups, and difficulties in imposing punitive actions by the Government.

To try and control the problem, the Forest Authority is moving on two fronts:

- by trying to ensure that all landowner groups receiving money are fully representative of the people and that the LOCs are incorporated under the Associations Act rather than the Companies Act, and that proper management controls are put in place.
- by trying to restrict the issuance of new Timber Permits being granted to LOC’s.

Unfortunately, there is little legislation backing these moves, especially for the 72 approved existing projects, and there are very high landowner expectations for gaining control and financial benefits, especially from the most educated. The (select few) landowners have also found unlikely allies in many of the ‘green’ NGO groups who are promoting the idea of landowner empowerment.
Unfortunately, many LOC directors take the NGO’s good intentions and construe them for their own benefit. This is an issue that will not be easily resolved.

d) Improve the level of monitoring and surveillance of log harvesting and export operations

Tremendous advances have been made in the standard of monitoring of forestry operations in the field. Staff housing, offices, vehicles and field equipment have been provided at all forestry projects and considerable staff training has been undertaken. However, the Government’s current financial difficulties are likely to place increasing budgetary pressures on the Forest Authority which will result in decreased monitoring capacity.

(e) Implementation of the Logging Code of Practice

Since the Code was adopted by the PNG Government in July 1996, the Forest Authority has undertaken a concerted awareness campaign and education program. It is imperative that this momentum be maintained and that the requirements of the Code which was made Statutory as from 1st July 1997 continued to be enforceable.

(f) Development of a consistent domestic processing policy

Currently, there is no clear policy on domestic processing and much of the debate regarding the subject is based on emotional issues. The Forest Authority currently has a study in progress to review the domestic processing policy options and to recommend the most efficient package of measures to encourage its development. This study commenced in July, 1997 and is expected to be completed by end of March 1998.

(g) Development of a plantation sector

There is huge potential for rural employment generation through plantation development, particularly on the large areas of deforested grasslands. In addition, it is almost certain that if a large processing sector is to get established in PNG then it will require a large plantation resource to provide the basis.

Historically, most plantation development in PNG has been undertaken by the State and the record of accomplishment is very poor. Most of the plantations which still exist have either been abandoned or are in a sorry state of neglect, although measures are currently being taken by the Forest Authority to improve this situation. There is a need to properly address the issues of land tenure and resource ownership in order that a successful privately owned plantation sector may evolve.
Following the Forestry Commission of Inquiry a considerable amount of new forest policy and legislation have been introduced. These include:

- **National Forest Policy** - this was issued in September 1991 by the National Executive Council and covers areas of forest management, the forest industry, forest research, forestry training and education, and forestry organisation and administration.

- **Forestry Act 1991** - this was Gazetted in June 1992. This Forestry Act was a direct result of the Commission of Inquiry and provided for the establishment of the new and autonomous Forest Authority to replace the old Department of Forests. The Act provides for much tighter controls in the acquisition and allocation of forests for development.

- **Forestry Regulation No. 15, 1992** - this was introduced to enable registration of forest industry participants and consultants under the Act.

- **Forestry (Amendment) Act, 1993** - this was certified in April 1993 and provided for a clear administrative function of the Board, the National Forest Service through the Managing Director and the Provincial Forest Management Committees.

- **The National Forestry Development Guidelines** - these were issued by the Minister for Forests and endorsed by the National Executive Council during September 1993. The Guidelines established essentially an implementation guide for aspects covered in the new Forest Act, especially in terms of sustainable production, domestic processing, forest revenue, training and localisation, review of existing projects, forest resource acquisition and allocation and sustainable development.

- **The National Forest Plan** - under the Forestry Act 1991 (as amended), the Forest Authority is required to prepare a National Forest Plan to provide a detailed statement of how the national and provincial governments intend to manage and utilise the country's forest resources. This was presented to Parliament in July 1996 and was endorsed. The National Forest Development Program (NFDP) under the Plan is now under implementation.

- **The PNG Logging Code of Practice** was finalised in February 1996 and tabled in Parliament in July 1996. The PNG Code is consistent with the Regional Code proposed at the 1995 Suva Heads of Government Forum Meeting but is more specific to PNG operating conditions. It became mandatory as of July, 1997.

- **The 1996 Forestry Regulations**, which cover all facets of the forest industry procedures and control were approved by the National Executive Council during 1996 in principle, subject to some changes to be finalised soon. These Regulations provide the legal status for the implementation of many of the requirements specified under the Forestry Act 1991 (as amended).

- **The Forestry (Amendment No. 27) Act 1996** was passed by Parliament and certified on the 11 October 1996. The major amendment relates to the membership to the Board to still have eight members, including the representatives of a National Resource Owners Association and the Association of Foresters of PNG.
A Forest Protection Policy was passed by the NEC in July 1996 and the 'Guidelines for Major Agricultural Projects, Particularly with Respect to Conversion from Forest' was passed in January 1997. Together, these two measures are designed to ensure that only genuine agricultural developments occur on forested lands, and that Timber Authorities for agricultural land clearance are not used as a back-door access to gaining forest resources.

The development of virtually all of the policy, legislation and regulations outlined above have served to greatly strengthen the capacity of the Forest Authority to monitor and control the forest industry on a sustainable basis. The Forest Authority has vigorously been pursuing its implementation.

FOREST RESOURCES

1 Natural Forests:

Figure 2 provides an overview of the allocation of the nation's forests. The definition of net productive or operable forest area is preliminary and will be better defined with the aid of up-dated inventory which is anticipated in the near future. The current estimate of total potential sustainable production from forestry projects is approximately 3.15 million cubic metres per annum.

In addition, if it is estimated that 4.4 million hectares of forest land is converted to agriculture over the next 50 years (an average of 88,000 ha per annum) and that the yield for clearfelling is 30 cubic metres per hectare, then annual log production could be boosted by an average of about 2.6 million cubic metres per annum over those 50 years. This would provide for a possible annual log harvest (from forestry and conversion projects) of approximately 5.73 million cubic metres per annum.

However, in terms of the forest resources already acquired, the picture is quite different. This is illustrated in Figure 3:

Table 2 shows that although the actual level of log harvest has remained approximately within the estimated level of sustainable cut since 1993, it has been considerably above the sustainable harvest level estimated for the areas already acquired for forestry projects - and a few concentrated areas have been particularly badly hit, especially West New Britain Province which presently accounts for over half of all log exports within the country and which is expected to be virtually logged out within 5 years.

2 Plantations

Compared to the natural forest resources, PNG's plantation resources are of only minor importance (see breakdown of plantation resources in table 3 below). However, if land tenure, resource ownership and other problems can be settled, there is a huge potential for plantations to provide rural employment and to provide the basis for the development of a viable processing sector.

Currently, most of the State owned plantations are either in a state of neglect or are abandoned, although measures are being taken to provide at least basic maintenance to many of these. The one exception is the Wau-Bulolo Plantation which provides logs at a
low cost to an antiquated and highly protected plywood mill. Replanting of this forest is below the sustainable level, at about 150 hectares per annum.

There are three main private plantations, all operated by Japanese companies. A chipmill is already operating on the forest resources at the Gogol Plantation, with 33,559 BDU’s of woodchip being exported from this mill in 1997. The Open Bay and Stettin Bay projects are due to come on stream within the next 4 - 5 years. It was planned that the timber resources from these plantations would be used for wood chips also. However, these plans appear to have been scrapped and the respective companies are currently re-evaluating their plans.

Figure 2: Estimate of Potential Sustained Yield for PNG’s Total Forest Resources
Figure 3: Estimate of Potential Sustained Yield from currently Acquired Forest Resources

<table>
<thead>
<tr>
<th>TOTAL LAND AREA ACQUIRED</th>
<th>10.1 mil ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMOUNT FORESTED</td>
<td>9.3 mil ha</td>
</tr>
<tr>
<td>NON FOREST</td>
<td>0.8 mil ha</td>
</tr>
<tr>
<td>SUITABLE FOR SUSTAINED YIELD MANAGEMENT (if landowners agree)</td>
<td>6.9 mil ha</td>
</tr>
</tbody>
</table>

The Tentative Sustainable Development from Acquired Forest Lands: 6.9 mil ha

less - 20% inoperable
less - 20% biodiversity (DEC)
times 24 m3/ha
Divided by 35 years

Estimated Maximum Sustainable Yield From Acquired Resources

2.5 MILLION M³ PER ANNUM

Table 2: Situation of PNG Rate of Forest Harvest

<table>
<thead>
<tr>
<th>Year</th>
<th>National Sustainable Volume (excluding Agric. Conversion) (million m³)</th>
<th>Sustainable Harvest Volume (From Acquired Resources) (million m³)</th>
<th>Actual Annual Harvest (million m³)</th>
<th>Permitted Annual Harvest (million m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>3.13</td>
<td>2.2</td>
<td>3.25</td>
<td>8.45</td>
</tr>
<tr>
<td>1994</td>
<td>3.13</td>
<td>2.2</td>
<td>3.5</td>
<td>7.74</td>
</tr>
<tr>
<td>1995</td>
<td>3.13</td>
<td>2.2</td>
<td>3.0</td>
<td>7.31</td>
</tr>
<tr>
<td>1996</td>
<td>3.13</td>
<td>2.8</td>
<td>2.7</td>
<td>7.01</td>
</tr>
<tr>
<td>1997</td>
<td>3.13</td>
<td>2.8</td>
<td>3.4</td>
<td>7.01</td>
</tr>
<tr>
<td>1998</td>
<td>3.13</td>
<td>2.8</td>
<td>2.0 (est)</td>
<td>7.29</td>
</tr>
<tr>
<td>PROVINCE</td>
<td>LOCATION</td>
<td>MAIN SPECIES</td>
<td>TOTAL AREA (as at Dec 1997)</td>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------------</td>
<td>---------------------------------------------------</td>
<td>-----------------------------</td>
<td></td>
</tr>
<tr>
<td>State Forests</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central</td>
<td>Kuriva</td>
<td>Teak</td>
<td>600</td>
<td></td>
</tr>
<tr>
<td>Madang</td>
<td>Madang</td>
<td>E. deglupta, A. mangium, T. brassii</td>
<td>900</td>
<td></td>
</tr>
<tr>
<td>Morobe</td>
<td>Wau-Bulolo</td>
<td>A. cunninghamii, A. humscinii, P. caribaea</td>
<td>12000</td>
<td></td>
</tr>
<tr>
<td>Milne Bay</td>
<td>Sagari</td>
<td>A. mangium, E. deglupta, T. brassii</td>
<td>1500</td>
<td></td>
</tr>
<tr>
<td>New Ireland</td>
<td>Kait</td>
<td>E. deglupta, Calophyllum sp., Pierocarpus indicus</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td>Eastern Highlands</td>
<td>Fayantina</td>
<td>P. patula</td>
<td>900</td>
<td></td>
</tr>
<tr>
<td>Eastern Highlands</td>
<td>Lapeugu</td>
<td>P. patula</td>
<td>3200</td>
<td></td>
</tr>
<tr>
<td>Eastern Highlands</td>
<td>Kainantu</td>
<td>P. patula</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>Western Highlands</td>
<td>Waghi</td>
<td>E. grandis, E. robusta, E. saligna, P. patula</td>
<td>2100</td>
<td></td>
</tr>
<tr>
<td>Southern Highlands</td>
<td>Orere,Kui, Baino</td>
<td></td>
<td>400</td>
<td></td>
</tr>
<tr>
<td>Private Forests</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Madang</td>
<td>Gogol</td>
<td>E. deglupta, A. mangium, T. brassii</td>
<td>10745</td>
<td></td>
</tr>
<tr>
<td>East New Britain</td>
<td>Open Bay</td>
<td>E. deglupta, T. brassii, A. mangium</td>
<td>12004</td>
<td></td>
</tr>
<tr>
<td>East New Britain (customary - ex State)</td>
<td>Kerevar</td>
<td>Tectona grandis, Eucalyptus deglupta, Ochroma lageopus</td>
<td>1900</td>
<td></td>
</tr>
<tr>
<td>West New Britain</td>
<td>Strait Bay</td>
<td>E. deglupta, T. brassii, A. mangium, O samarrama</td>
<td>10258</td>
<td></td>
</tr>
<tr>
<td>West New Britain</td>
<td>Ulamora</td>
<td>E. deglupta</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Central (customary - ex State)</td>
<td>Brown River</td>
<td>Tectona grandis</td>
<td>1200</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL PRIVATE</strong></td>
<td><strong>35107</strong></td>
<td></td>
</tr>
</tbody>
</table>

**GRAND TOTAL**: 57957
HARVESTING, PROCESSING AND MARKETING

1 Activity Breakdown

Forestry production increased to 3.01 million cubic metres in 1997, up from 2.67 million cubic metres in 1996 and 2.4 million cubic metres in 1995. The higher 1997 figures were largely due to abnormally dry conditions which allowed harvesting to continue in most areas throughout the entire year. It is ironic that the production increase coincided with a severe market downturn which is expected to continue for some time to come. During the year, average log prices dropped from around US$130/m3 to about US$75/m3.

Forest product export figures for the 1996 and 1997 years are shown in Table 4 below:

Table 4: Export of Forest Products - 1996/1997

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Logs</td>
<td>2,625,000 m3</td>
<td>352,160,000</td>
<td>3,006,000 m3</td>
<td>351,118,000</td>
</tr>
<tr>
<td>Sawn Timber</td>
<td>7,319 m3</td>
<td>3,569,227</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woodchips</td>
<td>45,757 BDU</td>
<td>9,078,679</td>
<td>33,559 BDU</td>
<td>9,761,268</td>
</tr>
<tr>
<td>Balsa</td>
<td>1,983 m3</td>
<td>1,009,562</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plywood</td>
<td>372 m3</td>
<td>365,808</td>
<td>324 m3</td>
<td></td>
</tr>
<tr>
<td>Sandalwood</td>
<td>46 tonnes</td>
<td>21,240</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Insufficient data at hand at time of preparing this Report.

Provincial log export volumes are illustrated in Figure 4 below. In recent years, the New Guinea Islands region has provided the largest share of log export revenue, producing over 60 percent of the total log export volume. West New Britain Province alone produced the equivalent of all the other provinces combined. Over the next few years it is expected that the focus of the major log production will move away from the New Guinea Islands region to other less exploited provinces including, Gulf, Western and Sandaun.

Japan has continued to be the major market for PNG logs (see Figures 5a and 5b below), with a relatively steady market share of approximately 65 percent of the total log export receipts. South Korea is the second most important market but it’s level of purchases has almost halved over the past four years – and this trend is likely to continue as Korean processors move increasingly to temperate softwood inputs.

The Japanese market continued to purchase the quality timbers; 60 percent of it’s purchases comprised Grade 1 and 2 log species. In contrast, the Korean market is based almost entirely on the lower grade timbers, with 80 percent of purchases being Grades 3 and 4 log species.
Another feature of the recent forestry boom is that, despite the availability of considerable Government incentives and subsidies for the domestic processing of timber, this sector has actually declined in output over the past decade. It is clearly much more profitable and lower risk to export raw logs than it is to process them domestically within PNG, and so it is that approximately 90 percent of the annual harvest is now being exported as logs. Figures 6, 7 and 8 below clearly show the stagnation and decline of the domestic processing sector compared to the log export sector.

*Figures 5a and 5b: Destination of Log Exports*
2 The Processing Sector

The National Forest Policy anticipates more downstream processing of forest products. The objectives of pursuing a domestic processing policy are to create employment, facilitate the transfer of technology and encourage export of value added products. However, the forest industry is predominantly based on log exports which largely reflects the perceived risk and commercial limitations of domestic processing in PNG. The existing number of processing facilities include:

1 Plywood factory in Bulolo
1 Woodchip mill in Madang
40 Sawmills with various capacities
20 Furniture factories and joinery workshops

The previous government in approving the National Forest Plan expressed the desire to promote gradual downstream processing of forest products. An interdepartmental committee has been formed and is chaired by the Department of Commerce and Industry to consider a number of incentives for downstream processing. The government has also engaged a group of consultants to study domestic processing and make its recommendations. This study is now in progress and is due for completion towards the end of March 1998.
Figure 6: Log Input Volume Exported: Round vs Sawn

Figure 7: Export Value of Raw Logs vs Timber Products

Figure 8: History of Woodchip Exports
3 Status of the Code of Logging Practice

The PNG Logging Code of Practice was finalised by a national technical working committee in February 1996. Following this, a joint NEC submission from the Ministers for Forests and Environment and Conservation resulted in the NEC formally endorsing the PNG Logging Code of Practice in late March 1996. The Code was then tabled and approved by Parliament in July 1996.

The PNG Logging Code of practice is given legal status through the Forestry Regulations, which provides (Regulation 241 - Logging and Roading Standards and Practices) that:

Timber Permit holders and their assigns shall ensure that forest roading and logging is undertaken according to standards and practices as specified by the Managing Director from time to time. Such standards and practices may be issued in the form of a “Logging code of Practice” or any other form as the Managing Director may determine from time to time.

Early field work which involved interviewing a significant number of forest industry field workers (planners, field supervisors, bulldozer drivers (roading and skidding), grader drivers, chainsaw operators etc), clearly identified the significant challenge involved in the full implementation of a logging code. The main findings were that:

- Very few field workers had any understanding of the concept of sustainable forestry practices;
- Nearly all had developed their current practices through watching others (equally untrained) or through trial and error. There was little evidence of any technical training;
- Most were receptive to the idea of changing their practices. This, however requires that:
  * Field operators be told why changes are required ie. they need to be given an understanding of the objectives of sustainable forestry and how their actions can contribute to its achievement; and
  * Field operators need to be shown how to undertake the new practices ie. good practical field instruction needs to be provided. Merely providing a written Logging Code of Practice is not sufficient.
- There is a limit to how much change can be introduced at any one time.

Given these findings the conclusion was drawn that significant progress toward sustainable forestry practices can be made, but the full implementation of the PNG Logging Code of Practice will take a sustained multi-front effort over a period of years rather than months.
Activities which have been or are being undertaken to ensure full implementation of the code include:

- Development of the "Key Standards For Selection Logging". The technical working committee which developed the PNG Logging Code of Practice was aware that the full implementation of the code would take time. In order to set a minimum starting point for full implementation the working group extracted out of the code 24 Key Standards. These represent the key areas for the achievement of sustainable forestry. The Key Standards are highlighted in the Logging Code.

- As part of implementation, the Forest Authority has developed a new set of field planning, monitoring and control procedures which set out required pre-logging planning to be undertaken by the logging company, the requirements and standards for the Forest Authority field staff to undertake monitoring and control during roading and logging operations, and requirements for post-logging activities.

- In making the public aware of the requirements under the Logging Code, multi page advertising supplementaries describing and explaining the main aspects of the Logging Code of Practice were placed in all major newspapers in English and the two national language - Motu and Pidgin. This resulted in over 140,000 copies being circulated and provided a high level of awareness of the new Code, especially with the resource owners.

- A series of intensive three week training courses for all field staff of the Forest Authority regarding the planning, monitoring and control procedures of the Logging Code began in July 1996 and ended in mid 1997. This was funded under the AusAid NFCAP Trust Fund.

- Presently, an AusAid funded HRD Project is well under-way and is already having a major positive impact. This project is expected to overhaul all forestry training in PNG, including the training of industry field staff.

FOREST RESEARCH

The PNG Forest Research Institute (FRI), is charged among other things, the responsibility to provide through research, scientific information and basis for the management of Papua New Guinea's forests on a sustainable basis.

Research Activities

Research activities within the Institute are arranged within four programs - Sustainable Forest Management, Planted Forests, Forest Biology and National Botanical Garden. Two other support programs, Technical Services and Administration, provide the services which ensure that the resources are available to undertake approved research and the results of research are communicated to those who need them.

The following notes provide an indication of current research activities.
1. Sustainable Forest Management Program

The major objective of this program is to provide the essential data needed for forest managers to sustainably manage PNG’s natural forest resource and to develop and refine silvicultural techniques to improve the forest stand quality hence increase the value of the forest to benefit the resource owners and the nation as a whole.

Presently, the three major prioritised projects under this program include:

(a) *Tree Growth and Yield Studies*

This project involves establishment of permanent sample plots (PSP) in recently logged over forests. In addition to a total of seventy (70) - one hectare plots established by the International Tropical Timber Organisation (ITTO) project on “Intensification of Growth and Yield Studies”, a total of thirty (30) plots have been established in recently logged over forests throughout the country by this program. In total one hundred (100) plots of one hectare have been established throughout the country. These are part of a national wide network of plots which will enable collection of growth data which will subsequently be used for yield prediction and calculation of the next harvest. These information will also assist review existing policies.

(b) *Silvicultural Techniques*

This project involves establishment of demonstration plots on post harvest forest management. So far two (2) - one hundred (100) hectare plots have been completed in the Morobe Province and Central Provinces. These are silvicultural experiments designed to test different treatment levels and will further be used to demonstrate to landowners and forest managers the option available to them to privately manage their respective forests commercially following logging.

(c) *Ecosystem Management*

This project involves investigation into diseases in both forest plantations and natural forests. Several forest plantations and natural forests have been covered. Collection of specimen have commenced and research is progressing to isolate pathogens. This section continuously monitor insect and pathogen outbreaks, investigate, report and recommend preventive measures to plantation managers, resource owners and others concerned.

2. Planted Forests Program.
This program has four major projects:

(a) **Species Screening**

Screening of indigenous timber species of PNG both for lowland and the highlands regions to see if they have any potential to be used as plantation species not only for commercial purposes but also for village forestry extension. In some parts of the highlands work has already begun with *Kauri Pine* while for the lowland with the selection of seed trees of *Pterocarpus* (Rosewood), *Pometia* (Taun), *Anisoptera* (Mesawa) and *Eucalyptus pellita* (PNG Source). Selection of the successful species will be recommended for industrial plantations extension purposes depending on their performances on some of the sites.

(b) **Species Development and Improvement**

Testing of different provenance and progeny to identify best provenances and seed trees that has fast growth and has good stem form with fine branching to be used for future plantations and community forestry. Currently working of *Araucaria* spp, *Agathis* spp, *Pinus* spp, *Casuarina* spp, *Terminalia* spp, and *Eucalyptus deglupta*.

This project is also researching into tree breeding techniques to improve form of plantation tree species. Currently looking into establishing new seed/clonal orchards of *Teak*, *Hoop*, *Pinus*, *Klinkii* and *Acacia mangium* for seed sources for future plantations.

(c) **Growth and Yield**

Study into silvicultural techniques to improve growth and yield of plantation tree species. Currently looking at growth and yield (vol./ha) of *A. mangium* on different sites to see what sites are suitable for this species so that they can be planted at the right site and secondly looking at factors limiting the early growth and survival of *Hoop pine* in the Wau/Bulolo area. Thirdly, working on volume tables for *Pinus oocarpa* in Bulolo and finally looking into appropriate fertilizer and rate required by *Hoop* and *A. mangium* for fast growth.

(d) **Management Manual**

Preparation of management manuals and information notes for plantation and potential plantation species to be used by the Plantation Managers and extension services during the establishment and maintenance of plantations and extension plantings. Currently working on certain species and these are *Hoop*, *Klinkii*, *Pinus* spp and *Balsa*.

Seven information notes have been drafted on the silviculture of specific *Pinus* species and indigenous species. The notes also include a guide to
seed tree selection and tree improvement for rural farming communities and for foresters.

3. Forest Biology Program

The major research project within this program is the development of computer based keys to enable forest managers, researchers and industry participants to accurately identify the estimated 2000 tree species found in the PNG's forests. These keys are essential for both improved forest management and effective identification of timber species for pricing and marketing. Scientists within this program are also responsible for the future development and maintenance of the nationally important insect and plant collections. Curation of the dried plant collections recently received a boost with the receipt of a significant grant from the McArthur Foundation (USA).

4. National Botanical Garden

The National Botanic Garden (NBG) is located in the centre of the city of Lae on 56 hectares of land reserved for a botanical garden. Located on the site is the Forest Research Institute, which houses some of the most important scientific infrastructures for biological research, eg., the National Herbarium, National Forest Insect Collection and the National Xylarium.

Papua New Guinea has a rich and unique flora, and the National Botanic Garden serves an important role as the centre for botanical research, plant conservation and education. The NBG has been developed over the years in parallel with the National Herbarium which houses the best reference collection (over 300,000 specimens) of the nations' rich flora. The objective of the project are to provide the scientific basis for the understanding and appreciation of plants as our natural heritage.

The redevelopment program started in 1995 which include fencing of the garden, major landscaping work to improve the drainage of the area, construction of public amenities area, children's playgrounds, shade houses for display of the country's rich flora and various smaller projects. The above activities are controlled through a Garden Management Committee comprising various sectors of the Lae city community.

INTERNATIONAL LINKAGES AND PROGRAMS

PNG is signatory to a number of international organisations which deals with forest and environment issues. These include:

(a) International Tropical Timber Agreement which gives the mandate for the International Tropical Timber Organisation to perform its function in the use and management of tropical forest resources.

(b) Inter-governmental Panel on Forests (IPF) under the United Nations Commission of Sustainable Development. This is an adhoc Panel dealing with the sustainable
management of all types. There is no legally binding instrument as yet but PNG is an active participant through the National Forest Service.

(c) **Convention on Biological Diversity (CBD).** The Department of Environment and Conservation deals with this Convention. However since issues of biodiversity are interrelated with forest issues the National Forest Service closely observes the deliberations and decisions of the Convention.

(d) **Melanesian Spearhead Group.** There is a scope for PNG to assist the Melanesian Spearhead Group States in Logging Codes of Practice, log export monitoring and surveillance and training of personnel.

(e) **South Pacific Forum.** PNG Forest Authority, representing PNG is a key player on deliberations on forestry issues.

(f) **Human Resources Development (Forestry) Project.** This is a four project commencing 1995, and being funded by AusAid. The main emphasis of the project is human resources development in the forestry sector including forestry training at the institution level namely University of Technology, Bulolo Forestry College and Timber Industry Training College.

(g) **Log Export Monitoring and Surveillance.** The project is undertaken by a Swiss company, Societe de Generale Surveillance (SGS), and is funded largely by the European Union. The main emphasis of this project is to ensure that proper accountability and value for logs being exported are accurately documented for government tax purposes.

(h) **Growth and Yield Studies.** The Growth and Yield Studies is a research project that is funded by the Japanese Government, and is administered by the Japanese International Cooperation Agency (JICA). This project has been in operation since 1993 and the JICA team of researchers operate out of the Forest Research Institute in Lae. A major seminar is scheduled for November 1998 for the project to present its findings. It is anticipated that the findings will have major policy implication to cuttings cycles, species and diameter limits.

(i) **East New Britain Balsa Project.** This project is funded by International Tropical Timber Organisation (ITTO). The objective of the project is to expand the Balsa wood industry after the volcano in Rabaul. Balsa is a fast growing tree and is harvested after 4 - 5 years and is considered an alternative income base in rural community development.

(j) **Timber Product Marketing Study.** A study to evaluate the marketing strategies for PNG Timber products being funded by the International Tropical Timber Organisation. The study commenced in 1996 and is expected to be completed in March 1998. The purpose of the study is to assess the market, possibility of a voluntary marketing organisation and market intelligence and viability of processing of timber in PNG.

(k) **Forest Inventory Mapping (FIM).** Funded by AusAid, the project is a continuation from an original program referred to as the Rapid Resource
Appraisal (RRA) project which started in 1995. At the completion of the RRA Project, the PNGFA sought an extension to update forest resource information through scanning and digitising of the resource maps. This project is on going and the output will assist the NFS to determine the volumes of forest resources available, especially in new forest potential areas.

THE FUTURE

Papua New Guinea is very much aware of the prevailing global concerns surrounding the tropical rainforest and the environment at large. There are a lot of various program that are being discussed and offered for tropical countries such as PNG to participate. To this end we have not yet moved towards establishing "model forestry projects". However, we have in place, the policy and legislative frame-work which is based on sustainable forest development and management. This being the corner stone to all future forest development, we anticipate no great difficulties in our participation in a model forestry network.

Acknowledging that the hardwood market in Asia is fast decreasing due to shift for temperate softwoods and plantation wood, Papua New Guinea is seriously considering the potential other forest products in bioprospecting and plantation development.
COUNTRY REPORT

- RUSSIA -

by Valentin V. Strakhov
Director
The All Russia Research and Information Centre for Forest Resources
Ongoing processes in Russia after UNCED and the Russian perspective on Model Forest Approach for Sustainable Forest Management

Valentin V. Strakhov


To implement obligations of the Russian Party under the *Convention on Biological Diversity*, Russia adopted the Federal purpose-oriented program of governmental support of zapovedniks (State strict nature reserves) and national parks for a period up to the year 2000 (Decree of 10th October 1995, No 1032). The final result of realization of this
program should be a scientifically grounded network of specially protected natural areas of federal importance covering all natural zones in the Russian Federation territory and, thus, ensuring the fulfillment of the above-mentioned obligations. According to this program, 36 State strict nature reserves (9.2 million ha of total area) and 28 national parks (4.9 million ha of total area) are to be established before the year 2000. As of 1st January, 1997, specially protected natural areas of the Russian Forest Fund occupied 35.3 million ha, their number totaling 3,919. In order to realize the provisions of the laws relating to State account of specially protected natural areas, the Federal Forest Service of Russia (FFSR) issued a Decree on 25th December, 1997 of keeping a State cadastre of specially protected natural areas within the bounds of Forest Fund lands.

With the purpose of protecting biological diversity within the Forest Fund area and pursuant to the provisions of the Federal Law On the fauna, the Russian Government issued a special Decree On improving conservation of fauna features and habitats within the Forest Fund area (13th August, 1997, No 1010). In 1997 the Government of the Russian Federation approved the Federal purpose-oriented program Preservation of the Amurian tiger of which the main range is situated within Khabarovsk and Primorsky Territories (Decree of 8th August, 1997, No 843). The program envisages, over a period between 1998 and 2003, establishing, within the bounds of each of those Territories, one zapovednik and two State special-purpose reserves (zakazniks) of federal importance, as well as a number of areas with a restricted nature management regime within Amurian tiger habitats.

According to the Article 58 of the Constitution of the Russian Federation charges all Russian citizens to make thrifty use of natural resources and take care of their preservation. This provision also applies to forests, as the most important
national strategic resource. However, the importance of forests as a global ecological factor and a habitat of numerous living organisms, including human beings, exceeds the limits of a solely raw materials base.

The above-mentioned National strategy of the Russian Federation in the sphere of environment protection and ensuring sustainable development recognizes conservation and reproduction of forests as one of the primary directions of Government's activities aimed at ensuring ecological safety and sustainable social and economic development of Russia.

The Concept for transition of the Russian Federation to sustainable development takes into account the best recommendations of the international community. Pursuant to this Concept, the sustainable forest management in Russia should be in line with increasing productivity and sustainability of forest ecosystems. In compliance with the efforts directed at elaborating a Strategy of sustainable development in the Russian Federation, the All-Russian Research and Information Center for Forest Resources (ARICFR) worked out (by order of FFSR) Strategy of sustainable development of Russian forestry which reflects the basic principles of a new Russian forest policy.

On 4th February 1997 a new Forest Code of the Russian Federation came into force. This Code develops and strengthens the State control over preservation, reproduction, protection and conservation of Russian forests. The national Forest Fund is recognized as being a State property. In order to coordinate this new Code with the above-mentioned documents, ARICFR worked out a Concept of sustainable forest management in Russia which determines the directions of Russian forest policy (both on national and regional levels) to attain profitability of forests,
improve forest management, ensure conservation, protection and reproduction of forests, with an allowance for biodiversity conservation and sustainable development in the Russian Federation.

To exercise forest management, the specific approaches are applied to accounting and control of forest resources, and to national strategies for their utilization, conservation and reproduction, because carrying out of forestry implies taking account of many economic and ecological problems. The relevant system for State account, control and forecasting of forest condition and forest management practices has been continually improving within the limits of FFSR powers.

In 1997 the FFSR issued new *Regulations on procedure for carrying out the State Account of the Forest Fund* which established a uniform accounting procedure being in line with the Forest Code of the Russian Federation. By the end of 1998 a new State Forest Account (reflecting the situation as of 1st January, 1998) is to be completed.

Among the mandatory federal-level documents, the *Criteria and Indicators for Sustainable Forest Management in the Russian Federation* are of particular importance. They represent guidelines of new generation which contribute to the working out of strategic directions in the field of sustainable forest management by taking into account global trends and Russia's international commitments. In accordance with the Forest Code, a national system for forest product certification is being worked out, and such a working out is considered to be one of the main tasks of forest sector reforms.

A new system of *forest use payments* makes it possible to increase forest income. A sufficient basis for raising profitability in forestry has been created owing to
establishing minimal rates of forest taxes for removal of timber at the federal level, and specific rates of forest taxes for removal of timber and for other types of forest use at the level of Russian Federation's Subjects.

To increase profitability of forest management is possible through application of market-oriented forms of forest use (from leasing to forest concessions) and forest auctions, by taking into account major timber markets and forest users' capabilities. This means that growth of profitability depends on the level of logging industry development. The State financial backing of the main forestry activities is expected to continue in the long run. It is necessary to develop mixed financial sources and create mechanisms for a forest income being partially reinvested back in forestry. One more reserve for financing sustainable forest management would be development of a well-founded system of priorities of revenues and expense items in the budgets of territorial forest administration bodies.

The Sustainable Forest Management (SFM) in Russia develop under umbrella of new Russian Forest Code as the purposeful, long-term and profitable relationships between people and forest ecosystems. The position of Model Forest Approach (MFA) in governing of Russian Forest looks as a very flexible and openness mechanism for decision making procedure regarding land use planning as whole.

The goals of SFM as well as MFA on the local territory are an utilization of market and non-market forest products and values without a degradation or disappearance of forests, but with maintenance of biodiversity and forest productivity at a level being acceptable for forest ecosystems and within people's power.
The following framework output from MFA for the SFM in Russia is suggested:

a) Practical participation of all partnership groups in decision making processes for SFM, beginning since land and forest use planning, on the basis of participation of all interested parties in processes of forest management, and collaboration of governmental, administrative organisms, private institutions and major groups of people.

b) Procedure of settling conflict situations that may occur before, during and after the decision made for SFM.

c) Work out the Criteria and Indicators for sustainable forest management in Russian Federation (C&I), adopted by Federal Forest Service of Russia in February 5, 1998, and work out the Forest Certification System (FCS) of Russian according to the Government Ordinance of Russia (February 2, 1998).

In Russian perspective the SFM include multi-purpose, continuous and inexhaustible utilization of forest resources and the functions and properties of the forests with market value (timber, fruits and berries, etc.) and without market value (e.g. the holistic effect on the people's health or the preservation of historical traditions). Consequently, the economic development of territories occupied by forests should be carried out on the basis of a flexible mechanism of utilization of the market and non-market bounties of the forest. Of course the SFM implies the conservation of forests, as a part of national landscapes of Russia.

Now we have some experience that SFM should be realized on the basis of scientific knowledge, analysis and comprehensive assessment of possible impacts on forest ecosystems, and these requirements are reflected in corresponding legislative and normative acts, guides, reference books and recommendations, and according to C&I for Russia.
How to reach the balanced utilization of forest resources, maintenance of all forest functions and characteristics, both commercial and still non-commercial?

From the pragmatic point of view this is possible to do through local (on the Forest Management Unit (FMU level) practicing forest management and land use. We shall aim to reach multipurpose, uninterrupted and sustained utilization of forest resources, functions and characteristics, both commercial (timber, fruits, etc.) and nonprofit (for instance, influence exerted upon spiritual health of people, or preservation of historical traditions).

At the FMU level the peoples faced with the necessity of solving interrelated social, economic and ecological problems on the basis of the existing conditions. We cannot subdivide the natural and ecological conditions (climate, regeneration, forest cover percent of a territory, the site class of stands, increment, etc.) from economic conditions (the demand for wood, sale, road density, basic assets, income, etc.). But we can achieve the production conditions (methods, organization, technology, etc.), and social conditions (size of the population, its demographic structure, the level of employment, incomes and the quality of life, human rights, etc.). The existing experiences of FMA in Russia give us opportunity to recommend the FMA as the relevant mechanism for land use planning at the local level of management system in Russia.

The history of forest management in Russia and experience of other countries show that the concept of forest management, in a basis of which lays only maximizing of the forest income, ignoring the maintenance of environmental and non-market benefits of forests, can result in irreversible changes of landscapes and species composition, in a general disturbance of the natural environment, transformation of a biological diversity and in a sharp decrease of their ecological stability.
In all times the prudence required that the activity of the forest economy of Russia was organized on the pattern that each generation is not a full owner, but only the temporary user of forest resources, obliged to transfer them to the following generations as a historical heritage not worse than received from previous generation.

Annexes: Information sheets on Mozhaiski, Taiga and Priluzhye model forests.
MOZHAISKI MODEL FOREST

The setting up of Mozhaiski Model Forest (MMF) was envisaged by the "Memorandum on co-operation in the field of forestry between Canadian Forestry Department and Federal Forest Service of Russia", as well as the Addendum thereof "On the protocol for establishing a Canadian-Russian model forest program", with the purpose of extending Russia's participation in the international model forest network. The matter was thoroughly discussed at the Russian-Canadian Workshop (March 22-25, 1995, Moscow-Mozhaisk) on setting up of the Second Russian Model Forest in the Region of Moscow.

**Brief information on the project:**

**PARTNERS** are from State forest administrations of Moscow Region and local forest management units (4), other nature management administrations (5), business associations (5), Research and Educational institutions (7).

**DESCRIPTION OF MODEL FOREST:**

**SIZE**

Total area of the Model Forest amounts to 152,502 ha, including 43,092 ha of the Shakhovskoi forest management unit (FMU), 45,249 ha of the Mozhaiski FMU and 64,161 ha of the Uvarovski FMU. There are altogether 19 forest districts (1,594 compartments) in the mentioned FMUs, including 5 forest districts (391 compartments) in Shakhovskoi FMU, 7 (490 compartments) in Mozhaiski FMU, and 7 (713 compartments) in Uvarovski FMU. Compartments area: average value - 90-100 ha; maximum value - 229 ha (Mozhaiski FMU), or 262 ha (Shakhovskoi FMU); minimum value - 8 ha (Uvarovski FMU), or 14 ha (Shakhovskoi FMU). The Model Forest stretches for 115 km from the North to the South, and up to 60 km from the West to the East.

**LOCATION**

The territory proposed for setting up of the Mozhaiski Model Forest is located in the West of the Moscow Region, within the limits of the Shakhovskaya and Mozhaisk Districts. The corresponding forest ranges are situated within the bounds of Shakhovskoi FMU (Shakhovskaya District), as well as Uvarovski and Mozhaiski FMUs (Mozhaisk District), which are the main forest fund holders in the mentioned Districts. FMUs occupy, on the whole, about 40% of the total area of the Mozhaisk and Shakhovskaya Districts. Forests are unevenly distributed over the considered territory. Forest ranges are strongly stripped by the areas of arable land being in possession of State and collective farms.

**OBJECTIVES**

The Mozhaiski Model Forest shall be established within the framework of the International Program on Model Forests with the purpose of creating a general understanding of sustainable forest management through international technological cooperation and sharing of information. The present project shall contribute to the working-out of national policy in the sphere of effective forest exploitation at regional and local levels.

The idea of comprehensive management of forest resources by taking into account their social, ecological and economic values, was taken as a principle when elaborating this project. The Model Forest to be established is typical, as regards its natural diversity, for central regions of the Russian Plain, and it may serve as the first example of sustainable forest management over a considerable part of those regions.

In order to implement the basic idea of setting up of the Mozhaiski Model Forest (putting into practice sustainable forest management at a local area), the following important objects are to be achieved:

1. Creation of a geoinformation management system that would include aggregate data on the Model Forest, to promote a decision making process.
2. Working out of classification system for the forest ecosystems to be met with in the Model Forest territory, on the basis of systematization of the data relating to biodiversity of forest ecosystems, their interactions with landscape processes and the changes to occur in time.
3. Working out and introduction of the models for effective forest utilization, on the basis of analysis of the existing forestry practices, assessment of all forest resources, by taking into consideration ecological and socio-economic conditions.
4. Working out of the methods aimed at analysing socio-economic trends and forecasting feasible results when making alternative management decisions.

5. Inventory and identification of all forest resources and values of the Model Forest, working out of value assessments for all kinds of resources.

6. Working out of criteria and indicators that would allow to assess condition of forest resources of the Model Forest when carrying out various monitoring works and exercising control over forest resources sustainability.

7. Satisfaction of spiritual, social and economic needs of population on the basis of efficient forest utilization.

8. Popularization of the idea of the Model Forest establishment among the people, cooperation between partnership members, maintaining relations of the Mozhaiski Model Forest with the International Model Forest Network.

9. Working out of the management structure and methods that could realize the objectives of the Mozhaiski Model Forest as regards exemplary sustainable forest utilization.

TARGET-ORIENTED PROGRAMMES AND PROJECTS

Following basic programmes should be developed:

1. An interdisciplinary programme of ecological research.

2. A programme toward organization of an ecologically sound multi-resource forest use.

3. Methodology of a complex governing of the Mozhaiski Model Forest proper to reach strategic objectives.

EXPECTED RESULTS

A fruitful integration of partners has to result in a sustainable forest use, employing advanced technologies, more complete use of non-wood resources, a balanced impact on forests that dont hinder them to accomplish all their functions. On the other hand, a working model of a modern forest use on a given territory will allow to demonstrate an example of a wise sustainable management of forest resources for forest management units of the Moscow Region and its neighbours.

The practical results of setting up of the Mozhaiski Model Forest, as a model of sustainable development, on the basis of multiresource forest management should be expressed in the following:

- Maintenance of ecosystem, species and genetical biodiversity in the territory of the Model Forest, establishment of such conditions of forest utilization that would ensure the orientation of forest successions towards restoration of coniferous-broadleaved forests being similar to radical forests.

- Conservation and maintenance of natural landscapes of the Model Forests.

- Stabilizing and improving the condition of watersheds of small and middle-sized rivers, banks of reservoirs, lakes and ponds, within the bounds of the Mozhaiski Model Forest.

- Preservation and appropriate keeping of national monuments of Russian people relating to the battle of Borodino, as well as other historical, cultural and natural monuments.

- Implementation of the model of sustainable development in forestry, agrarian sector, as well as in related processing industries, on the basis of fruitful cooperation of partner groups and introduction of advanced technologies of forest exploitation and timber processing.

- Realization of research programs relating to forest ecology, informatization, advanced technologies of sound forest exploitation by taking into consideration both production and recreation purposes.

- Harmonization of economic, social and ecological interests.

- Balanced pattern of recreational forest utilization, without any damage to forest.

- Education of conscientious attitude of people towards all forest values, and participation of people in the process of sustainable forest management.
TAIGA MODEL FOREST
In January 1996 the Enso-Gutzeit Oy and WWF agreed upon cooperation aimed at assisting sustainable forest management in the Republic of Karelia. The parties came to a conclusion to use a sizable (5,000-10,000 ha), representative and uniform forest area, as a model forest, for carrying out applied research and demonstration purposes. In March 1996 the draft project was submitted to possible investors. For planning purposes a working group was set up with the participation of WWF, Enso Forest Development Oy (EFD) and Forest and Environment Group Ltd (FEG). In April 1997 the preliminary version of the project was published.

Brief information on the project:
PARTNERS are from State forest administrations (3), Government bodies (2), Research and Educational institutions (5), UNEP, WWF Finland, interested national organizations of Finland (6)
SIZE AND LOCATION: About 2,500 ha of forest area (under the authority of Petrozavodsk State University), near settlement Matrosy, Pitkiananta District, Republic of Karelia, Russian Federation
OBJECTIVES: Main objective consists in promoting sustainable forest management and conservation of biodiversity in the Karelian boreal forests.

Immediate objectives:
1. Establishing a model forest area for applied research and demonstration;
2. Testing and demonstrating appropriate forest management and wood harvesting procedures and assessing the economic impacts and financial sustainability of forestry operations;
3. Testing and demonstrating the criteria and indicators that will be needed for wood ecocertification in the future;
4. Surveying the biodiversity of managed production forests in the model area and assessing the ecological impacts of forestry operations;
5. Conducting a socio-economic baseline study and a multiple use survey in the model area and assessing the social impacts of forestry operations;
6. Strengthening the capacity of appropriate forestry institutions in sustainable management of forests and in conservation of biodiversity.

PROJECT IMPLEMENTATION PERIOD: The project is to be implemented within a period of three years, from January 1997 up to December 1999.

EXPECTED RESULTS
The project will be directed to assist the Federal forest service of Russia and the State Forestry Committee of the Republic of Karelia in their efforts to lay a foundation for ecologically, financially and socially sustainable forest management and wood harvesting practices in Russia, especially Karelia. The project is expected to create a basis for environmentally feasible, economically profitable and socially acceptable utilization of the forests resources, and to promote the conservation of biodiversity.

The project will give the forest research institutions from both Russia and Finland an opportunity to gain new information on the dynamics of boreal forests. The project will assist the forest industries in both countries to satisfy the ecological demands of the environmentally conscious consumers in the product markets.

The immediate beneficiaries of the project will be the rural population in the area, through improved employment and income opportunities and increased economic activity. The forest product companies both in Karelia and Finland will also benefit from the improved supply of raw materials.
PRILUZYE MODEL FOREST

Brief information on the project:

The idea of setting up the Priluzye Model Forest (Republic of Komi) is a constituent part of the WWF Project "Conservation and management of boreal forests: Pechoro-Ilychshi Model Project, Republic of Komi, Russia" implemented by financial support of the Swiss Government. The role of this Model Forest consists in working out of the models for carrying out reforms in forestry, by taking into account regional economic, social and historical peculiarities, on the basis of advanced world experience.

PARTNERS are from State and local forest administration (3), Forest industries (4), Government bodies (2), Legislative and self-governing bodies (2), Research and Educational institutions (7), World Wide Fund for Nature (WWF), Syktyvkar Branch

SIZE AND LOCATION: The Prilluzye Model Forest (PMF) is located in the south-western part of the Republic of Komi. The PMF total area is 795,000 ha, of which 96% fall to the share of stocked forest area.

OBJECTIVES:
1. Development of a new forest policy on the basis of experience gained in the Model Forest.
2. Revision of the methods applied in conventional silviculture.
3. Improving qualification and educational level of foresters.
4. Creating conditions for transition to sustainable model of forest use and forestry.
5. Creating conditions for socio-economic development of the region to be based on forest complex development.
6. Creating a working model for conservation of biodiversity and ecosystems in the managed forests.
7. Raising productivity and merchantability of forests in conformity with requirements of biodiversity conservation in the forest ecosystems.
8. Enhancement of responsibilities and participation of local people in forest management considered as a source of their well-being.

EXPECTED RESULTS:

1. Forestry:
   - creating conditions for sustainable development;
   - balance of forestry and economic goals, on the basis of biodiversity conservation;
   - working out of new concepts in forestry;
   - introduction of landscape planning on the basis of GIS-technologies;
   - improving qualification of foresters;
   - practical adoption of new ecological criteria for the cadastre assessment of forest lands;
   - introduction of new technologies of forestry operations.

2. Forest industries:
   - attracting potential investors;
   - new technologies;
   - certified products;
   - access to international market;
   - improving qualification.

3. Economy:
   - attracting investors;
   - introduction of new technologies;
   - wood-processing;
   - economic stabilization on the basis of forest complex development;
   - ecological certification of forest products;
   - access to international market;
   - general economic improvement;
   - employment stabilization.

4. Local population:
   - socio-economic stability of the region under conditions of market reforms;
   - enhancement of responsibilities and participation of local population in the development of the region;
   - creating conditions for establishing partnerships to involve local people and Model Forest's partners.
CASE STUDY

- GASSINSKY, RUSSIA MODEL FOREST -

by Vladimir Pominov
President
Gassinski Model Forest
Dear Ladies and Gentlemen:

First of all I would like to thank the organizers of this conference in the person of the Japan Forest Agency and the International Model Forest Network Secretariat for the invitation and the opportunity to participate in this very important meeting.

We represent at this conference the Gassinski Model Forest Association - the first model forest in Russia. It was established in 1994 at the initiative of the Ministry of Foreign Affairs of Canada and the Federal Forest Service of Russia.

The reason for the establishment of the model forest was the idea to implement into reality a model of sustainable forestry management. This was the desire of not only the Russian Forest Service representatives and other nature protective agencies but also of the citizens of Khabarovsk Krai.

Khabarovsk Krai is rich in forest resources. They are utilized by various State agencies and private companies, which have no coordinated plan of activities. Each tries to pursue its own interests and rights for timber. To coordinate activities of rational forestry management and forest resources use a decision was made to develop a consolidating project. Such a project would have to take into account the interests of forest loggers, forest protection personnel, hunters and trappers, fishermen, indigenous people and others. That is why the decision was made to establish an Association able to solve the problems of sustainable forest management on the basis of consensus.

The Association has embraced 22 partner organizations including bodies of local administration, units responsible for environment protection, logging companies, scientific research institutions, higher educational institutes, communities of indigenous people residing on the model forest territory, representatives of mass media, and others.

The partners made the decision to set up an experimental territory on which to implement the main principles of sustainable forestry management in the forest. According to conditions that were jointly worked out the territory chosen would have to have in microcosm, the complete set of problems found in the whole region.

A common tract of the Forest Service land measuring 395,000ha in the Nanai administrative region of Khabarovsk Krai was made an experimental forest unit. The forest in this territory was not noted by a particularly high value forest. From the 1950’s to the 1990’s the area was intensively logged and there were also serious outbreaks of gypsy moth infestation. Still today, the problem of mass spruce stands drying back remains an urgent one.

On the other hand the area of the Gassinski Model Forest is characterized by a high biological diversity. There occur over a thousand of flora species in the model forest territory. Twenty-seven of 44 rare and endangered plant species are included in the Russia Red Book.
The forest resources are represented mainly by various types of coniferous, broad-leaved and *Pinus koraiensis* forests. The species composition of the Gassinsky Model Forest is as follows: spruce and fir cover 39.4% of the area, *Pinus koraiensis* - 15%, larch - 7%, birch - 26%, linden - 5.0%, ash - 4.3%, oak and other species - 3.3%.

The wildlife composition on the territory of the model forest is rich as well. It is represented by more than 20 species of game and 50 species of birds. The Siberian tiger also occurs there. The rivers Amur and Anyuy are notable for high diversity of fish resources.

The landscape is diverse and includes mountainous - hilly tracts intermingled with lowlands. The hydrographic regime includes three large rivers: the Anyui, Pikhtsa, and Tormasu as well as Gassi Lake and its tributaries, and a high number of creeks and springs. Over four thousand indigenous people of the North and Priamurye reside in the region. The total model forest area is suitable for economic development.

The Canadian Government provided support for the organization of the model forest. The first phase of financial support from Canada amounted to 3 million Canadian dollars. The Russia Federal Forest Service provided financial support for development of the model forest’s infrastructure and established an experimental forestry unit.

From the very outset of its activities the Gassinski Model Forest Association has set for itself the following important goals:

1. To elaborate and implement a territorial model of sustainable ecological development, while taking into account the interests of the majority of the population, its communities and groups.

2. To elaborate and implement a model of the socio-economic development in the model forest territory on the basis of sustainable nature resources use.

Based upon this the following objectives were determined:

1. To establish a capable organization with its own structure of administration and coordination.

2. To compile a plan and strategy for concerted work to achieve the goals identified.

3. To accomplish a set of activities related to an inventory of model forest resources.

4. To carry out scientific and technological research to determine the ecological and economic status of the model forest.

5. To develop recommendations and programs for improving the environmental and economic status of the model forest.

6. To involve the local population in the territory and its resource managers.

7. To compile a programme of long-term activities.

8. To disseminate the accumulated experience in Khabarovsk Krai and other regions of Russia.
All projects within the framework of the Gassinski Model Forest Program were divided into blocks:

1. **Organizational** - includes all projects related to administration and coordination activities. In the framework of these projects workshops were organized, local experts traveled abroad on business and professional missions, foreign experts were invited to visit the model forest area, and reports and proceedings of the partners meetings were published.

2. **Inventory** - includes a group of projects related to creating an inventory of the model forest's resources. Within this block of projects a forest inventory was carried out as well as wildlife population enumeration, forests protection and disease status and monitoring work was organized. On the basis of the forest inventory data a geographic informational system (GIS) was established. The GIS in its essence will be a unique tool that will aid future economic decision making on the basis of objective informative data.

3. **The Ecological block** of projects was intended for execution of scientific research to examine the model forest’s ecosystems, and to evaluate their resistance to human impact. Optimum forest management systems were developed in this block. The issues of preserving the vegetation and wildlife biodiversity and also the genetic pool of the main forest forming species were studied. A new approach was suggested to divide the area into economic sections based upon the watershed principle.

Using data from the ecological block of projects a great number of maps were compiled including one illustrating areas of ecological risk in the territory. A program for the ecological development of the territory was worked out.

4. **The Economic block** of projects included research aimed at improvement of the economic situation of the model forest territory. Options were considered for improving the standard of living of the indigenous people who reside in the model forest. In particular a small sawmill was purchased for the indigenous Nanai community. Research was also carried out on the processing and use of non-wood forest products. The territory was further evaluated to determine opportunities for industries such as tourism, sports hunting and sport fishing. On the basis of these projects a formal "Program of the Economic Development of the Model Forest "Gassinski" was elaborated and adopted by the regional government and the government of Khabarovsky Krai.

5. **The Technical block** of projects envisaged development of equipment and tools for wood processing, the planting of forest seedlings, and forest fires prevention and control. In this program area demonstration site was organized to show the new technologies and machines.

6. **The Communication and education block** included one of the most important trends in the model forest’s activities. Experts responsible for this block of projects were involved into dissemination of knowledge about nature, model
forests and issues of sustainable development. The activities in the model forest were reflected in the mass media.

In the framework of this project area training programs were developed for the environmental education of students. A documentary film on model forest was also released.

At the moment the model forest is in transition. During the four years that the model forest has existed very valuable and numerous scientific materials have been accumulated. Two wide-scale programs were developed: the economic and ecological development of the territory. A GIS and sound scientific-technological basis for the model forest were established. The Canadian partners constructed a model forest office building in which the model forest Executive Directorate is located. In sum, the conditions have been created for the practical testing of recommendations for sustainable forestry management made by scientists and experts in Phase I.

Because of the complicated economic situation in Russia and reductions in available financing for Phase II, the Gassinski Model Forest Program will be decreasing the scope of its activities. However in spite of all the financial obstacles the Khabarovsk Krai Forest Service is firmly intent on putting into practice the positive experience and recommendations on sustainable forestry management which were suggested by the Association's scientists and experts.

The next financial year we plan to work on 4 main trends:

1. To develop criteria and indicators of sustainable forestry management conforming to the local conditions found in the Gassinski model forest.

2. To create a decision making support process.

3. To proceed with development of the economic block to improve the economic situation in the region.

4. To inform the population on the issues of environmental protection and education of the young in a spirit of caring for nature.

Besides the above mentioned trends we are also actively seeking sponsors to finance further scientific research, establishing enterprises for processing of non-wood forest products, and development of tourism on the territory of the Gassinski Model Forest.

In conclusion we would like to emphasize our aspiration to continue our involvement in the International Model Forest Network. We hope to widen our relations with the other model forests of the world, and we also believe in mutually advantageous cooperation of Russia scientists and experts with those from foreign countries.

Thank You.
President of Gassinsky Model Forest Association

Vladimir Pominov
COUNTRY REPORT

- SENEGAL -

by Ndiawar Dieng
National Forestry Action Plan Coordinator
Minister’s Adviser and Coordinator
Ministry of the Environment and the Protection of Nature
Community Based Sustainable Forests Management Approach
Senegal Case Study

By Ndiawar DIENG National forestry action plan coordinator, Ministry adviser

INTRODUCTION:

Since Independence, the first priorities in Senegal were to develop the agricultural sector for achieving both food self sufficiency and improving the country's Trade Balance.

The expectations were broken by 1968 with the occurrence of serious droughts which highlighted a more heavy constraint always hidden: the desertification process with which, it provokes severe land degradation and distortion of the traditional systems of production and led to the hardening of life conditions in rural and urban areas with an increasing of the populations poverty; energetic problems; lack of drinkable water; loss of biodiversity...

The impacts of these constraints have led to initiate policies aiming to take into account environmental aspects in every development program and to enforce activities dealing with extension and the populations training to reach a sustainable involvement in term of taking decisions and actions in the management of the forest resources. Those actions have been supported by reforms such as:

- the restructuration of the forest policy;
- the modification of the forest law;
- the adoption of new laws for the formal transfers of natural resources management competencies to local collectivities.

Thus the strategies enhanced moved from government fields planting activities to what we have called «rural forestry» and which is an integrated approach for the base communities territories.

THE PROWALO PROJECT

This case of the project "Aménagement des forêts et gestion des terroirs du Walo – PROWALO" is part of the logical framework described and has, as main objective, to contribute in the reconstitution and the maintaining of a balanced ecological milieu and to develop agropastoral resources with the participation of concerned populations from:

- the improvement of the regional forest service methods of work and the reinforcement of the organising capacities of populations for a sustainable management of forest resources and
- the settlement of a coherent agro-sylvopastoral development program aiming the preservation of a stable and productive natural milieu in the villages territories.
The project activities are located in the North of Senegal, by the river Senegal valley which was sometime covered by riparian forests of *Acacia nilotica* often classified as national forests. In this region, the outlaw cutting for fuelwood and, mainly, the lower rainfall (less than 150 mm) which doesn’t allow the regeneration has led to a high reduction which is threatening this specie.

This situation is complicated by a great need of land for agricultural which has led to forest clear cutting, even in national forests, to install agricultural irrigated land in the context of the functioning of the Diarna Dum aiming to irrigate 240000 ha.

1 - Project strategy

The strategy of this project of the Ministry of Environment and Nature Protection (National Forestry Service) is based in participative approach including:

- training and extension activities to associate populations in the planning and the implementation of field programs with the contribution of the other actors of the project activities area;

- reinforcement of the forestry actions coordination by an involvement of the forestry agents working in the project area;

- strengthening of the partnership system which is focusing in the role and the contribution of each party.

The project is at his third phase (1994-1998) funded by The Netherlands for 3,000,000$ and executed by FAO.

Besides the support to the Forestry Service in term of infrastructures, equipments and training, the project is also supporting populations for the inventory and the mapping of local forests, the local organizations training (particularly women organizations) mainly for the settlement of local communities natural resources management committees, and for the forestry at school including teachers and students training.

2 - Activities and results

The natural conditions of the project intervention area (drought, insects attacks, natural disasters) has led to the the following activities:

- the elaboration of forest resources management plans for the areas located out of national forests from the estimation of the forest and pastoral potentialities and the populations training in forest and pastoral techniques including nursery, phytosanitary controls, windbreaks and live fences management, grass harvesting and storage;

- The realisation of natural resources conservations plantings in area out of natural forests supported by local nurseries, windbreaks and live fences, pilot areas of irrigated trees planting, roadside and river banks planting, fodder production and preserved areas;

- The increasing of the financial capacities of local people and the reduction of the
women's work form an improvement of intervention capability and knowledge in activities leading to catch more income (dye, vegetables, poultry and honey production, farming, financial management, native language literacy), support in the formulation of local small projects and through a warranty fund, having other equipments such as mills, improved stove or irrigated lands.

- Adoption of integrated local territory management models including knowledge to inventory the available and potential resources for the local people with the support of a pluri-disciplinary team using the MARP as mapping tool and socio-economic studies.

3 – Means of the Project

This item refers to:

- the human resources which are composed of 7 engineers, 7 technical agents and 7 international experts closely working with the Regional Forest Service up to the lower level;
- Material means including buildings for offices, cars, office supplies including computers, mapping and extension tools, field and other population support tools;

4 – Constraints

The major problems encountered since the beginning of this phase are referring to:

- the limited human resources including those of the other supporting partners;
- the difficulties encountered by local people to reach their objectives because of their limited financial means for the implementation of the local projects even when they are supported.
- difficulties to regenerate and protect forests even though a good extension program was performed because of the lack of grazing control in afforested lands.

Conclusions

Despite the ecological and socioeconomic constraints encountered by the project, overall, satisfactory results are being achieved within the participatory approach and agencies and NGOs cooperation as well. Overall, initial credit to farmers is critical for maintaining a genuine participative approach for a sustainable local development.
COUNTRY REPORT

- THAILAND -

by Apiwat Sretarugsa
Director
Planning Division
Royal Thai Forest Department
MODEL FOREST AREA OF SUSTAINABLE FOREST MANAGEMENT
THAILAND PERSPECTIVE FOR SUSTAINABILITY

Mr. Apiwat Sretarugsa
Director of Planning Division
Royal Forest Department
Thailand

Paper presented at the International Workshop on Model Forests for Field-Level Application of Sustainable Forest Management
Tokyo, 10-12 March, 1998
I. RATIONALE

Even though forestry activities in Thailand have been stressed intensively on the protection and conservation of forest areas and their natural resource base, forest encroachment by rural villagers, both for their homesteads and lands for operation, have become even more severe problems leading to a rapid decline in forest areas during the past development decades.

As a result, various conflicts over uses of forest and land resources are widely taken place throughout the country. Villagers, for the survival of their livelihoods, thus, demand the government to manage conservation forests by improving the forest boundaries and securing them land rights through a land reform scheme. To accommodate those demand, the Royal Forest Department of Thailand will require policy guidelines and appropriate measures for future implementation. In this vein, model forest area based on sustainable development approach is of great importance for solving the problems.

II. OBJECTIVE

The overall objective is to review and highlight a policy framework for sustainable forest management and to outline a model forest area with respect to forest resources and forest land use planning and management. Specific objectives of the paper are as follows:

1) to review the current situation and identify major problems in forestry development in Thailand;
2) to highlight strategies and policy measures contributing to sustainable forest management; and
3) to determine an alternative model forest area for sustainable forest resources management.

III. CURRENT SITUATION

3.1 Forest Area.

Thailand is one of the South-East Asian countries with total land area of 51.3 million hectares and a population of about 60 millions in 1996. During the last three decades, a vast forest areas were depleted in the course of national development. The forest cover of the Kingdom has declined from 27.2 million hectares or 53.3% of the land area in 1961 to only 13.1 million hectares or 25.62% in 1995 (Royal Forest Department, 1995) Annex 1.
3.2 *Forestry Problem.*

Deforestation has been and still is the most serious environmental problem of the country, with severe implications for the sustainability of the economy and the welfare of its rural people. Forestry problems in Thailand have directly associated with socio-economic problems.

The main underlying causes of forestry problems can be traced to increasing demand for land for agricultural production, expansion of socio-economic infrastructure, and population growth. Current forestry problems can be classified into two categories:

1. Forest encroachment leading to a decline in forest areas and shortage of wood for domestic consumption, and
2. Conflicts over use of forest and land resources.

3.3 *Forest Zonation.*

National forest reserves in Thailand cover the total area extent of 23.0 million hectares which some parts have been deteriorated due to encroachment for socio-economic activities during the past development decades. In 1992, the Cabinet had adopted a forest land use classification scheme which divided national forest reserves into three main zones, namely:

1) Conservation Zone (Zone C): Forest areas for conservation purpose 14.1 million hectares,
2) Economic Zone (Zone E): Forest areas for economic development 8.3 million hectares, and
3) Agricultural Zone (Zone A): Forest areas suitable for agriculture 1.1 million hectare

IV. POLICY FRAMEWORK FOR SUSTAINABLE FOREST MANAGEMENT

4.1 *Constitution of the Kingdom of Thailand B.E. 2540 (1997).*

The Constitution determines national fundamental policy on national resources which states that “The state shall encourage and enhance people’s participation in the conservation, maintenance, and utilization of natural resources and biological diversity in balanced manner as well as in the protection of environmental quality in accordance with the principles of sustainable development.”

4.2 *1985 National Forest Policy.*

The 1985 National Forest policy emphasized on the setting up long-term management and development of forest resources in relation to other natural resource base. The policy has fixed the overall target in maintaining national forest area at 40% of the total land area or 20.52 million hectares. Among these, 15% will be designated in the conservation forest while 25% will be productive forest. Other key aspects were addressed on people’s participation on forestry development, improvement of administrative system, and forest research operation.

The Eighth Plan set the target in forest resources conservation and development during the Plan period as follows:

1) rehabilitation of forest resources at least 25% of the total land area or about 12.5 million hectares,
2) conservation of mangrove areas of 168,000 hectares for the maintenance of biological diversity and environmental stability, and
3) promotion of community forestry for the protection of environment and quality of life of rural people.

V. APPROACH TO SUSTAINABILITY

5.1 Action Plan for Forestry Development.

In response to the policies related to forestry, the Royal Forest Department has translated the policies into five-years concrete action plan which will be served as guidelines and mechanisms for implementation during 1997-2001. The action plan has its goals and objectives in three main aspects:

(1) to conserve and protect the natural forest and designate to be conservation forests of not less than 12.5 million hectares or 25% of total land area,
(2) to rehabilitate protected areas and degraded watershed by planting trees through public and private involvement in order to increase forest areas of 20 million hectares or 40% of total land area,
(3) to resolve conflicts in forest resources and land use and to enhance participation and involvement from various parties, both public and private sectors, and general people in sustainable forest management.

5.2 Strategies for Forestry Development.

To achieve the desired goals and objectives, the implementing strategies are determined in five aspects:

(1) Protection of existing natural forests.
This strategy can be employed through land use demarcation, increase efficiency in inspection and following up forest encroachment cases in protected areas, and raising public awareness in the conservation of forest resources.

(2) Rehabilitation and reforestation.
Specific measures cover the protection and maintenance of protected areas and watershed areas, promotion of technical and market-based incentives in reforestation, and strengthening the capacity of communities in community forestry development.

(3) Mitigation of conflicts over use of forest and land resources.
Specific measures aim at investigation of land tenure and permission for land use operation, and promotion of mechanisms for people's participation and involvement in sustainable forest management through enhancing indigenous knowledge base.
(4) Improvement of management efficiency.
This can be done through decentralized development system with delegation of authority into local administrative bodies more widely, improvement of forest data base together with the improvement officials' attitudes and revision of rules and regulations for effective performance.

(5) Research and development and transfer of technology.
Major activities comprise of setting up policy on research and development, public relations and transfer of technology in forest and forest-related activities to specific target groups, and supporting international cooperation and collaboration on forestry development.

5.3 An Alternative Model Forest Area.
Sustainable forest management provides a balanced approach to forestry development in the manner that forest resources shall be sustainably managed socially, economically, and ecologically. In order to achieve sustainable forest management, an alternative model forest area is proposed addressing the application for forest resources and forest land use planning and management at field level (Figure 1).

Based on this model, the target area cover five categories of forest areas which will implemented in 66 provinces with to total area of 16.9 million hectares. Three key strategies and relevant activities are proposed covering:
1) Mitigation of forest resources and forest land use conflicts,
2) Forest protection, and
3) Rehabilitation of natural resources and the environment.

VI. IMPLICATIONS FOR FUTURE POLICY

In order to achieve sustainable forest management, future policy initiatives for long-term planning and management should be addressed the followings:

1) Balanced Development Approach.
Forest land and forest resources should be properly managed so as to enhance the environmental stability as well as to upgrade the living standard of rural villagers. The conservation strategies must go hand in hand with the eradication of poverty and inequality problems if to achieve sustainable forest management.

2) The Need for an Integrated Approach to Development.
Forest land and forest resources shall be managed efficiently through the integrated approach. Coordination and collaboration among concerned agencies in forest land use should be strengthened. At the same time, revision of rules and regulations in accordance with present situation must be carried out properly.

3) Public Participation.
Promoting public participation and involvement in the forest land use planning and management is one major component in achieving sustainable forest management. Private sector, non-governmental organizations (NGOs), government agencies concerned, and general public must be fully involved in development process.
   All stakeholders concerned with forestry development, both from government agencies, private sector, non-governmental organizations (NGOs), local communities, and general people should be well educated and enhanced through capacity building. Changes in roles and attitudes are also crucial for joint cooperation and collaboration in efficient manner.

REFERENCES


Royal Forest Department, 1993, *Thai Forestry Sector Master Plan*, Royal Forest Department, Ministry of Agriculture and Cooperatives, Bangkok, Thailand.
Figure 1: Model Forest Area for Sustainable Forest Resources Management

**TARGET FOREST AREA**

- 16.9 MILLION HA in 66 PROVINCES

### 3 STRATEGIES

<table>
<thead>
<tr>
<th>I.</th>
<th>II.</th>
<th>III.</th>
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<tr>
<td>MITIGATION OF CONFLICTS</td>
<td>FOREST PROTECTION</td>
<td>REHABILITATION OF FOREST AND LAND RESOURCES</td>
</tr>
</tbody>
</table>

#### ACTIVITIES

- Survey of problems and situations
- Appropriate land use survey and planning
- Demarcation of forest areas and boundaries
- Forest Land management
- Forest land holding survey and registration
- Investigation and certification of land rights (both homestead and land for operation)
- Protection of forest encroachment through enforcement of forest laws
- Public relations and public awareness program
- Promotion of integrated land-use planning
- Protection of forest areas for natural rehabilitation
- Reforestation extension in degraded areas
- Secure of land rights and promotion of tree farming
- Extension of community forestry as well as village woodlot programs
- Capacity building
- Monitoring and evaluation
## Annex 1

### Table 1: Forest Area in 1961 to 1995

<table>
<thead>
<tr>
<th>Year</th>
<th>Million rai</th>
<th>Million hectare</th>
<th>%</th>
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<tr>
<td>1961</td>
<td>171.0</td>
<td>27.4</td>
<td>53.3</td>
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<tr>
<td>1973</td>
<td>138.6</td>
<td>26.6</td>
<td>43.2</td>
</tr>
<tr>
<td>1976</td>
<td>124.0</td>
<td>24.1</td>
<td>38.7</td>
</tr>
<tr>
<td>1978</td>
<td>109.5</td>
<td>17.5</td>
<td>34.2</td>
</tr>
<tr>
<td>1982</td>
<td>97.9</td>
<td>15.7</td>
<td>30.5</td>
</tr>
<tr>
<td>1985</td>
<td>94.3</td>
<td>15.1</td>
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<td>1988</td>
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<td>83.5</td>
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<td>26.0</td>
</tr>
<tr>
<td>1995</td>
<td>82.2</td>
<td>13.2</td>
<td>25.6</td>
</tr>
</tbody>
</table>
WORKSHOP REPORT

- UNITED STATES OF AMERICA -

by Oregon Department of Forestry
OREGON'S FORESTS IN THE 21ST CENTURY

Study Plan to Assess the Condition and Trends of Oregon's Forests

Oregon Department of Forestry
Forest Resources Planning Program

February 1998

"STEWARDSHIP IN FORESTRY"
The forest assessment projects will provide the background about conditions and trends of Oregon's forests, in-depth analyses of significant policy questions, and analytical tools with which to examine scenarios of the future development of the state's forests under alternative forestry policies. Key to the projects will be use of criteria and indicators from the Santiago Declaration as the basis to describe forest conditions.

These projects totally support the watershed approach to the analysis of forest policy and for project proposals. With the knowledge of conditions, trends, and inter-resource tradeoffs that these projects will provide, policy decisions can be made that will help restore and enhance forest health and salmon productivity with the least impact on other resources and the provision of necessary services, values, and forest products. Integrating the needs and values of Oregonians into policy proposals is a vital potential outcome of these projects as well.

Starting with the 1993-95 Biennium, Department staff have been working on the SB! 125 (1991 session) requirement to produce information on the cumulative effects of forest practices on Oregon's soil, air, water, fish, and wildlife resources. The forest assessment projects combine that effort with preparations for the Assessment of Oregon's Forest Resources which will precede the 2001 revision of the Board of Forestry's Forestry Program for Oregon (FPFO). The forest assessment projects effort got underway formally with the symposium, Oregon's Forests in the 21st Century, held at Oregon State University on January 4, 1996, which was jointly sponsored by OSU and the Oregon Board of Forestry.

Building on the cumulative effects project, the forest assessment projects are comprised of three components: 1) An Oregon "First Approximation Report," 2) An integrated assessment of Oregon's forests that builds on the "First Approximation Report," and 3) Continued development of more advanced and integrated tools for answering policy questions:

1. An Oregon "First Approximation Report" will provide important and comprehensive factual information about conditions and trends of Oregon's forests. This report will address criteria and indicators of sustainability that are being discussed at international levels. It will analyze available information to craft sound policies for Oregon's forests as well as serving as a starting point for collecting additional needed data where it is currently missing. The first approximation report will be completed in 1999.

See Appendix A for a list of criteria and indicators and a preliminary analysis of data availability to address the criteria and indicators. See Appendix B for an example of the type of spatial information that will be produced in this report. Appendix B shows the extent of area by forest type and will be used to help address Criterion 1: Conservation of biological diversity.

2. An integrated assessment, the Assessment of Oregon's Forests, will build on the "First Approximation Report" and will lay the foundation for the next Forestry Program for Oregon. The product of this work will be an assessment of Oregon's forest resources, which will incorporate an integrated look at multiple forest resources, and will be published by the Department as proceedings from a symposium to be held in 2001. The publication will include additional information derived from ongoing inventories of forest resources and from models specifically designed to use these inventories.

This work will be an outgrowth of the 1988 work of that same name. The assessment report will examine a specific set of policy questions reflective of current and anticipated resource issues. It will include an explicit analysis of the implications of a continuation of current Board of Forestry policies. Alternative policy scenarios will be examined at the request of the Board of Forestry.
This information will support deliberations of the Board of Forestry in developing action plans for the next *Forestry Program for Oregon.*

3. **Development of more advanced and integrated tools for answering policy questions** will be a key component of the forest policy projects. Asking "what if" questions and answering them through the use of scientifically sound models and analytical tools such as Geographic Information Systems (GIS) will become increasingly necessary as resource management decisions become increasingly complex and integrated. This component of the assessment projects will build on ongoing efforts by the Pacific Northwest Research Station and research conducted at Oregon State University and other academic institutions.

Examples of policy questions that will be answered with outputs from models developed for the forest assessment projects include:

- How sustainable are resource outputs from Oregon’s forests?
- How will Oregon’s land development patterns change Oregon’s forest land base and management practices over time?
- How will the structure and diversity of forest fish and wildlife habitats evolve over time?

Appendix C shows test simulations from the Coastal Landscape Analysis and Modeling Study (CLAMS). The forest assessment project is partially funding CLAMS and will use much of the scientific knowledge developed by CLAMS and other ongoing studies as a foundation for assessing current and future conditions of Oregon’s forests.
The products from the forest assessment projects will include publication of a "First Approximation Report" in 1999, a 1999 symposium presenting results from the first approximation report and from ongoing integrated assessment research, and published proceedings from a symposium to be held in 2001. Both the first approximation report and the integrated assessment report will pull together state-of-the-art information and results of ongoing research about conditions and trends in Oregon’s forests into reports suitable for review by the Board of Forestry and other policy makers.

Policy and Working Groups Direct Analyses

An umbrella policy group oversees the assessment projects. This group ensures that efforts by the working groups are achieving the goals and objectives of the assessment process. For example, the group is currently attempting to gain consensus on agreement of measures and adequacy of information to address internationally recognized criteria and indicators of forest sustainability and to prioritize the issues and policy questions to be addressed.

Policy group members include:

- George Brown, Dean, Oregon State University College of Forestry
- David Bayles, Conservation Director, Pacific Rivers Council
- Dave Bowden, Longview Fiber Company
- Jim Brown, State Forester, Oregon Department of Forestry
- Joyce Cohen, Governor’s Office
- Jim Greer, Assistant Director, Oregon Department of Fish and Wildlife
- Sam Johnson, Oregon Board of Forestry
- Thomas J. Mills, Station Director, PNW Research Station
- Lydia Taylor, Deputy Director, Oregon Department of Environmental Quality
- Sara Vickerman, State Conservation Director, Defenders of Wildlife
- Ilene Waldorf, Oregon Small Woodlands Association
- Robert W. Williams, Regional Forester, USDA Forest Service
- Elaine Zielinski, State Director, Bureau of Land Management

Groups working in four key areas will prepare information to be published in the first approximation report and in the integrated assessment: 1) Criteria and Indicators, 2) Integrated Assessment, 3) Social and Behavioral, and 4) Incentives, Regulation and Taxation. The groups will develop common frameworks for describing, assessing and evaluating forest resources and will also, to the degree feasible, work toward an integrated assessment of Oregon’s forests. They will also ensure that important policy issues and research needs will be addressed.

Proposed working groups include:

1. **Criteria and Indicators** — This group is developing the methods that are needed to describe and quantify the indicators of sustainability. The group’s primary focus is gaining consensus on the data sets that will be used to develop Oregon’s First Approximation Report. The group is identifying existing data sets where possible and prioritizing the collection of additional data sets that are needed to describe the indicators. Close ties with the other groups are essential to assure that the data sets used or created to describe the indicators can also be used by the researchers and in models developed for the integrated assessment.
2. **Integrated Assessment** — Will integrate available and ongoing research into a comprehensive, integrated analysis of conditions and trends of Oregon's forests and will develop analytical tools for analyzing consequences of alternative forestry policies. Where possible, the models will use the indicators to describe future conditions of Oregon's forests. Where feasible, other areas will provide information for the integrated assessment; where not feasible, other areas will provide separate analyses.

3. **Social and Behavioral** — Will analyze the social and economic consequences of the management of Oregon's forests. The institutional mechanisms by which people view and interact with Oregon's forests will be examined, as well as the production of market and nonmarket values by the forests. As much as is feasible, information developed by the group working on the social and behavioral parts of the Assessment will be used by the group working on the integrated assessment.

4. **Incentives, Regulation, and Taxation** — Will analyze interactions between forest policy, forest taxation, landowner behavior, and conditions and trends of Oregon's forests. Specific emphasis will be given to existing forest policy and analysis of how nonregulatory and regulatory forest policy might need to change to meet the goals and objectives of the Forestry Program for Oregon. As much as is feasible, information developed by the group working on the incentives, regulation, and taxation parts of the Assessment will be used by the group working on the integrated assessment. Formation of the incentives and regulation working group has been postponed until a literature review of methodology for analyzing policy alternatives has been completed.

Proposed working groups objectives are to:

1. Coordinate with the policy group on addressing issues and policy questions,
2. Narrow the scope of the issues into manageable research questions,
3. Identify ongoing research that will address prioritized issues and policy questions,
4. Propose new research needed where ongoing research will not address prioritized issues and policy questions,
5. Where needed, develop methodologies and protocols that can be used to answer the questions,
6. Recommend existing data sets that can be used to answer the questions,
7. Prioritize the needs for collecting additional data,
8. Describe the criteria and indicators relevant to the group's areas of expertise, and
9. Identify how research and analysis integrates into the overall assessment, how the group's efforts coordinates with the efforts of other working groups, and how the research and analyses answers the assessment and benchmark policy questions.

Working group members include:

1. **Integrated Assessment** —
   - Tom Spies, Forest Ecologist, Pacific Northwest Research Station
   - Norm Johnson, Forest Policy Specialist, Oregon State University College of Forestry
   - Rebecca Johnson, Recreation Economist, Oregon State University College of Forestry
   - Jim Sedell, Fish Biologist, Pacific Northwest Research Station
   - Darius Adams, Forest Economist, Oregon State University College of Forestry

1. **Social and Behavioral** —
   - Rebecca Johnson, Recreation Economist, Oregon State University College of Forestry
   - Richard Haynes, Forest Economist, Pacific Northwest Research Station
   - Bruce Shindler, Social Scientist, Oregon State University College of Forestry
   - George Stankey, Resource Economist, Pacific Northwest Research Station
   - Paul Warner, State Economist, Oregon Office of Economic Analysis
1. Criteria and Indicators –
   - Susan Willits, Program Manager, Pacific Northwest Research Station
   - Janet Ohmann, Forest Ecologist, Pacific Northwest Research Station
   - Linc Cannon, Oregon Forestry Industries Council
   - Keith Hupperts, Defenders of Wildlife

1. Incentives, Regulation & Taxation (Suggested Members) –
   - Tax Specialist, Oregon Forest Industries Council
   - Small Woodlands Owner, Eastern Oregon
   - Small Woodlands Owner, Western Oregon
   - Conservation Group Representative
   - Academic Representative

Proposed Timeline

1. Formation and first meeting of policy group: completed
2. Consensus on key elements to be in the Oregon First Approximation Report: ongoing
3. Data collection and analysis for Oregon First Approximation Report: ongoing
5. Final Oregon First Approximation report completed: June 1999
6. Assessment of Oregon's Forests First Approximation Symposium: September 1999
7. Integrated assessment information gathering and analysis: ongoing
8. Symposium presenting results of integrated assessment: 2001
10. Development of advanced models and other analytical tools: ongoing
ONGOING PROJECTS FUNDED FROM 1997-99 BUDGET

Tabulated below are ongoing projects funded by the Oregon Department of Forestry with monies from the 1997-99 Budget. Additional contributions to the assessment project are being made by the Oregon State University College of Forestry and Pacific Northwest Research Station.

Ongoing forest assessment projects for the 1997-1999 biennium:

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<th>Project</th>
<th>Principal Investigator</th>
<th>Phases and Products</th>
<th>Completion Date</th>
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<td>1. Forest Recreation</td>
<td>Rebecca Johnson</td>
<td>I. Gathering of current data on recreation availability and use</td>
<td>July 1998</td>
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<tr>
<td></td>
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<td>II. Report to ODF on recreation criteria and indicators</td>
<td>January 1999</td>
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<td></td>
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<td>III. Analysis</td>
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<tr>
<td></td>
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<td>1) Projections of recreation availability and use</td>
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<td>2) Estimation of relationships between recreation use and changes in ecosystem</td>
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<td></td>
<td></td>
<td>characteristics (to degree possible)</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>3) Final report</td>
<td>June 1999</td>
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<td>2. Socioeconomic</td>
<td>Rebecca Johnson</td>
<td>I. Background information gathering</td>
<td>July 1998</td>
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<td>1) Completion of literature review</td>
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<td>2) Completion of interviews of participants in past socioeconomic assessments</td>
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<td>3) Completion of gathering of socioeconomic indicators</td>
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<td>4) Data for socioeconomic indicators (to degree possible) to ODF for first approximation report</td>
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<td>II. Workshop</td>
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<td>III Analysis</td>
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<td>2) Development of proposal for implementing the improved methodology</td>
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<td>3) Completion of final report</td>
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<td>2) Initial inventory, economic, management intensity and other information needed for initial model runs gathered</td>
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<td>1) Initial model run completion</td>
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<td>and the CLAMS project</td>
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<td></td>
<td></td>
<td>3) Data to ODF on criteria and indicators (to degree possible from model inputs and projections)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>III. Delivery of final model, documentation, example projections, and data sets to CLAMS and ODF</td>
<td>June 1999</td>
</tr>
<tr>
<td>4. Landscape Simulation</td>
<td>Norm Johnson</td>
<td>I. Landscape simulations for test basins</td>
<td>May 1998</td>
</tr>
<tr>
<td>Methodologies</td>
<td></td>
<td>1) Landscape simulations for Alsea and Nehalem drainages</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2) Several fish and wildlife response models to be part of the simulations</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3) Maps and other documentation from simulations to ODF</td>
<td></td>
</tr>
</tbody>
</table>
II. Landscape simulations for entire CLAMS area
   1) Landscape simulations for CLAMS area completed
   2) A narrative of potential implications of simulations regarding criterion I, Conservation of Biological Diversity
   3) A report describing the data, methods, assumptions, and models used
   4) A report documenting the results of the simulations by river basins, including disturbance

III. Landscape simulations for western Oregon
   1) Landscape simulations for western Oregon completed
   2) A narrative of potential implications of simulations regarding criterion I, Conservation of Biological Diversity
   3) A report describing the data, methods, assumptions, and models used
   4) A report documenting the results of the simulations by river basins, including disturbance
   5) To ODF details of simulations including all data used (and requested by ODF)

5. Forest History
   Tom Spies
   I. Development and testing of approach in the Coast Range
      Extension to rest of western Oregon, see notes under item 3
      1) Report with quantitative estimates of how fire and human disturbance have influenced measures of biodiversity (coarse filter)
      2) In report, a qualitative estimate of amount of forest land in which ecological structures and processes are outside of historical range (indicator 3a)
      3) In report, a narrative of potential implications of current & historical trends for fundamental ecological processes (indicator 3c)
         Note: narrative to be delivered for indicators 3a and 3c suitable for publication in first approximation report by January 1999
      4) A map and characterization of past fire regimes for the Coast Range suitable for assessing sustainability
         Note: Results of projects to be presented at September 1, 1999 symposium, Assessment of Oregon's Forests, Phase I: First Approximation

6. Forest Data
   Sue Willits
   I. 1998 Oregon Mill Study
      1) Completion of summary design
      2) Data collection
      3) Analysis and final repair
   II. Additional tree stocking information collection for eastern Oregon non-federal lands
   III. Land use change analysis
      1) Completion of study design
      2) Photo interpretation completed
      3) Final report written by Pacific Northwest Research Station, and Oregon Department of Forestry, Agriculture, and Land Conservation and Development

7. First Approximation Report
   Multiple Partners
   I. Prioritization of and consensus about data sets needed to describe the indicators
   II. Data Collection and Analysis
   III. First Approximation Report

8. Symposium
   Oregon Department of Forestry
   I. First Approximation Report Summary
   II. To-date results from integrated assessment projects
Expenditures for the Forest Assessment projects are currently being incurred by the Oregon State University College of Forestry and the Oregon Department of Forestry. Oregon State University expenditures for the Oregon coastal, southwest Oregon and eastern Oregon regions are being paid for out of current College of Forestry research budgets. Additional funding for model development, calibration and analysis by College of Forestry and other researchers will be required in the 1999-2001 budget. The additional funds needed to develop data sets and models for half-state and statewide analyses would come from Oregon Department of Forestry budget and other sources. Expenditures by the Pacific Northwest Research Station on ongoing inventory and research will also support Forest Assessment projects.

Funding for Oregon Department of Forestry expenditures on the Forest Assessment projects for the 1999-2001 biennium will come from Department of Forestry budget, cooperative grants and other, as yet unsecured, sources.

Proposed 1999-2001 funding and fund sources for forest assessment projects:

<table>
<thead>
<tr>
<th>Funding Source</th>
<th>General Fund</th>
<th>Federal Funds</th>
<th>Other Funds</th>
<th>Total Funds</th>
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<tbody>
<tr>
<td>Oregon Salmon and Clean Rivers Plan</td>
<td>132,000</td>
<td>--</td>
<td>143,000</td>
<td>275,000</td>
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<tr>
<td>Assessment Project Continuation</td>
<td>134,810</td>
<td>--</td>
<td>190,190</td>
<td>325,000</td>
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<tr>
<td>First Approximation Report and Integrated Assessment Analytical Work</td>
<td>--</td>
<td>--</td>
<td>132,000*</td>
<td>132,000</td>
</tr>
<tr>
<td>Eastern Oregon Analysis Program Option Package</td>
<td>228,000</td>
<td>--</td>
<td>152,000</td>
<td>380,000</td>
</tr>
<tr>
<td>Key Issues Analysis Program Option Package</td>
<td>150,000</td>
<td>--</td>
<td>100,000</td>
<td>250,000</td>
</tr>
<tr>
<td>Socioeconomic and Recreation Assessments Program Option Package</td>
<td>66,000</td>
<td>--</td>
<td>44,000</td>
<td>110,000</td>
</tr>
</tbody>
</table>

*Funding source is continuation of a grant from the Oregon Forest Resources Institute.

1. Specific expenditures proposed for the Oregon Salmon and Clean Rivers Plan and Assessment Project continuation funding include:

   1) Complete western Oregon analysis work ($255,000)
      a) Partner with BLM and Forest Service in development of 1997 vegetation layer
      b) Complete integration of 1997 remote sensing data and field plot data
      a) Develop western Oregon vegetation modeling system based on CLAMS and Applegate work
      b) Adapt biological and water quality response models to vegetation change modeling

   1) Adapt westside timber model to private lands in eastern Oregon ($70,000)
      a) Revise model code as necessary
      b) Prepare data sets using 1998 FIA inventory of private lands in eastern Oregon
      c) Software purchase (GAMS)

   3) Update eastern Oregon vegetation layer ($110,000)

   4) Hardware and software updates ($25,000)

   5) 1999 publications and symposium ($25,000)

   6) 2001 publications and symposium ($25,000)

   7) Complete development zone (land use change and implications for forestry) ($50,000)
      a) Complete western Oregon development zone (land use) analysis—photo point inventory to be completed in current biennium.
      b) Develop sampling design and implement to gather field plot stocking level information to tie to photo point information.
c) Inventory and analyze selected areas of eastern Oregon for land use change and implications for forestry in eastern Oregon.
d) Complete modeling work and integrate with other components of assessment.

8) Develop modeling system to begin quantifying implications of forestry-related regulatory and incentive proposals. ($40,000)
   a) Complete literature review and study plan.
   b) Complete quantitative analysis of policy alternatives.

TOTAL of these 8 items is $600,000

2. Expenditures proposed for Program Option Package 1, Eastern Oregon Analysis include:

The program option package to expand landscape assessment analysis work to eastern Oregon is budgeted at an additional $380,000. Models and data for eastern Oregon are currently not available but are needed to be able to better inform decision-makers of the effects of the choices in forest policy and in forest regulatory efforts.

The funds will be used to improve the reliability of predictions of forest processes, including habitat for forest dwelling terrestrial and salmonid species. Initial conditions will be determined from updated vegetation and timber inventory information and other sources. Disturbance modeling and other methodology will build on work completed by Oregon State University for the Applegate and Oregon Coastal Range areas of western Oregon. This additional work would be the subject of an agreement with a researcher or research organization qualified to perform such work (e.g., Oregon State University College of Forestry, USFS PNW Research Station). Work would be coordinated with other ongoing efforts such as the Interior Columbia Basin Management Project and the ongoing FIA inventory of lands other than national forests in eastern Oregon.

Work to begin analysis of forest resources in eastern Oregon will include:

1) Analysis of change in stand condition in eastern Oregon nonfederal lands, including continuing analysis of stands identified as understocked in eastern Oregon.
2) Completion of eastern Oregon timber supply analysis.
3) Landscape characterization and analysis of eastern Oregon ecosystems.
4) Landscape modeling of disturbance and succession across landscape in eastern Oregon.
5) Characterization of risks and opportunities related to forest health and ecosystem processes.

We are aware that the USFS-BLM project, ICBEMP (Interior Columbia River Ecosystem Management Plan) has produced much useful information; however, project data was collected on a very broad-scale and was designed for large scale planning (multi-state) efforts. The USFS is planning to bridge the “gap” between this very-coarse-scale data and the fine-scale data they have and use for Forest-level planning, but they intend for this mid-level-scale process of “sub-watershed planning” to be accomplished over longer periods of time. Where possible, Forest Assessment project work will utilize ICBEMP data, building on already completed work.

3. Expenditures proposed for Program Option Package 2, Key Issues Analysis Package, include:

The program option package to expand landscape assessment analysis work is targeted toward key assessment issues: riparian area management and carbon sequestration and global warming. This program option package requests the addition of $250,000 to:

1) Gather additional (more specific and more accurate) data on vegetation in the riparian areas closest to the streams.
2) To accelerate efforts in model development to be able to better inform decision-makers of the effects of the choices in forest policy and in forest regulatory efforts.
3) Work with Oregon Department of Fish and Wildlife to develop and gather data for biodiversity indices.
4) Update annual report methodology including reporting current and historical timber harvests in cubic as well as board feet and reconciling mill survey with timber harvest report and product production.

5) Continuing to update and enhance criteria and indicators developed in first approximation report.

6) Complete development of other models needed for both eastside and westside analysis. Examples include development of snag and woody debris dynamic models and various fire models.

The additional data and models would be developed in partnership with the PNW Research Station, the Oregon State University College of Forestry and others. The riparian management work would develop a pilot system that would key on the use of remotely-sensed data-gathering methods and would produce a limited inventory of streamside vegetation. The extent of the inventory produced depends on the cost and success of ongoing pilot system development. The modeling work would begin integration of Oregon assessment work with national and global modeling efforts for key issues such as carbon sequestration and global warming.

Local Watershed councils are charged with producing watershed-level plans and promoting projects to improve riparian function and watershed conditions. Without detailed data sets describing riparian vegetation composition and condition, their work will be prolonged because of the need for on-the-ground visits before specific plans can be drafted. Watershed-level information on riparian vegetation will enable planning that can assess treatment needs and can highlight locations most likely to benefit from improvement and restoration projects.

The model-development work would also begin the integration of Oregon’s Forest Assessment with national and global modeling efforts, particularly with research efforts targeted at analyzing carbon sequestration and global warming. Assessment work would be partnered with work of the Oregon Department of Energy, the USDA Forest Service and the US EPA. Because of the ability to coordinate with other agencies, the Department’s portion of the model-development work is estimated to be only $25,000.

4. Expenditures proposed for Program Option Package 3, Socioeconomic and Recreation Assessments Completion Package include:

The program option package to complete socioeconomic and recreation components of the Forest Assessment Project will require the addition of $110,000. Information about values of Oregon’s forest resources is currently incomplete but is needed to be able to better inform decision-makers of the effects of choices in forest policy and of the economic effects of forest regulatory efforts.

Current assessment work is developing new methodologies for including socioeconomic considerations in development of forest policy. Ongoing is an assessment of trends in social indicators and forest values for Oregon, including those in the criteria and indicators of forest sustainability from Oregon’s First Approximation Report. Also ongoing is development of an improved methodology for analyzing the socioeconomic components of an integrated forest assessment. However, given the current time and resource limitations, implementing the improved methodology is scheduled for the 1999-2001 biennium.

Current work is also aimed at assessing recreation availability and use and is describing relationships between recreation and landscape changes. Specific objectives of this work are to address the criteria and indicators of forest sustainability for Oregon’s First Approximation Report, to estimate forest recreation availability and use, to integrate ongoing work with GIS data layers, and to estimate recreation use models. Current work is descriptive; needed and proposed in this program option package is enhancing and extending methodology currently being developed to estimate relationships between recreation use and changes in ecosystem characteristics. Work will
include projections of recreation supply and demand and impacts on forest recreation of changes in forest policy and management.

This program option package, in addition to completing ongoing Forest Assessment Project work, will integrate with ongoing efforts by OSU and PNW researchers in the CLAMS project for the Oregon Coast Range area, the USFS-BLM ICBEmp (Interior Columbia River Ecosystem Management Plan) and other ongoing or already completed work.
COUNTRY REPORT

- VIETNAM -

by Nguyen Ngoc Lung
Director General
Forest Development Department
and
Nguyen Truong Thanh
International Cooperation Department
Ministry of Agriculture and Rural Development
MODEL 'FOREST RESTORATION AND DEVELOPMENT OF COLOGICAL-AGROFORESTRY SYSTEM' IN THE HILLY AREA OF DOAN HUNG DISTRICT, VINH PHU PROVINCE - VIET NAM

Nguyen Ngoc Lung, Nguyen Truong Thanh
Forest Development Department
MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT

SUMMARY

A model for forest restoration by integrating indigenous species in the development of ecologically sustainable agroforestry systems in the hilly area of Doan Hung district (Viet Nam) has been established. This was based on a combination of mixed planting indigenous species with promoting natural regeneration on an area consists of low hills and rice fields, where the mixed natural forests had been destroyed during the war and now is planned for establishing community protection forests and household's production ones. Additionally, the rice fields, fishing ponds and livestock are to be improved by the introduction of improved technologies as well as varieties.

During the first two years, perennial indigenous species stands have been inter-cropped with:
- Short term agriculture crops like soybean, ground-nut and pine-apple.
- Non-timber species like cinamomum and rattan.
- Nitrogen fixing, fast growing and bamboo species which can supply timber and fuel wood after 5-10 years.

The site was planned from the hill top downward the valley as F1: Protection forest; F2: Production forest; F3: Home garden; L: Livestock; P: Fishing pond and F4: Rice field.

The 3-year old forest has already produced effects on soil conservation and water supply during the dry season for annually cultivating one rice and one maize crop. As also resulted from the transfer of new farming techniques, the introduction of improved seeds, the breeding of pig and cow, the income of every household in the pilot area has increased by 20-35%.

The investment on this model were paid by the local farmers and also by the Government's non-interest credit. The loan is to be reimbursed after 3 years if it was invested on agriculture and 5 years on forestry. The model is highly appreciated and being used as a demonstration for extending to other areas which have similar conditions.
1. INTRODUCTION

1.1 Types of demonstrations on forestry development

Corresponding with the ecological forest systems in Viet Nam, forest establishment, either by planting or by natural regeneration to restore the ecological systems, is classified according to:

- The structures of tree species: Mixed broad leave forest, pure forest, bamboo forest, mangrove forest and tropical pine forest.
- The objective functions: Watershed protection forest, environment protection forest, anti-sand moving forest, pure or mixed production forest, non-timber production forest, soil conservation forest etc.

This report deals with a model on protection forest combined with ecological and agroforestry systems.

1.2 Natural and socio-economical conditions in Doan Hung district

- Climate condition

Doan Hung has humid and tropical climate. The mean annual temperature is 21°C; mean annual humidity 87%; mean annual rainfall 1,750 mm. The annual natural evaporation accounts to 30% of the rainfall. The average number of rainy days during the whole year is 156. Rain is unequally distributed. 80-85% of the rainfall concentrates on the period from May to October. The average wind velocity is 1.53 m/s; maximum 26 m/s. In a year, there are 4-5 storms.

- Topography and soil conditions

Most of soil in the pilot area is red-yellowish that developed on mica and gneiss rocks. There are also small valleys among the low hills with swampy soil.

This up-side-down bowl-like hilly area is topographically a transition between the delta and the mountainous regions. The average slope of the hills is 22-28°. The altitude of this area is 80-300 m.

The natural area of Doan Hung district is 3.214 ha, classified into:

1. Forestry land: 973,8 ha, accounts to 30,3% (with forest: 290 ha; unforest: 683,8 ha)
2. Agricultural land: 1.375,5 ha, 42,8%.
3. Resident land and others: 846,7 ha, 26,9%.

- Vegetation

This area once had a flora consisting 780 plant species of 477 branches that belong to 120 families. There are high economical value species like lim xanh (erythrophloeum fordi), Lim xét (peltophorum tonkinensis), gũi (aglaia gigantea), chò nau (dipterocarpus tonkinensis) rạng rạng (cassia pinnata), giề (quercus sp.).
Since 1996, due to the war and man's impact, the forest area has been reduced. At present, the vegetation coverage is 16-18% that resulted in soil erosion, serious ecological damage, lack of water for rice cropping, deduction of crop and livestock production. However, the climate and soil conditions are still possible for growing indigenous tree and bamboo species.

- **Socio-economic conditions**

The area has a population of 13,796 persons of which, the Kinh majority accounts to 82% and the Cao Lan group 12%. Local people generally has low living standard but they possess an average education level. They traditionally earn livelihood by gardening and agro-forestry farming in an unsustainably ecological system. Their agro-forestry production structure is self-subsistence and unstable. The average food production is 200 kgs of rice-equivalent per person per year. In general, the cultural and socio-economic conditions in this area are difficult. The pilot project area is 30 km far from any agricultural product consuming market.

1.3 **Project objectives, activities, scale and time schedule.**

- **Project objectives**

1. To develop an ecologically stable system for this hilly region by increasing the vegetation coverage up to 30% and improving the its protection function for soil and water conservation.

2. To improve the farming conditions of the participated farmers and increase their agricultural and forestry income up to 20-25% by introducing improved seeds and livestock.

3. To develop a demonstration model on sustainable forestry development, possibly for replicating on other hilly areas in the North of Viet Nam.

- **Project area**

The project covers an area of 721 ha (forestry: 588.9 ha, agriculture: 132.1 ha) within four communes in the south Doan Hung district. The number of official participated household is 76 and unofficial 249.

- **Project activities**

1. To carry out participatory and reasonable land use planning and land allocation in the four communes.

2. To transfer improved forestry and agricultural farming techniques to the farmers.

3. To apply integrated technical options for sustainable agro-forestry development.

4. To establish sustainable demonstration models on social forestry development for extension.
- **Project budget:**
  1. Non-interest credit: 900,000,000 VNĐ (approximately 70,000 USD)
  2. Farmers' inputs: land, labor, material (2,000,000,000 VNĐ as roughly estimated)

- **Project duration:** From September 1994 to September 1997.

2. **ACHIEVEMENTS AND DISCUSSIONS**

2.1 **Land use planning and land allocation**

Participatory approach was applied for land use planning and land allocation to identify boundaries of forestry and agricultural farming areas. The process was fully recognized and supported by the participants. With the project assistance, village regulation on forest management was formulated. This is quite significant for well protection of the planted pine stands. The allocation of forests and forest land to farmer household does ensure their ownership over these assets. Then, 76 official and 249 unofficial participated household have been organized in order to mobilize community effort for planting forest and fruit tree species, applying intensive farming techniques for rice, maize and livestock and developing side-line production.

2.2 **Establishment of protection and production forests**

During the past three years, 588 ha have been reforested by three methods:

1. Developing agro-forestry by inter-cropping ground-nut and soybean in mixed plantation of indigenous species with *acacia mangium*.
2. Promoting natural regeneration and enriching existing forest stands.
3. Improving and transferring the pure eucalyptus stands into mixed stands.

2.2.1 **Planting 390 ha new forest for protection and production**

As resulted from forest destruction, the remaining on the project area were grass with bushes. Its soil was heavily degraded although the thickness of the soil layer remains 50-100 cm. To promote tree growing, following silvicultural techniques were applied:

- Species selection has to observe two principles: Ecological site matching and product generation. Basing on trial results, 4 main indigenous species were selected. They are *lim xanh* (*erythrophloeum fordii*), *lim xet* (*peltophorum tonkinensis*), *sỗ phằng* (*pasania fissa*) and Trâm tráng (*canarium copaliferum*). 5 other species were also selected for supporting the growth of the main species. They are keo tai tướng (*acacia mangium*), mỗ, (*mangletia glauca*), luông (* ), bố dề (*styrax tonkinensis*) and cốt khí (*tephrosia*).

- Application of mixed tree planting and agro-forestry combination. The project has solved the conflict between long-term protection and short-
term economic benefit for farmers by planting Keo tai tường and Luống in between the indigenous species. Keo tai tường and Luống are fast growing species and can produce quick effect for soil conservation. After 3-5 years, Luống already generates annual income for farmers by selling its various products (shoots as food, pulp bamboo, construction material). This help encouraging the farmers to participate more in forest development.

Model of mixed stand for protection: Indigenous species (Lim xệt, lim xanh, sêr phang, tràm trắng) mixed with acacia mangium.

![Diagram of mixed stand for protection]

This model was designed for areas where the slope is >25°. The spacing is 6 x 3 m, or in another word 1.100 trees/ha.

Model of mixed stand for protection combined with production. Indigenous species mixed with acacia mangium, Luống, cốt khỉ, ground-nut and soybean. This model was designed for areas where the slope is < 25°.

![Diagram of mixed stand for protection combined with production]

The result is that all "bare" land of the four communes in the south of Doan Hung district have been reforested.
Table 1: Growth of different tree species after 30 months

<table>
<thead>
<tr>
<th>Tree species</th>
<th>D. at stump</th>
<th>BHD</th>
<th>D. of canopy</th>
<th>H</th>
<th>Survival rate %</th>
<th>Growth potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Lim xet</td>
<td>3.38</td>
<td>2.72</td>
<td>1.45</td>
<td>2.81</td>
<td>98</td>
<td>well growing</td>
</tr>
<tr>
<td>2 Lim xanh</td>
<td>3.40</td>
<td>1.77</td>
<td>1.26</td>
<td>1.85</td>
<td>90</td>
<td>well growing</td>
</tr>
<tr>
<td>3 Sōi phang</td>
<td>4.87</td>
<td>3.43</td>
<td>3.12</td>
<td>3.31</td>
<td>92</td>
<td>well growing</td>
</tr>
<tr>
<td>4 Trâm trăng</td>
<td>3.85</td>
<td>2.43</td>
<td>1.13</td>
<td>2.64</td>
<td>94</td>
<td>insects eat leaves</td>
</tr>
<tr>
<td>5 Mỗ</td>
<td>4.45</td>
<td>2.56</td>
<td>1.67</td>
<td>2.87</td>
<td>86</td>
<td>well growing</td>
</tr>
<tr>
<td>6 Bố được</td>
<td>7.99</td>
<td>6.65</td>
<td>2.65</td>
<td>5.11</td>
<td>88</td>
<td>well growing</td>
</tr>
<tr>
<td>7 Keo</td>
<td>8.84</td>
<td>6.13</td>
<td>2.79</td>
<td>5.27</td>
<td>85</td>
<td>well growing</td>
</tr>
<tr>
<td>8 Luông</td>
<td>5.78</td>
<td>3.52</td>
<td>3.52</td>
<td>5.60</td>
<td>96</td>
<td>well growing</td>
</tr>
</tbody>
</table>

Field observation and data analysis show that after 30 months, the mixed plantations do grow very well with high survival rate. Of the four main planted species, only Trâm trăng did not grow well because of insects and suppression. The rest perennial trees (lim xet, lim xanh, sōi phang), can help improve the soil and improve the ecological condition, are growing very well. Other supportive tree species (keo, mỗ, bố được), very useful for soil coverage during the early stage, are also developing very well. Luông can provide annual economic income during the first 25 years.

2.2.2 Promoting natural regeneration and enriching forest in 96.4 ha

This was applied in areas where exhausted vegetation is possible for regeneration (there are mother trees for seeding, the density of projected trees is 600-800 trees/ha with the average height of >1.2 m). Here, Bamboo Luông were planted along the boundary, indigenous trees were internally planted in rows. Thinning was applied to provide light for promoting the main tree growth and diverting the stand to the designed composition.

2.2.3 Improving 102 ha pure eucalyptus plantation

Previously, these plantations were created by local farmers. As resulted from miss-selection of species, the quality of these stands is very low. The silviculture solution for these stands is that where it was possible for natural tree regeneration, it was promoted; where the regeneration potential is weak, acacia mangium seedlings were planted with 6 x 3 m spacing or 550 seedlings per ha. The result is that in increased density of regenerated and planted trees has considerably contributed to improved the soil and the ecological conditions in these stands; both eucalyptus and acacia mangium trees in the mixed stands do grow very well.

2.2.4 Effects of the combined-protection-and-production forest system

One of many effects of these systems is the restoration of ecological equilibrium through improving the its capacity in soil conservation and water regulation. This contributes much to develop agriculture production as well as to improve the living condition of the local farmers. Different products can be extracted from the mixed plantation such as raw material for paper
production, fuel wood and also material and housing construction. Other agricultural products have added 3-5 millions VND to the family's annual income. As resulted from better stand management (tending and fertilizer application), the mean annual increment of the mixed stands during the first 3 years has increased by 5 m³/ha.

2.3 Ecologically sustainable system based on agro-forestry development

- Agricultural production increased

One of the project objectives is to assist farmers in applying intensive farming techniques so they can satisfy their food need and engage more in forest activities. Due to the availability of water during the dry season (as a result of the ecological restoration), the project has helped farmers plant one more crop (maize) on their rice land during the winter season. The project has also introduced in the area improved rice varieties as C70, CR203, DH60 and improved maize P11. In addition to fertilizer and seed support, the project has provided technical training for the farmers and encouraged them to apply it in their agricultural production. Intensive farming methods have been employed on 43.7 ha of rice, thus, increasing the production from 4.500 kg/ha to 6.000 kg/ha. The production of winter crop maize on 15 ha is 4.200 kg/ha (this is an additional income for the farmers in the project area). The ground-nut production is also increased from 1.000 to 1.500 kg/ha. Therefore, their food income has increased from 200 to 250 kg (rice-equivalent) per person per year.

- Livestock production

70% local cows have been crossed with the Sindh. The meat production of the breading cow has increased by 34%. The average weight of one year old calf is 250 kg. Likewise, the production of pigs increased by 20% and fish 25%.

- Fruit and tea garden development

43 ha of garden have been planted with high value fruits such as longan, litchi, custard apple and also tea. The sale of fruits from a single custard apple tree is 50.000 VND. The tea production has increased by 30%.

Lesson from the project in Doan Hung district has confirmed that the base for ecologically sustainable development is an integrated and sound forestry and agricultural combination. This must be aimed at increasing the productivity and/or income from a area unit used for agriculture or forestry production.
Table 2: Productivity of the demonstration model after three years

<table>
<thead>
<tr>
<th>Items</th>
<th>Average in the district</th>
<th>Of the demonstration model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest trees (m³/ha/year)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Lim xet</td>
<td></td>
<td>5.7</td>
</tr>
<tr>
<td>2 Lim xanh</td>
<td></td>
<td>2.3</td>
</tr>
<tr>
<td>3 Sói phang</td>
<td></td>
<td>8.5</td>
</tr>
<tr>
<td>4 Trâm trăng</td>
<td></td>
<td>2.2</td>
</tr>
<tr>
<td>5 Bô đê</td>
<td></td>
<td>13.5</td>
</tr>
<tr>
<td>6 Keo</td>
<td></td>
<td>12.0</td>
</tr>
<tr>
<td>7 Bamboo lương</td>
<td></td>
<td>8.4</td>
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In developing social forestry strategy, the project has assisted farmers to apply its model on:

F1, F2 (forest) 588.9 ha
F4 (rice field)  58.7 ha
F3 (Garden)      43 ha
P (Fish pond)    22 ha
L (livestock)    412 Sindh breeding cows, 275 local cows and poultry.

This is the social forestry system that based on the farmers' voluntary participation. They do the work and they get the benefits. This is closely linked with the project’s supportive services. Technical progress in agriculture and forestry have been applied in the demonstration model. This help increasing the biological diversification and improving economical benefits for the farmers. In this project, individual household is seen as a unit for developing the social forestry model. Therefore, it conforms to the progressing trend and sustainable development of the country.
2.4 Sustainable features of the demonstration model

As indicators for the sustainability, the demonstration model bears following features:

1. The areas of forestry plantations have been maintained. So are the production of agriculture and forestry.
2. Biological diversification is created in agricultural and forestry development.
3. The protection function of forest is lengthened. Thus, soil conservation and water supply have been improved.
4. Forest is better managed which will help achieving reasonable species composition.

3. CONCLUSIONS

After three years developing ecologically sustainable agro-forestry model in the hilly area of Doan Hung district, following conclusions have been drawn:

• Due to a sound methodology, the demonstration model has been successfully developed. The approach applied in this project is a participatory one in which, local farmers and communities were facilitated to work out plan, then implement it by themselves and for their own benefits. The average annual income per a household thus has increased by 20-25%.

• There are three factors that help the demonstration model become sustainable. First, with the introduction of mixed indigenous species plantation, the vegetation coverage has increased to 30%. As a result, soil and water conservation is improved to an extent that allows to increase the number of annual crops as well as the agricultural production. Secondly, the transfer of improved seeds, livestock and farming techniques to the farmers has facilitate them to diversify as well as to increase the production. Thirdly, through the project implementation, the farmers are better trained so they can properly organize and manage their production activity.

• The model has been highly valued by an evaluation team of the Government. It is now used as a demonstration of sustainable management for the mountainous area in social forestry development, in establishment of protection forest to support agricultural production and in agro-forestry combination.

• This successful model can be well extended to neighboring regions because the conditions for its extension (land availability, credit and improved farming techniques) are very simple.
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<td>trám trang</td>
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(International Model Forest Network Secretariat)
ANNEX F

Annual Model Forest Workshop Series,

Forestry Agency of Japan
Below is a summary of the objectives of the forthcoming series of workshops on model forests to be sponsored by the Forestry Agency of Japan, beginning in the 1997-1998 fiscal year (FY) up to the year 2000:

1. **Background:**

Since 1991 the Forestry Agency of Japan has been providing a fora and conducting field-oriented discussions among foresters and researchers world-wide for sustainable forest management. It is understood, at the same time, that while these discussions focus on the field level a key requirement to the achievement of sustainable forest management remains political-level support and commitment. In so much as participants have attended these meetings in their personal capacities they have successfully opened practical and accessible avenues for discussion and deliberation on this issue.

We now have in front of us IPF proposals for action which provide a wide range of measures to achieve sustainable forest management. At the same time we also have an initiative, namely the model forest approach, which has been practiced and/or examined by several countries present here for the demonstration of sustainable forest management at the field-level.

In this connection, the Forestry Agency of Japan will host a new series of international workshops on model forests and/or similar approaches from FY 1997 to FY 2000. The first session of FY 1997 begins today, here in Tokyo, and the following sessions will be arranged in due course. This inaugural session brings with it the sponsorship of the International Model Forest Network Secretariat (IMFNS) whose current global consultation process is facilitated through work such as this.

2. **Objective:**

With the goal of sustainable forest management in mind we have identified the following four objectives for this series of four workshops:

1) to deliberate and exchange views on the role of model forests in achieving sustainable forest management;
2) to propose practical options for effectively promoting model forest projects;
3) to enhance international cooperation in this context; and ultimately;
4) to develop and propose ways of feeding back the result of model forest projects to the overall land use policy planning process in each country.

This first workshop, while paying due consideration to the wide range of environmental, social, economic, and cultural diversity underlying forests and forest management practices world-wide, will focus in particular on the first two of these four objectives. The detailed agenda of the remaining sessions will be examined and presented after this first workshop.