

Food and Agriculture Organization of the United Nations

THE NETHERLANDS TRUST FUND SUPPORT TO SUSTAINABLE FOREST MANAGEMENT IN LOW FOREST COVER COUNTRIES

THE ROLE OF PLANTED FORESTS AND TREES OUTSIDE FORESTS IN LANDSCAPE RESTORATION IN LOW FOREST COVER COUNTRIES

Forest Resources Development Service Forest Resources Division Forestry Department Working Paper FP/34E FAO, Rome (Italy)

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Comments and feedback are welcome.

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Foreword

People of developing countries facing desertification and severe land degradation, particularly in arid and semi-arid areas, can experience extreme food insecurity and abject poverty. In most countries, their relationships with forests and trees are inseparably interlinked and interdependent. Poor people recognize that forests and trees protect soil, water and biological diversity, provide shelter and shade for their villages as well as havens for cultural customs and help to combat desertification. To meet their basic food, fuel-wood, fodder, medicine and construction materials from the meagre resources available, they adopt survival attitudes, overexploit forests and rangelands, and provoke alarming rates of deforestation and forest degradation, which further erode their livelihoods.

Decentralized, participatory, intersectoral and multidisciplinary approaches to policy, planning, implementation and monitoring are new to many developing low forest cover countries. They require new institutional frameworks as well as training and skills in forest planning and management. The voice of the forestry sector, which has generally been marginalized, needs to be mainstreamed in intersectoral planning committees and working groups to derive national development priorities and national forest development strategies. In so doing, it should examine the real value and potential roles of natural forests, planted forests and trees outside forests in supporting landscape restoration and sustainable livelihoods in urban and rural landscapes.

It is critical to integrate planted trees and forests in more holistic approaches to provide environmental services, biodiversity benefits and meet people's short and long-term needs. It is also necessary to make modern technology and traditional knowledge available in more people-oriented approaches to be shared through national and international networks, and sound extension and technical support systems and demonstrations.

The six case studies (Islamic Republic of Iran, Oman, Tunisia, Mali, Ethiopia and Namibia) and the three regional workshops (Tehran, October 2002, Nairobi, December 2002 and Bamako, January 2004) which are summarized in this working paper were carried out under the FAO-Netherlands Partnership Programme as follow up to the Tehran Process, promoting sustainable forest management in low forest cover countries, with focus on the Near East and African Regions

The case studies and regional workshops reflect the uniquely different ecological, social, cultural, environmental and economic conditions prevailing in the regions and outline the role of planted forests and trees outside forests in supporting sustainable forest management and landscape restoration in low forest cover countries. Natural forests, rangelands, woodland resources, trees outside forests, agroforestry, urban and peri-urban forestry, all play important roles in supporting the social, cultural, environmental and economic landscapes, particularly in low forest cover countries.

The case studies and regional workshops highlighted major issues, the policy/legal/ institutional contexts, status of forests and rangelands, constraints, opportunities, gaps in knowledge, lessons learned and the proposed actions for the way forward. These are first steps in translating polices and proposed actions towards implementation.

Acknowledgements

These initiatives were undertaken through the collaboration of a large number of stakeholders from across the Near East and the African areas. The valuable support from the Islamic Republic of Iran, Oman, Tunisia, Mali, Ethiopia and Namibia was necessary to undertake the case studies in such a transparent manner. Each of these case study countries allowed FAO consultants to travel widely to feature areas and to engage with key stakeholders to obtain a sound understanding of the conditions on the ground.

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The Governments of the Islamic Republic of Iran, Kenya and Mali, together with FAO and the Netherlands, hosted regional workshops of low forest cover countries to identify constraints, opportunities, gaps in knowledge, lessons learned and future actions in enhancing the role of planted forests and trees outside forests in landscape restoration.

The FAO Representations in case study countries and those hosting regional workshops provided the logistical and administrative support in an efficient and effective manner. Pape Kone and Hassan Abdel Nour in the FAO Regional Offices in Accra and Cairo respectively, provided experienced technical support. Graciela Andrade and Marisalee Palermo in Rome Headquarters were critical in providing the necessary financial and administrative support. Ms Victoria Heymell authored the synthesis from the case studies and regional workshops and assisted in final editing.

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List of Abbreviations

ADB	African Development Bank
AFD	Agence Française de Développement (Mali)
AGEFORE	Aménagement pour la Gestion de la Forêt et de l'Environnement (Mali)
BCM	Billion Cubic Metres
BEAGGES	Bureau d'Experts pour l'Auto-Gouvernance et la Gestion de
	l'Environnement au Sahel
BOAD	Banque Ouest Africaine de Développement
CARE	Cooperative for Assistance and Relief Everywhere, Inc.
CBOs	Community-Based Organizations
CDM	Clean Development Mechanism
CENESTA	Centre for Sustainable Development and Environment (Iran)
CES	Conservation des Eaux et du Sol (Tunisia)
CFPF	Centre de Formation pour les Pratiques Forestières (Mali)
CIFOR	Centre for International Forestry Research
CILSS	Comité Inter-États de Lutte Contre la Sécheresse au Sahel
CITES	Convention on International Trade in Endangered Species of Wild
	Fauna and Flora
СМ	Council of Ministers (Oman)
CNDD	Commission Nationale de Développement Durable (Tunisia)
CPF	Collaborative Partnership on Forests
CPR	Council of Peoples' Representatives (Ethiopia)
CPS	Cellule de Planification et de Statistiques (Mali)
CRIAA	Centre for Research Information Action in Africa
CSE	Centre de Suivi Ecologique (Senegal)
DAPP	Directorate of Agricultural Policy Planning (Namibia)
DED	Agence de Coopération Allemande pour le Développement
DoF	Directorate of Forestry (Namibia)
DGF	Direction Générale de Forêts (Tunisia)
DGAAWF	Directorate General of Agriculture, Animal Wealth and Fisheries
DNCN	Direction Nationale de la Conservation de la Nature (Mali)
DREN	Desert Research Foundation of Namibia
DRR	Department of Rangeland Resources (Oman)
DT	Dipar Tunisien
FARO	Ethionian Agriculture Research Organization
EARO FC/FU	European Community/European Union
ENGREE	Ecole Nationale du Génie Rural, des Faux et des Forâts
FTR	Ethionian Birr (local currency)
FAO	Food and Agriculture Organization of the United Nations
FC	Forestry Code
FCFA	Franc de la Communauté Financière Africaine (Mali)
FNDD	FAO/Netherlands Dartnership Programme
FRΔ	Forest Resources Assessment
FRO	Forest and Range Organization (Islamic Républic of Iran)
FSC	Forest Stewardship Council
FU	Forege Units
1.0	Porage Units

GDAW	General Directorate of Animal Wealth (Oman)
GDEA	General Directorate of Environmental Affairs (Oman)
GDP	Gross Domestic Product
GDS	Germany Development Services
GEF	Global Environment Facility
GIE	Groupement d'Intérêt Economique (Mali)
GM	Global Mechanism
GTZ	Deutsche Gesellshaft dür Technische Zusammenarbeit (German
	Agency for Technical Cooperation)
IBCR	Institute of Biodiversity Conservation and Research (Ethiopia)
IBRD	International Bank for Reconstruction and Development
ICRAF	World Agroforestry Centre
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IER	Institut d'Economie Rurale
IFAD	International Fund for Agricultural Development
IFF	Intergovernmental Forum on Forests
IGO	Inter-Governmental Organization
ILO	International Labour Organization
INAT	Institut National d'Agronomie de Tunisie
INCD	International Convention to Combat Desertification
INRGREF	Institut National de Recherches en Génie Rural, Eaux et Forêts
	(Tunisia)
IPF	Intergovernmental Panel on Forests
IPR	Institut Polytechnique Rural (Mali)
ISPT	Institut Svlvo-Pastoral de Tabanka (Tunisia)
ITCZ	Inter-Tropical Convergence Zone (Ethiopia)
IUCN	The World Conservation Union
JICA	Japan International Cooperation Agency
KfW	Kreditanstalt für Wiederaufbau
LFCC	Low Forest Cover Country
MAF	Ministry of Agriculture and Forestry (Oman)
MDR	Ministère du Développement Rural (Mali)
MEAT	Ministry of Environment and Territorial Management (Tunisia)
MET	Ministry of Environment and Tourism (Namibia)
MOA	Ministry of Agriculture (Ethiopia)
MRME	Ministry of Regional Municipality and Environment (Oman)
MRMEWR	Ministry of Regional Municipality, Environment and Water Resources
·	(Oman)
MT	Metric Tons
MWR	Ministry of Water Resources (Oman)
NAPCD	National Action Plan to Combat Desertification (Oman and Namibia)
NFPA	National Forest Protection Areas (Ethiopia)
NGO	Non-Governmental Organization
NWFP	Non-Wood Forest Product
NP	National Programme
ODYSEPANO	Sylvo-Pastoral Development Office for the North West (Tunisia)
OPDI	Pilot Areas in Integrated Development
PAM	Programme Alimentaire Mondial
PAMOS	Programme d'Appui à la Mise en Oeuvre du Schéma Directeur de
	Développement Rural (Mali)

PDF	Projet de Développement Forestier (Tunisia)
PGRN	Programme de Gestion des Ressources Naturelles (Mali)
PIRL	Projet inventaire des ressources ligneuses et occupation agricole
	des terres au Mali
RAMSAR	Convention on Wetlands
REF	Régie d'Exploitation Forestière (Tunisia)
RIFR	Research Institute of Forests and Rangelands (Iran)
RRD	Rangeland Resources Department (Oman)
SADC	Southern Africa Development Community
SERNES	Service d'Experts des Ressources Naturelles du Sahel
SFCDD	State Forest Conservation and Development Department (Ethiopia)
SIDA	Swedish International Development Cooperation Agency
SME	Small and Medium Enterprises
SOS	SOS Childrens Orphanage Villages
STP/CIGQE	Secretariat Technique Permanent du Cadre Institutionnel de Gestion
	des Questions Environmentales (Mali)
TOFs	Trees Outside Forests
TOR	Terms of Reference
TOR	Technical Office of Rangelands (Iran)
ТР	Tehran Process
UEMOA	Union Économique et Monétaire Ouest Africaine
UNCBD	United Nations Convention on Biological Diversity
UNCCD	United Nations Convention on Combating Desertification
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNESCO	United Nations Economic and Social Commission
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNFF	United Nations Forum on Forests
UNICEF	United Nations Childrens Fund
UNSO	Office to Combat Desertification and Drought
UPUFG	Urban and Peri Urban Forests and Green Spaces
USA	United States of America
USAID	United States Agency for International Development
USD	United States Dollars
UTF	Unilateral Trust Funds
WEHAB	Water, Energy, Health, Agriculture and Biodiversity of the World
	Summit on Sustainable Development
WETLANDS	Wetlands International

THE ROLE OF PLANTED FORESTS AND TREES OUTSIDE FORESTS IN LANDSCAPE RESTORATION IN LOW FOREST COVER COUNTRIES

SYNTHESIS

There is increasing awareness globally and in low forest cover countries (LFCCs), in particular of the need to integrate planted trees and forests in holistic, landscape approaches that focus on environmental services and biodiversity benefits, that also meet peoples' shortand long-term needs. Combined with increased availability of new technologies and knowledge available in country and through international networks, this means there are opportunities to establish sound extension and technical support systems. However, landscape restoration goes beyond the forestry sector alone, and requires Governments of LFCCs to integrate forestry initiatives into multi-disciplinary, inter-sectoral policy and planning mechanisms to address sustainable livelihoods.

Based on the case studies and the recommendations from the workshops, the following landscape restoration issues apply to a greater or lesser extent to all LFCCs in the Near East and Africa. These issues are repeated through the Tehran Process, the Case Studies and the Workshops, and therefore need urgent consideration in the development of action plans, strategies and implementation for the future:

- Strong government policies, strategies and institutions are required, in addition to a decentralized approach, and need to be supported by motivated and knowledgeable staff. Ongoing reviews of legal, planning and policy frameworks will allow for the incorporation of new concepts and approaches in landscape restoration;
- Inter-sectoral and inter-disciplinary approaches are necessary to address landscape restoration solutions to the problems of forest loss and environmental degradation. These should not be solely forestry driven, but receive input from all sectors involved in natural resource management;
- Foresters and the forestry sector have been somewhat marginalized in the past and need to be mainstreamed in inter-sectoral approaches to landscape restoration;
- Participatory processes are essential. Government officials and other groups need to work with local people, to learn from their traditional knowledge, to help meet their needs and to focus on integrated landscape management;
- Land tenure. Communities need to have secure land tenure in order to have confidence in their benefits from planting and managing trees;
- Many LFCCs need better information on the status of their resources. Sound planning, management and monitoring require valid and up to date data whether on forest and tree resources, social or environmental issues. Assessment and monitoring need to be ongoing;
- Networks for access to new technologies, information exchange and communication are vital, whether national, regional or international;
- Application of new technologies into planted tree and forest development, including improvements in water management efficiency, genetic resources and tree improvement practices, are necessary;

- Financial costs, user pays, provision of low interest loans for afforestation. Managers, policy makers and stakeholders all need to be made aware of the long-term benefits and eventual returns, if they are to be prepared to invest in forests and trees in the landscape;
- Awareness raising and capacity building of stakeholders. Through environmental education programmes in schools and communities, it is possible to change attitudes to land-use management to ones of sustainable landscape restoration and environmental management;
- Integration of scientific with traditional knowledge is a relatively new concept, that needs to be more fully accepted;
- In many countries, the value of trees outside forests, although recognized legally, have not been fully quantified in terms of wood, non-wood forest products (NWFPs), diversifying the landscape and providing other services; and
- Support to the Tehran Process, which in turn can provide an enabling environment for the establishment of a full LFCC Secretariat as a body that can lead, liaise, coordinate and inform for and on behalf of the LFCCs in rehabilitation of degraded lands and forest landscape restoration.

INTRODUCTION

Background – Case Studies, Workshops

In support to the Tehran Process to address key issues identified in the Tehran expert meeting, FAO, co-sponsored by the Netherlands and collaborating Government partners, prepared case studies to assess forests and tree resources and evaluate the role of planted forests, trees outside forests (including urban and peri-urban forests) in forest landscape restoration under a range of environmental, socio-political and economic conditions in low forest cover countries. Six countries were selected (Ethiopia, the Islamic Republic of Iran, Mali, Namibia, Sultanate of Oman and Tunisia) to host the case studies and to provide inputs to two regional workshops: in Tehran, October, 2002 for the Near East countries; and in Nairobi, December 2002 for the African countries. (Carle *et al.*, 2003)

The purpose of the two regional workshops, based upon the Tehran Process recommendations, through the LFCC case studies, was to share lessons learned and translate recommendations into achievable strategies and actions, for incorporation into national forest programmes and preparation of proposals to donors, including follow-on support through the FAO-Netherlands Partnership Programme (FNPP). A third event included an Africa–Near East Workshop on Sustainable Urban and Peri-Urban Forestry and Green Spaces Development, held in Tehran, in July 2003.

A fourth workshop was held in Bamako, Mali, in January 2004, with the aim of translating the proposed actions into implementation. The objectives of the workshop were to:

- Evaluate the lessons learned from the LFCCs case studies and proposed actions from previous workshops;
- Translate the proposed actions into realistic programmes for sustainable forest and range resources management and the implementation of the Tehran Process in LFCCs.

This document summarizes the recommendations and resolutions of the Tehran Process, the case studies and the workshops. It then synthesizes and evaluates the recommendations and resolutions from the combined case studies and workshop proceedings, along with outcomes from the Bamako workshop, the Urban and Peri-urban Forests and Green Spaces Workshop for low forest cover countries (Tehran, July 2003) and the Strategic Framework for LFCC (2004), into some strategic and priority actions to move forward.

Annexed at the end of the report are Executive Summaries from the six case studies and workshop proceedings and resolutions from the two regional workshops (Tehran and Nairobi), as well as the final joint Africa and Near East workshop held in Bamako.

Preamble

The specific set of issues and challenges facing LFCCs are unique to each country. The institutional, economic, ecological and social frameworks of each country are sufficiently different to require that unique sets of national plans and solutions be developed in each instance. Many features that contribute to low forest cover are, however, common to many countries. It is therefore possible to compile a generic list of key issues relating to planning

and investment, and to group together challenges common to particular regions. (Tehran Process, 1999)

Low Forest Cover Countries (LFCCs) have special needs and requirements. These can be addressed by adopting important strategic proposals for action and rendering practical approaches for the consideration of the decision makers, for eventual use in compiling and drawing up National Action Programmes of the countries, as well as at regional and international level and in global forestry agreements. (Tehran Process, 1999)

LFCC definition

According to FAO's Forest Resources Assessment 2000 (FRA 2000)¹, there are 56 low forest cover countries² found primarily in arid and semi-arid zones of Africa and the Near East/Asia. They encompass 2.726 billion hectares of land and have 105 million hectares of global forest areas (3.9 % of forest cover), 10 million hectares of planted forests (9.8 % of the forest area), and a population of 900 million, of which 64% live in Asia. (Carle *et al.*, 2003)

People of developing countries facing desertification and severe land degradation, particularly in arid and semi-arid areas, can experience extreme food insecurity and abject poverty. In most countries, their relationships with forests and trees are inseparably interlinked and interdependent. Poor people recognize that forests and trees protect soil, water and biological diversity, provide shelter and shade for their villages as well as havens for cultural customs and help to combat desertification. In order to meet their basic needs for food, fuel-wood, fodder, medicine and construction materials, from the meagre resources available, they adopt survival attitudes, overexploit forests and rangelands, and provoke alarming rates of deforestation and forest degradation, which further erode their livelihoods. (Carle *et al.*, 2003)

Traditional sustainable forest management principles and practices are effective at enhancing the quality of life and livelihoods of rural people, however they can be difficult to apply in circumstances where people struggle to survive at very basic subsistence levels. But it is possible to enhance the role of planted forests and trees outside forests (including agroforestry) to better meet the needs of poor people and relieve some of the pressures on natural forests and rangelands. (Carle *et al.*, 2003)

Tehran Process

The Tehran Process launched at the international expert meeting on "Special Needs and Requirements of Developing Countries with Low Forest Cover and Unique Types of Forest³, hosted by the Government of the Islamic Republic of Iran, Tehran, October 1999, recognized the uniqueness of the issues and needs for sustainable forest management in low forest cover countries. A Secretariat was established in Tehran to support the process and to champion the

¹ Low forest cover countries according to FRA 2000 (FAO 2001) where forest is defined as having >10% crown cover and an area of >0.5 ha and excludes land predominantly used for agriculture.

 $^{^{2}}$ "Low forest cover country" has not yet been formally defined, but it commonly refers to countries in which forest cover is less than 10 percent of land area.

³ A Government-led initiative, sponsored by Canada, Denmark, Finland, Germany, Norway in collaboration with Egypt, Sudan and in cooperation with FAO, UNEP, UNDP and IFAD, attended by 77 participants from 39 countries and six international agencies and NGOs.

cause of low forest cover country issues in international processes (UNCBD, UNFCCC, UNCCD, UNFF) and provide support services to member countries. (Carle *et al.*, 2003)

It was recognized that planted forests, trees outside forests, urban and peri-urban forests and agroforestry provided benefits and services, such as:

- Rehabilitation of degraded lands, enhancement of biodiversity conservation, protection of soil and water values, improvement of agricultural production through maintenance of soil fertility and diversification of the landscape;
- Improvement and diversification of revenues in the fight against poverty and food insecurity through the utilization of wood and non-wood forest products;
- Sustainable supply of wood and non-wood forest products for subsistence and industrial uses; and
- Improvement of quality of life through shelter, shade, beautification and absorbing pollutants and sequestering carbon. (Carle *et al.*, 2003)

The meeting of LFCCs in Tehran, Iran, in 1999, emphasized the need for concerted action, government commitment and collaboration among countries with similar problems. The declaration that established the Tehran Process called for increased investment from within the region, the donor community and from international agencies. It also suggested that non-governmental organizations (NGOs), the private sector, research and training institutions and the rural poor could play a positive role, especially at the local level. The Tehran Process has potential to make a real difference in the future, particularly if efforts are geared to national forestry planning, forest management and planting programmes aimed at increasing forest cover, diversifying the landscape and meeting the needs of rural people. (Carle *et al.*, 2003)

The Tehran Process concluded that:

- Existing legislative, policy and institutional frameworks have failed to adapt to meet increased demand for forest goods and services in LFCCs;
- The quantity and quality of forest resources need to be measured and recorded more effectively;
- There is a need to adopt participatory processes with communities, rural families and NGOs, to equitably share benefits, adopt rural development programmes, decentralize administration; conduct and apply relevant ecological and social research; and derive sound criteria and indicators for sustainable forest management;
- There is an urgent need to develop successful development programmes for regeneration, afforestation and reforestation in LFCCs in order to increase forest cover, restore landscapes and meet their diverse forest products needs, particularly in wood energy;
- Removal of energy price distortions through subsidies, the reconciliation of potentially conflicting sectoral policies (agricultural sector, marketing and market development and the provision of information related to technology improvements) is necessary; and
- High-level political priority and support to apply modern technology and environmentally sound practices (including criteria and indicators) are necessary to achieve sustainable forest management. (Forestry Component)

LFCCs recognized that the main policy, strategic planning and institutional issues require inter-sectoral and multi-disciplinary approaches to landscape restoration in order to address:

- Severe poverty alleviation;
- Advancing desertification;
- Pressures of urban and peri-urban development;
- Balance between economic and environmental sustainability;
- Secure rights to land, land-use and crop ownership;
- Greater participatory planning with communities, rural people and NGOs;
- Response to market signals and market economy. (Forestry Component)

The main **constraints** related to sustainable forest management reported at the Tehran Process are important, because they form the basis of most of the issues surrounding past failure of LFCCs to achieve successful landscape restoration. Therefore, these constraints must be overcome for any strategic way forward to be successful. They included:

- Lack of knowledge on the extent of forest resources and true value economic, environmental, social and cultural importance of these ecosystems for the well being of poor rural people;
- Lack of legislative, policy and strategic planning framework, the institutional structures and capacity and capability (technical and financial) to manage natural and planted resources in a sustainable way; and
- Lack of local participation in planning and decision-making, settling land tenure questions, in the improvement of rural infrastructure and improving the status of rural communities. (Forestry Component)

Recommendations relating to the achievement of landscape restoration and sustainable forest management included:

- Collection, analysis, and dissemination of forest resource information for planning, management and monitoring;
- Development of criteria and indicators for sustainable forest management benefiting from the existing processes, particularly Dry-zone Africa and the Near East;
- Conduct joint research projects on issues affecting LFCCs, particularly the development of models for management and rehabilitation of natural forests and woodlands;
- Greater participation of stakeholders (communities, rural families and NGOs) to take into account broader perspectives in forestry planning, implementation and monitoring;
- Greater emphasis on food security and non-wood forest products in the rural community, including provision of fuelwood and fodder;
- Greater account of the role of forests in carbon sequestration;
- Review institutional structures and strengthen capacities to address the newly defined priority needs of stakeholders;
- Secure international support to facilitate sustainable forest management;
- Direct increased resources and priority to reforestation, regeneration, afforestation and restoration of degraded lands in LFCCs;
- Match species/provenance with site and incorporate indigenous species whenever possible; and
- Promote renewable energy programmes based on wood. (Forestry Component)

CASE STUDIES

The case studies in the Islamic Republic of Iran, Sultanate of Oman and the Republics of Tunisia, Mali, Ethiopia and Namibia focussed on enhancing the role of planted forests and trees outside forests in supporting sustainable forest management and complementing management of diminishing natural forest, range and woodland resources in the landscape. In each case, information gained for the case study was collected from collaborative work between an FAO consultant, a national consultant, Government authorities and other collaborating national stakeholders. The case studies focussed on the major issues, the policy/legal/institutional contexts, status of forests and rangelands, constraints, opportunities, gaps in knowledge, lessons learned and the proposed actions for the way forward.

The case studies were undertaken to assist in formulation of planned actions as inputs to the Regional Workshops to feed into the respective National Forestry Programmes and to enable the development of proposals for future donor support, and eventual implementation.

Broad **conclusions** from the case studies can be summarized as follows:

- Forestry sectors are often not well integrated into the national economy, with limited capacity to undertake the diversity of issues to be resolved. Consequently, in many cases, environmental, social and economic dimensions in forestry planning in the wider landscape are still in their infancy;
- For forestry and range policy, planning and legislation to address sustainable livelihoods and land use, there must be commitment to cross-sectoral integration, coordination and participation;
- Foresters can be somewhat reticent about participatory approaches, considering them to increase costs and slow completion of their work, with no clear benefits to them personally;
- In many cases, knowledge and technology transfer to the main stakeholders and participatory process remain weak while planning and decision making remain highly centralized;
- Training needs must be re-assessed;
- Research is lacking, and needs to also focus on integrated participatory agro-forestry, community forestry and small holder forestry and their links to other sectors;
- Restricted land and crop ownership or user rights; and
- Legislation and regulatory frameworks are often inadequate for integration of forest and tree management into wider social, cultural, environmental and economic landscapes.

Recommendations from the case studies:

Development choices and issues:

- Promotion of participatory planning and management, and empowerment;
- Promotion of education and awareness programmes; and
- Clarifying land and crop tenurial rights.

Institutional and legal improvements:

- Decentralization;
- Comprehensive review and updating of land use and forest policy legislation;
- Capacity building and institutional reform;
- Cross sectoral coordination;
- Regional cooperation;
- Enhance research and information on resources and livelihoods;
- Develop new technologies for processing wood and NWFPs; and
- Encourage private sector involvement in forest investments.

Resource use and management:

- Maintaining and sharing traditional knowledge;
- Strengthen organizational capacity of traditional medicines;
- Assessment and monitoring of status and trends in forest cover and land use, ongoing and necessary; and
- Conduct social and environmental impact assessments to gauge the needs and aspirations of people.

Enhancing the role of planted forests:

- Integration of planted forests into a broader land-use and landscape restoration context;
- Maintain and increase rate of reforestation and afforestation in a wide range different mechanisms to support diversity of forests and trees in the landscape;
- Clarify concepts and definitions; and
- Ensure technical support in new approaches to foresters, extension officers, communities and families.

Enhancing the role of trees outsides forests (TOFs):

- Recognize TOFs as a valuable resource in the landscape;
- Promote planting and use in private holdings, agro-forestry, and for shade and shelter;
- Develop silviculture guidelines for various species in different ecological contexts;
- Provide appropriate training; and
- Target suitable ecological zones for planting.

Supporting the Tehran Process:

- Promote exchange of experiences, knowledge, and networks;
- Information sharing this may require governments to be more "open" than they are accustomed to being;
- Incorporate proposed actions of the Tehran Process into forest policy; and
- Establish a monitoring and reporting system to gauge follow-up actions of the Tehran Process in landscape restoration.

Technical initiatives:

- Promote use of alternative energy sources;
- Ensure adequate technical support;
- Promote use of information technology for forestry; and
- Encourage networking both nationally and regionally.

Cross cutting:

- Women and women's groups;
- Target youth and teachers; and
- Strengthen intersectoral forums of communication to guide planning and evaluation.

Unique issues relating to specific countries

Some issues, unique to the individual countries, came out of the case studies.

Role of planted trees and trees outside forests

The case studies revealed that the use of trees outside forests take a variety of forms of which agroforestry, village and urban plantings, roadside plantings and orchards are the most widespread.

In both Mali and Namibia, extensive agroforestry is undertaken in a parkland setting. In Mali parkland agroforestry is based on natural trees that cover 39% of the country. In traditional Sahelian parklands, millet and sorghum are often grown with *Faidherbia (Acacia) albida*. In the infertile soils, crop production is higher, within a 5–10 m radius of the trees, compared with those grown in the open, due to improved nutrient cycling and micro-climate. The trees additionally provide fuelwood, fodder, pods, and shade. In the north of Namibia where most people live, trees that produce fruits, nuts, oil, medicinal products, or craft materials, also improve soil fertility or provide shade. So they are left standing. Shade and fruit trees are also planted around homesteads and farm woodlots as living fences. (Carle *et al.*, 2003)

In Tunisia, agroforestry practices include planting *Acacia, Atriplex* and *Medicago* for browse and forage, and planting windbreaks around irrigated agricultural areas. There is also some emphasis on planting multi-purpose species (trees such as walnuts, pistachio, pecan, hazel and carob), particularly in mountainous areas and forest clearings. (Carle *et al.*, 2003)

In cities tree planting has generally been stressed for aesthetic and recreational benefits. Urban, peri-urban and roadside plantings have been promoted in all countries studied, while Tunisia has perhaps been the most active. Initiatives have included establishment of green belts, park, lining boulevards and motorways, coastal esplanades and implementing a national programme for heritage trees. Iran has been active in developing a network of urban and periurban planted forests and parks. Often, however, problems arise when irrigation cannot be sustained in the long term due to water shortages. Here, using treated wastewater from cities is seen as an opportunity for urban and peri-urban tree planting in several countries. (Carle *et al.*, 2003)

Combating desertification

This is a major objective for all LFCCs. From the case studies, Iran and Tunisia have so far made the most progress. In Tunisia planted forests were established to fix dunes and act as windbreaks and shelterbelts. In Iran, desertification control stations have been established. (Carle *et al.*, 2003)

Institutional capacity and national planting plans

Noticeable in Ethiopia and Oman were problems of poor records and under-funded government institutions without clear strategies to address forest issues. Conversely, Tunisia and Iran+ both have major planting programmes in hand. Namibia, independent only since 1990, has developed forest policies and legislation that advocate tree planting and recognize the role of forests and woodlands. Mali focuses on managing natural forests, while having a relatively small planting programme. (Carle, 2003)

Social issues

In Namibia, the subsistence agricultural sector contributes only 1.5% of GDP, but is essential to the livelihood of about 70% of the population. (Namibia case study)

In Mali, unemployment appears to prevail in urban areas. In rural areas, lack of employment seems less important because people cultivate crops if weather permits. Although underemployment and unemployment may be more disguised in rural areas, they constitute the main causes of poverty. (Mali case study)

Land tenure

In Ethiopia, grazing and browsing occur over more than 50% of the country's land area. This heavy pressure constitutes the biggest threat to the environment. Pasturelands are not owned by individuals or groups of people, and this leads to the "tragedy of the commons", where grazing lands are exploited well above their carrying capacity. (Ethiopia case study)

In Iran, land nationalization in the past has meant that traditional land users have been deprived of their land tenure security and former rights, and now tend to use the natural land resources as common resources, on the basis of "first come first served", again leading to overexploitation and degradation. Improved land tenure security provided through participatory management schemes has improved the situation. (Iran case study)

WORKSHOPS

Tehran (October 2002) and Nairobi (December 2002)

The purpose of the workshops, based upon the Tehran Process recommendations, through the presentation of LFCC country case studies, was to share lessons learned and translate recommendations into achievable strategies and actions. These strategies and actions were intended for incorporation into national forest programmes, and to be used in the preparation

of proposals to donors including follow-on support through the FAO-Netherlands Partnership Programme.

Workshop participants included policy, planning and technical officers, responsible for decision making with respect to sustainable natural resources management from Governments and international and regional agencies.

The countries represented at the Near East Regional Workshop included North Africa, the Gulf and temperate zones representing a range of cultural, social, economic, environmental, governance and institutional characteristics.

The major ecological regions represented at the Africa Regional Workshop included arid Northern Africa, East and West Sahelian Africa; Southern Africa, a Small-Island Developing State as well as a Central African State which represented a range of cultural, social, economic, environmental and institutional characteristics.

At the workshops, the following was covered:

- Participants were reminded of the Tehran Process initiatives for low forest cover countries;
- Country case studies for Tunisia, Oman and Iran for the Near East Workshop, and country case studies for Mali, Ethiopia and Namibia for the Africa Workshop, were presented and discussed, as examples of status and trends in forestry and livelihoods in different conditions prevailing in different low forest cover conditions (environmental, social, economic, cultural, institutional);
- Participating countries were able to contribute their inputs, thus enabling participants to share experiences and ways forward in initiatives relating to planted forests, trees outside forests and urban and peri-urban forestry with respect to sustainable forest management, landscape restoration and livelihoods in low forest cover countries.

In each case working groups were formed, based upon the topics: (i) planted forests; (ii) trees outside forests; and (iii) urban/peri-urban forests. The purpose of the working group sessions was to discuss issues, constraints, opportunities, conclusions and recommended actions for the way forward on selected topics related to sustainable forest management and landscape restoration.

Objectives

Sustainable forest management – the backbone for sustainable livelihoods, can be achieved through enhancing and encouraging the planting of forests and trees – through afforestation and reforestation – to support natural forest and agriculture in a landscape restoration approach.

Constraints

Common factors

Physical

• Severe fragility of ecosystems with regard to climate (rainfall/drought, fragile soils);

- Water-scarcity and poor management;
- Extreme social and economic pressures due to subsistence existence.

Legal/policy/planning framework

- Inconsistent government policies, legal, planning and regulatory framework related to natural resource management between sectors;
- Lack of co-ordinated planning programmes and collaboration between sectors, and no multi-disciplinary integrated approach. This can result in competition and conflicts (of interest) with other sectors, particularly agriculture, because of a lack of land-use development plans;
- Poor financial viability and the long term nature of rehabilitation can make it difficult to attract necessary financial resources;
- Lack of political will, coupled with an undervaluation of environmental and social benefits results in limited allocation of resources to Governments;
- Land tenure unclear land ownership and land-use rights can result in an exploitative economic environment. It also limits confidence and hinders the development of planted trees and forests, which require long-term investment; and
- Inadequate account of traditional laws in formal laws.

Institutional framework

- Weak institutional capacity in some countries, plus unclear management roles between governments, local communities, smallholders, NGOs, municipalities and private sector. Decentralization and autonomy are not always undertaken with full institutional reforms (retraining and allocation of appropriate resources);
- Insufficient networking at national and regional level;
- Many institutions may be involved in natural resource management and land-use issues resulting in incoherent land-use and confusing and conflicting initiatives. Frequent institutional changes can create organizational instability and suboptimal performance in the management of trees and forests;
- Narrow perception of the roles and values of planted forests and tree resources by key governmental decision makers can result in limited allocations of resources and poor performance of planted forests (limited funding for tending, silviculture and protection after planting);
- Imbalance between the number of professionals, and a lack of field managers and technicians;
- Educational curriculum development not always keeping pace with modern and traditional knowledge developments; and
- Poor access to markets for wood and non-wood forest products.

Technical/management knowledge and information

- Lack of forest and tree resources data and research information, including:
 - information on performance of planted trees (growth and yield data)
 - forest mechanisms
 - site/species matching (arid/saline)
 - seed sources and species provenances
 - invasive species

- alternative mechanisms for growing
- indigenous and exotic silviculture;
- Limited technology to increase productivity of planted trees, forests and agricultural crops (water harvesting, genetic and wider tree improvement programmes, including seed orchards, nurseries and silviculture);
- Lack of monitoring of past afforestation and reforestation with regard to advocacy in water and environmental protection;
- Lack of traditional knowledge to consider alongside scientific;
- Poor forest and tree protection against fire, pests, diseases and destructive interventions by man; and
- Lack of compliance of stakeholders with policies, laws, regulations and codes of practise (this may involve private sector, NGOs, donors and State).

Social and environmental

- Lack of participatory planning and management, including insufficient access by women and youth to land, involvement in participatory approaches (to planted trees and forest development);
- Insufficient respect for ownership rights, community rights, traditional rights. Protected area management by the public sector too often disregards the livelihoods of local communities and small holders, whose lives depend upon these areas. Frequently, no consideration for the needs and aspirations of the rural populace;
- Lack of baseline and subsequent socio-economic and environmental impact assessment prior to and after afforestation and reforestation;
- Insufficient public awareness and the potential role of NGOs; and
- Unsolved cultural constraints specifically relating to sacred forests where sustainable forest management principles and practices are not applied.

Planted forests

- Poor financial viability (and the long term nature of returns) make it difficult to attract investment in husbandry of forests and tree based systems compared with other land uses (for example annual crops);
- No guidelines for the preparation of management plans for planted forest. Therefore a lack of silvicultural and protection management for planted forests, and lack of sound field management data and operational maps;
- Lack of appropriate technology manpower/mechanical/chemical; and
- Focus on exotic forest, often without full consideration of environmental and social implications of combining these with indigenous species in the landscape.

Trees outside forests (TOFs)

- Lack of general awareness among managers, policy and decision makers regarding the role and potential of TOFs in supplying social and economic products in the landscape; and
- High cost of actual TOF resource evaluation with respect to types of resources and systems.

Urban, peri-urban forests and green spaces (UPUFGs)

- Lack of interest, involvement and commitment from foresters and other stakeholders in the use of trees in diversifying the urban and peri-urban landscapes and providing valuable products and services;
- Lack of knowledge on appropriate species for urban conditions with respect to pollution, pests, diseases and fire;
- Lack of water;
- High land prices;
- Limited involvement of civil society in greening urban areas;
- Absence of linkages between social, economic and environmental factors in the urban development process;
- Lack of a global vision (long term planning and management); and
- Lack of means and capacities of municipalities and partners.

Opportunities

Common factors:

- Afforestation and reforestation for production, protection, conservation, aesthetics and recreation is increasingly recognized to enhance soil and water protection and land stabilization, carbon sequestration, to decrease excess runoff and help ameliorate flood hazard, rehabilitation of denuded and degraded lands, restore landscapes and to enhance biodiversity;
- Ongoing reviews of legal, policy and planning frameworks allow incorporation of innovative, new concepts and approaches. Political decision makers can be engaged in translating their awareness and commitment to international processes (desertification, biodiversity, climate change), into commitment of resources for planted forest and tree development in restoring landscapes;
- Decentralization and adoption of participatory planning approaches allows for involvement of communities, families, local governments and individual investors and their input in decision-making;
- International processes and donors are receptive to providing support (both financially and through other resources) to invest in afforestation and reforestation;
- National governments can articulate and integrate planted trees and forest issues into national forest programmes to reflect commitment to international processes and national priorities in order to maximise the opportunities of increasing availability of funding and technical support from international donors;
- Availability and access to new technology and collaboration between countries through networking, including internet, publications, regional, national and sub-national meetings and study tours;
- Inter-sectoral collaboration and integrated land-use planning show potential, including the integration of planted trees and forests in an ecosystem approach that incorporates both agricultural and forest resources;
- Potential to engage other stakeholders outside the public sector (NGOs, communitybased organizations (CBOs), civil society, State Enterprises, private sector and others) to reduce central government costs for maintenance and exploitation, more effective control over forest resources, environmental benefits and local conflict resolution,

natural resources for local development; effective management through partnerships and sustainable livelihood for community;

- Implementation of newly developed national level principles, agreed criteria and indicators for sustainable forest management provide the foundations on which to plan, manage and monitor planted trees and forests, and can address the key resources, social, environmental, cultural and economic dimensions;
- Financial preferential low interest loan availability for afforestation, reforestation and trees outside forests provides incentives, while free market dynamics (particularly prices) gives the opportunity to diversify and to adopt more flexible approaches in pursuit of optimal financial benefits when forest products are being marketed;
- Application of new technologies into planted tree and forest development, including improvements in water management efficiency (safe use of waste and sewage treated water), genetic resources, tree improvement practices are possible;
- Awareness raising and capacity building for government decision makers, schools and the general public have great potential;
- Integration of scientific and traditional knowledge is a relatively new concept;
- Rehabilitation of unique forests not only for biodiversity conservation but for controlled eco-tourism is an emerging possibility; and
- LFCC Secretariat can be more pro-active on key issues on behalf of LFCCs.

Planted forests and trees outside forests

• Can provide wood and NWFPs to substitute for forest product imports. This can provide increased returns and improve livelihoods.

Urban, peri-urban forests and green spaces

- Integration of wildlife and forest realities into urban environments;
- Experienced LFCCs can assist others;
- Researchers can develop silviculture treatments adapted to use in urban conditions;
- Urban communities can benefit from in-country forestry capacity in forest management;
- Some large urban and peri-urban forests established in the past remain as examples of what is possible; and
- Committed technical personnel are available.

Lessons learned

Common factors

• Decentralization and participatory approaches supported by appropriate legal, policy regulatory and planning frameworks, which must be reflected in institutional reforms with clear mandates for the main stakeholders. Decentralization has given more incentive to local authorities for better management and expansion of planted forestry species. Participation of rural communities enables the melding of scientific and traditional knowledge, and ensures full communication, information and education exchange. Consistency in policy, laws, regulations and plans ensures clear objectives for all stakeholders;

- Secure land tenure is essential as a foundation on which to build an investment on tree planting towards sustainable forest management and landscape restoration;
- Capacity building for stakeholders and ensuring educational awareness through environmental programmes in school systems build understanding within the communities;
- Equitable benefit sharing between stakeholders is vital, while marginal groups, specifically women and youth, must be involved at the outset of formulation of plans and implementation of natural resource management activities;
- An enabling environment is necessary to enhance opportunities and role of the private sector into forestry development;
- Cross sectoral Integration of forestry with other forms of land use requires that growing mechanisms and management of landscapes be properly addressed;
- Indigenous species are clearly best adapted to sites, and their planting contributes to conservation of biodiversity, however there are valid reasons for planting exotic species as well. Multi purpose species that provide for a variety of uses will always be of value;
- Good information regarding climate, species adaptability is critical in planning successful planted forestry species; and
- Water harvesting technologies (both traditional and modern) as well as planting techniques are recognized as being vital to successful afforestation and reforestation.

Planted forests

- Recognition that exotic species have a place in forest plantation development (eg. Multipurpose species, nurse species in sand-dune reclamation, for commercial and industrial purposes). Planted exotics may reduce exploitation of natural forest for wood and fuelwood products;
- There is a need for sound planning, management and monitoring which are dependent on quality forest resource data, along with social and environmental information;
- Participation of communities in planning and plantation forest management has had successful results to date; and
- There can be positive financial benefit for rural communities investing in planted forest.

Trees outside forests and urban and peri-urban forests

- Communication and collaboration between decision makers, researchers and different stakeholders involved in managing TOFs and UPUFs are necessary in order to create synergies for economic growth and conservation of forested areas;
- TOFs and UPUFs have a legally recognized status in many countries, however their true value in wood, NWFPs and other services is not always fully reflected and so they do not receive the priority they deserve in terms of investment; and
- There is high potential for UPUFG development and an important role exists for foresters, civil society and urban developers in their promotion. However all need to be better equipped and trained to meet the challenge.

Gaps in knowledge

Common factors

• Lack of research and technology on indigenous species, silviculture, information on ecological zones;

- How to communicate and link locally, nationally, regionally and internationally into appropriate networks for information on production and on potential markets, as well as access to new initiatives;
- How to develop flexible people approaches to planted trees and forest development;
- Technical assistance for developing and updating forest assessment and information systems;
- Recognition of the value of traditional knowledge;
- Lack of knowledge on more efficient use of fuelwood or alternative methods;
- Training curricula of professional education, technical and community training do not reflect the major reforms in the contribution of planted trees and forests in landscape restoration;
- Studies on the impact of afforestation and reforestation on carbon sequestration and enhancement of biodiversity are needed; and
- How to incorporate socio-economic, environmental and cross-sectoral issues such as gender balance, meeting the needs of ethnic minorities through participatory planning, evaluation and monitoring.

Planted forests

- Guidelines needed for collaborative partnerships and management planning for forest plantation development. So far there is a lack of technical management tools, such as codes of planted forest practice, guidelines for participatory planning, growth and yield models, yield tables for increasing productivity and efficiency in management;
- Comparative land-use analysis to evaluate financial and economic performance of planted forests with other land-uses;
- Development of growth and financial simulation models for the main afforestation and reforestation methods; and
- Monitoring of international markets for wood and non-wood forest products.

Trees outside forests, urban and peri-urban forests and green spaces

- Concept and definition of TOFs need more elaboration;
- Use of traditional knowledge as a basis for development;
- Resource assessment methods, sustainable harvesting, distribution and marketing of TOFs and UPUFs and wood and non-wood forest products derived from them need to be examined; and
- Regarding UPUFGs, general lack of awareness among policy makers, not always a high priority in planning and urban development, and associated lack of participatory approach.

Recommended actions

Common factors

• Inter-sectoral planning. Integrate landscape approaches and sustainable development policies, strategies, legislation and regulations to include forestry and poverty reduction and food security strategies in National Development Plans. Forestry representation to be more pro-active in integrating forestry issues into the rural landscape;

- The transition from centralized to decentralized and participatory approaches incurs costs in providing technical support services, which must either be borne by appropriate allocation of resources from national treasuries or charged on a user-pays basis;
- Foresters. Change the mindset of foresters from owning the forests to providing the enabling conditions (policy, laws, regulations, strategic planning, monitoring) and support services (extension services, success stories, demonstrations, training) to private owners (corporate and smallholders), combining technical, scientific and traditional knowledge in decentralized and participatory approaches to meet people's livelihood needs and respond to market demands;
- Assessment and monitoring. Prepare justifications for national forest assessment, then, existing forest resources can to be identified and mapped. Document and enumerate traditional knowledge regarding TOF according to standardized formats in each countries, through involvement of all stakeholders, with CBD, CCD, IUCN, LFCC and NGO focal points;
- Technical knowledge should be applied in unison with appropriate policy/legal/regulatory/institutional frameworks to deliver effective field performance;
- Network appropriate knowledge and technologies in LFCC through electronic and other mass media distribution systems, using the LFCC Secretariat with support from FAO and UNEP;
- Prioritize preparedness to drought and other mitigating factors particularly in combating desertification, famine and environmental calamities (wildland fires);
- Water and water management are critical in planted trees and forest developments. Nurseries and plantations need to demonstrate efficient management if they wish to gain preferential treatment from governments wishing to introduce water taxes;
- Mobilize the necessary human, financial and capacity building resources to enhance the role of planted trees and forests to sustainable forest management and landscape restoration;
- Newsletter publications, updating of LFCC website, promotion of an award for excellence for contribution to LFCC forestry in the Near East region;
- LFCC Secretariat to be allocated the necessary resources to carry out functions more effectively; and
- FAO to assist the Near East region LFCCs to submit a project idea for a regional, integrated, multi-dimensional project that would incorporate the ideals of sustainable forest management.

Planted forests

- Translate criteria and indicators for sustainable forest management into actions, with improved justifications and proposals to national governments, international donors and funding agencies to reflect the full benefits (environmental, social, economic) of planted forests;
- Change the homogeneous (engineering) approaches to planted forest development (primarily exotic species in monocultures) to respond to more diverse, flexible, heterogeneous (multiple species) approaches to planted forests, including agro-forestry and multi-tiered systems, as appropriate;
- Through successive surveys, assess and monitor the true impacts and contribution of planted forests on social, environmental and economic benefits to the national economy and internalize the true costs where possible;
- Document success stories in planted forest and tree resources development in the region; and
- Encourage afforestation and reforestation on private and collective lands by providing adequate loan and incentives according to context.

Trees outside forests

- Give status to traditional knowledge, i.e. improve the acceptance of traditional knowledge. Outcomes of studies on traditional knowledge to be presented and discussed in a regional workshop jointly organized by FAO, ICRAF and ICRISAT;
- Establish a network of institutions and experts on TOF, under management of LFCC Secretariat;
- Consider and enhance the important role of TOF as part of farming systems, by establishing village woodlots, and integration of trees into the rural and urban landscape in all ecological zones, thus also satisfying demands for wood, fuelwood and NWFPs;
- Establish value of TOF resources through establishment of market system analyses;
- Encourage regional cooperation in promoting TOF; and
- Ensure that appropriate management techniques are undertaken in order to support the specific needs of the different eco-regions.

Urban, peri-urban forests and green spaces

- Programme a regional awareness campaign by the LFCC Secretariat, based on information provided by countries and municipalities;
- Conduct studies, comparing activities, experiments, models, results and impacts;
- Access information centers for better information, and for promoting regional networks on UPUFGs;
- Organize workshops and expert meetings on the working of UPUFG in urban spaces, their design and programming. Regional cooperation is important for exchange of experience and expertise in enhancing UPUFG development;
- Twinning between South-South and North-South municipalities for information and experience exchange; and
- The Parks and Green Spaces Organization, Tehran, in collaboration with FAO and the LFCCs Secretariat, to jointly host a workshop on UPUFGs for LFCCs in the Near East region. (Undertaken in July 2003).

Roles of countries, donors, international agencies

LFCCs, LFCC Secretariat, donors, international agencies and other stakeholders can mobilize their resources so that the outputs of the workshops become tangible outcomes in the field. This can be achieved through the following actions:

Low Forest Cover Countries

- Appoint a focal point for country membership to the LFCC Secretariat, for liaison on all matters relating to LFCCs;
- Urge member countries to make special budget allocations for afforestation, reforestation and TOF development;
- Urge member countries to provide funds to be loaned by agricultural banks or similar agencies on long-term low interest rate basis;
- Commit follow up to the Recommended Actions of the workshops by directing them to the appropriate national authorities;
- Request FAO and UNEP to allocate resources from their governing bodies to assist in supporting the development of the LFCC to a full global secretariat;
- Wealthy LFCCs to allocate funds for initiatives in afforestation, reforestation and TOFs in developing LFCCs;
- Raise awareness and prepare proposals to national governments to access funding and technical support from international donors for priority LFCC issues, including access to CDM, WEHAB and other new initiatives; and
- LFCCs share in a partnership with the LFCC Secretariat and other LFCC governments.

Low Forest Cover Country Secretariat

- Proactive role of the LFCC Secretariat in being the global focal point on low forest cover country issues, data, lesson learned and sharing of technical information;
- Maintain lobbying for LFCC issues at international processes and meetings, as well as to multi-lateral financial agencies and donors;
- Enhance collaboration and sharing between LFCCs;
- Implement the recommendations of the FAO (McConnell and Abdel Nour) consultancy report on the LFCC Secretariat with respect to support for afforestation, reforestation and TOFs;
- Establish a steering committee for the LFCC Secretariat, including the host country -Iran, selected LFCC members, FAO and UNEP to facilitate support systems to achieve actions in afforestation, reforestation and TOFs; and
- Role in implementation of the recommendations of the six LFCC country case studies supported by FAO-Netherlands.

International agencies (FAO, UNEP and regional agencies)

- FAO and UNEP to assist in providing background and justification to LFCC Governments for the benefit of members of the LFCC Secretariat;
- Research and advise the LFCCs on procedures to access funding under CDM, WEHAB and other initiatives;

- Provide policy and technical assistance in forest resources assessment, national forest programmes formulation, and provision of management tools and technical support to development of planted forests and tree resources within their capacity; and
- Assist LFCCs to prepare proposals to international donor agencies on projects and programmes related to planted forest, TOFs and UPUFs.

Tehran Workshop (July 2003)

The Africa-Near East Workshop on Sustainable Urban and Peri-Urban Forestry and Green Spaces Development, held in Tehran, in July 2003, endorsed the conclusions and recommendations of the Tehran (October 2002) and Nairobi (December 2002) regional workshops and recommended additional practical ways forward, including:

- Involve and access information centres for better information collection mechanisms and on promoting regional networks on UPUFG;
- Document success stories in UPUFG design, implementation and management;
- Conduct studies comparing activities, experiments, models, results and impacts;
- Organize workshops or expert meetings on criteria and indicators for a proper balance between UPUFG and urban spaces, appropriate functions for UPUFG, and design and programming;
- Arrange for a regional awareness campaign, monitored by the LFCC Secretariat, based on information provided from other countries and from municipalities;
- Twinning between South-South and North-South municipalities for exchange of experience and expertise for mutual support in enhancing UPUFG development;
- The Tehran Parks and Green Spaces Organization can act as a centre of excellence and host a workshop on UPUFG for LFCCs in the Near East region;
- Urge member countries, municipalities and Governments to make special budget allocations for UPUFGs;
- Appoint an in-country focal point for liaison on all matters relating to LFCCs;
- Wealthy LFCCs should allocate funds for initiatives in UPUFGs; and
- LFCC Governments need to share a partnership with the LFCC Secretariat and the Islamic Republic of Iran in providing personnel and other resources.

A separate report for this workshop is under preparation.

Bamako Workshop (January 2004)

The Bamako Workshop Recommendations centred on continued strong support to the Tehran Process and a wish from the participants to see continued support for development of the LFCC Secretariat, including its eventual development to international status as a full global Secretariat.

Much of what came out of the Bamako workshop went into developing the Strategic Framework. This document places much emphasis on the strengthening of the LFCC Secretariat.

A strengthened Secretariat can help LFCCs to pursue the strategies and priority actions needed to move forward. The Secretariat has the potential to be the focal point for LFCC issues. However if LFCCs are going to invest in the Secretariat, they will want to have access to tangible benefits at the country level in return. Therefore the Secretariat needs to prove that it is efficiently and effectively able to champion the cause of the LFCCs.

Strengthening the capacities of the Secretariat can be achieved through:

- Maintaining efforts to ensure recognition of the full mandate of the Secretariat to represent low forest cover countries at international processes and meetings and upgrade its profile to international status;
- Make available the membership registration for and liaise with the interim member countries focal points (participants in workshops) as well as with FAO and UNEP designated officers to enhance membership registration and finalize the nomination of national focal points to live up to membership commitment and responsibilities;
- Take action to convene and constitute a council of members that would endorse the Secretariat's mandate, approve its plan of action and recognize its policy, legal, regulatory and institutional frameworks; and
- Request FAO, UNEP and the Government of the Islamic Republic of Iran to allocate resources and assist in supporting the development of the LFCC to a full global secretariat. (Sadio, 2004)

The Secretariat would:

- Maintain lobbying for LFCC issues at international processes and meetings;
- Enhance collaboration and sharing between LFCCs;
- Put together basic conditions for efficient implementation of the programme of activities;
- Assist in the implementation, coordination and follow-up of national programmes of action;
- Collect, update and analyse relevant information from member countries and partners;
- Develop the LFCCs website;
- Inform international donors and funding agencies by reflecting the full social, economic, environmental and political benefits of forest and tree resources;
- Assist countries in identifying potential donors and in requesting assistance;
- Promote exchange of knowledge and capacity building through workshops, training courses, technical expertise and educational opportunities; and
- Mobilise and diversify financial resources to enhance the role of the Secretariat and that of the member countries. (Sadio, 2004)

FUTURE STRATEGY

Priority actions

The list of recommendations and resolutions from the Regional Workshops can appear exhaustive and daunting; however, a closer examination reveals that some of the points mentioned have been or are in the process of being achieved. There is undoubtedly clear awareness among LFCCs of the issues and the concerns regarding what is at stake. Different aspects are being dealt with to different degrees in different countries. A matter of concern is that LFCCs do not become complacent. They need to keep revisiting the issues, and maintain close communications with each other and the LFCC Secretariat, in order to keep the process moving.

The following is a list of actions that urgently need consideration in the development of action plans, strategies and future implementation.

Development choices and issues

It is recognized that planted forests and trees outside forests have positive contributions to make to increase forest cover restore landscapes and promote sustainable forest resource management. LFCCs are endeavouring to incorporate tree planting and management into national forestry, poverty reduction and food security strategies including adequate implementation mechanisms to ensure these are achieved in practice by being more pro-active in integrating forestry issues into the rural landscape. Priority actions include:

- Articulate and integrate planted forests and trees outside forests issues and actions into national forest and agricultural national development plans, backed by the necessary resources. Politicians and decision makers to demonstrate their full commitment to international processes and national priorities;
- Participatory processes are essential. Government officials and other groups need to work with local people, to learn from their traditional knowledge, to help meet their needs and to focus on integrated management;
- Land tenure. Communities need to have secure land tenure in order to have confidence in rights to the benefits from planting trees;
- Raise awareness among all sectors involved in natural resource management, as to the need to integrate land-use and sustainable development policies, strategies, legislation and regulations to include forestry and poverty reduction and food security strategies in National Development Plans;
- Awareness raising and capacity building of stakeholders including youth, rural communities and minority groups. Through environmental education programmes in schools and communities it is possible to change attitudes to land-use management to ones of sustainable environmental management;
- Clarify the roles of the State, the private sector, communities, NGOs and other stakeholders in planted trees and forest development;
- Prioritize preparedness to drought and other mitigating factors, particularly in combating desertification, famine and environmental calamities (wildland fires) in sustainable forest management, to assist in minimizing impacts and preparation towards securing national and international assistance; and
- Change the engineering approaches to planted trees and forest development (exotic species monocultures) to more diverse and flexible mixes of multiple species (indigenous and exotic) in mechanisms including agroforestry and multi-tiered land-use.

Institutional and legal improvements

There is urgent need for the development of appropriate and well-coordinated institutional and legislative frameworks with clear mandates, responsibilities and resources to support more efficiently and durably the initiation and implementation of rangeland, woodland and watershed management, environmental protection, desertification control and rural development programs. This can be achieved through:

- Strong government policies, strategies and institutions are required, in addition to a decentralized approach, and need to be supported by competent and knowledgeable staff. Ongoing reviews of legal, planning and policy frameworks allow for the incorporation of new concepts and approaches;
- Inter-sectoral and inter-disciplinary approaches are necessary to address problems of forest loss and environmental degradation. These should not be solely forestry driven, but receive input from all sectors involved in natural resource management in the landscape;
- Foresters and the forestry sector, have been somewhat marginalized in the past and need to be mainstreamed in inter-sectoral approaches;
- Financial costs, user pays, provision of low interest loans for afforestation. Managers, policy makers and stakeholders all need to be made aware of the long term benefits and eventual returns, if they are to be prepared to invest in forests;
- Support decentralization, intersectoral, multi-disciplinary and participatory approaches to policy, planning, implementation and monitoring;
- Provide appropriate allocation of resources from national treasuries to support the costs incurred in the transition from centralized to decentralized and participatory approaches;
- Cross sectoral collaboration Devise approaches to promote the integration of tree planting and management into landscape development programmes and agricultural national development plans;
- Foresters need to incorporate scientific research and traditional knowledge and technology on indigenous species, along with more flexible people-oriented approaches into planted forests and tree management practices. They need to be well equipped technically to work with local communities and farmers at subsistence levels and this also requires inter-disciplinary collaboration; and
- National forest research programmes, and education and training curricula need to keep pace with priorities reflected in the national forest programmes, policies and laws. They need to reflect a greater interest to invest in tree planting.

Resource use and management

LFCCs are aware that they need better information on the status of their resources. Sound planning, management and monitoring require valid and up to date data either on forest and tree resources, social or environmental issues. Assessment and monitoring need to be ongoing activities. Priority actions include:

- Prepare justifications for national forest assessments and successive socio-economic and environmental surveys (baseline and follow up) on the true impacts and contribution of planted trees and forests to social, environmental and economic benefits to the national economy;
- Integration of scientific with traditional knowledge is a relatively new concept that needs to be accepted;
- Network appropriate knowledge and technologies in low forest cover countries through electronic and other mass media distributions systems; and

• Investigate value of forest resources, both planted forests and TOF (including products, processing, value adding).

Enhancing the role of planted forests

In regard to planted forests, there is a lack of benefit analysis techniques to evaluate comparative financial and economic performances with other land-uses. Additionally there is a lack of technical tools, indicators, guidelines for participatory planning, growth and yield models for increasing productivity and efficiency in management. Priority actions should include:

- Apply sound technical forestry knowledge and technology in unison with appropriate policy/legal/regulatory/institutional frameworks to deliver effective field performance by strengthening support systems in planted forests and tree resources targeted to the specific needs of people in particular ecological zones, socio-economic, environmental and governance conditions;
- Provide technical management techniques on planted forests and trees to make available improved germplasm, silviculture and forest protection technology; and
- Application of new technologies into planted tree and landscape development, including improvements in water management efficiency, genetic resources and tree improvement practices.

Enhancing the role of TOFs

There has been a general lack of awareness among managers, policy and decision makers regarding the role and potential of TOFs in supplying social and economic products. As well, there are high costs associated with evaluating TOFs with respect to types of resources and systems. Therefore:

- In many countries, the value of trees outside forests, although recognized legally, have not been fully quantified in terms of wood, NWFPs and other services;
- Promotion of planting and use in private holdings, agroforestry and for shade and shelter is needed; and
- Availability of water is often an issue. An alternative to using scarce irrigation water, especially when implementing urban and peri-urban planting programs, is to utilise treated wastewater from cities. FAO is a good source of information, in addition to the valuable experiences with projects in Egypt, Jordan, Kuwait and the Yemen.

Supporting the Tehran Process and Secretariat

At the international level, the Secretariat to the Tehran Process is currently managed and funded by the Iranian Government, with technical assistance from FAO. To enable the Secretariat and countries to better champion the cause of low forest cover countries at the international and national levels, it is necessary to:

- Provide support to the Tehran Process, which in turn can provide an enabling environment for the establishment of a full LFCC Secretariat as a body that can lead, liaise, coordinate and inform for and on behalf of the LFCCs;
- Formally register country members and nominate national focal points to collaborate with the Secretariat of the Tehran Process and commit to the responsibilities of membership;
- FAO/UNEP provide technical support to the Secretariat as necessary and assign a senior officer with adequate resource allocation to provide technical support to the Secretariat in implementation of the Strategy and Action Plan;
- Promote benefits of membership, and share information on low forest cover country issues, data, lessons learned and collaborate in technical support of common interest;
- Recognize the full mandate of the Secretariat to represent low forest cover countries at international processes and meetings;
- Prepare better justifications and proposals to national Governments and international donors and funding agencies reflecting the full benefits (environmental, social, economic) of planted forests and tree resources;
- Mobilize human and financial resources and capacity building at the national level to support the Secretariat of the Tehran Process to enhance the role of planted forests and tree resources; and
- Ensure that FAO and the Secretariat provide assistance in proposal preparation for projects and programmes related to planted forest, trees outside forests and urban and peri-urban forests which address climate change, combating desertification, rehabilitating degraded lands and alleviating poverty support applications for international funding under the CDM, WEHAB, NEPAD, GEF and other funds. (Carle *et al.*, 2003)

Networks

Networks for access to new technologies, information exchange and communication are vital, whether national, regional or international. The following actions need to be undertaken:

- Initiate the establishment of a LFCC network around national specialists;
- Network appropriate knowledge and technologies in LFCCs, through the Information, Education and Communication Division's facilities;
- Access information centres with the aim of developing data collection mechanisms and promoting regional networks on planted forests, TOFs and UPUFGs; and
- Set up a LFCC information website describing the status of planted forest trees and tree resources in the country.

Information and knowledge

Current and up to date information are vital for any programme of sustainable management to be successful. Therefore the following issues must be addressed:

- Collect, update and analyse relevant information on the country;
- Establish a system of regular monitoring and assessment of planted forests, trees outside forests and urban and peri-urban forests;

- Initiate gathering and exchange (with other LFCCs) of forest and tree resource data;
- Document success stories as well as lessons learned, in natural resource management;
- Initiate procedures towards maintaining a record of traditional knowledge relating to TOFs; and
- Knowledge of more efficient uses of woodfuel or alternative methods of providing financially competitive energy sources to reduce dependence on woodfuel.

The way forward

The meeting of LFCCs in Tehran, Iran, in 1999 (FAO 2000) emphasized the need for concerted action, government commitment and collaboration among countries with similar problems. The declaration establishing the Tehran Process calls for increased investment from within the region, the donor community and from international agencies. It also suggests that NGOs, the private sector, research and training institutions and the rural poor could play a positive role, especially at the local level. The Tehran Process has much potential to make a real difference in the future, particularly if efforts are geared to national forestry planning, forest management and planting programs aimed at increasing forest cover and meeting the needs of rural people. (Carle, 2003)

In moving forward, it is clear that integrated and holistic approaches must be implemented in order to reduce pressures on forest and range resources. Planting trees as forests, tree clusters or agroforestry systems are part of the solution, as are regenerating and managing natural forests. With regard to providing alternative income to rural people, approaches include large-scale planted forests for industrial purposes, commercial orchards, small-scale projects for non-wood forest products, and tourism.

In most cases, LFCCs need better information on the status of their resources so they can monitor change and develop integrated management policies and plans. Tunisia has advanced the most in this regard and its approach could be used as a model for others.

Countries that have similar problems need to share experiences and adapt approaches to local conditions. Both Tunisia and Iran offer insights in this area, as do other countries, such as Australia, South Africa, and the United States of America. The expertise of international agencies like FAO, UNEP, ICRAF and CIFOR can offer appropriate services in landscape restoration.

Many developing LFCCs require different institutional frameworks, as well as training and skills for forest planners and management, in order to ensure understanding of decentralized, participatory, inter-sectoral and multidisciplinary approaches to policy, planning, implementation and monitoring. The voice of the forestry sector, which has generally been marginalized at the national level needs to be mainstreamed in inter-sectoral planning committees and working groups to derive national development priorities and national forest development strategies, taking account of the current value and potential role of natural and planted forests and tree resources in supporting lives in urban and rural landscapes. The necessary priority actions have been recognized. The important step now is for LFCCs to act on the recommendations and take this process forwards.

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APPENDIX 1.

Case Studies - Executive Summaries

- Islamic Republic of Iran
- Oman
- Tunisia
- Ethiopia
- Mali
- Namibia

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (FAO) GOVERNMENT OF THE ISLAMIC REPUBLIC OF IRAN

FAO-NETHERLANDS PARTNERSHIP PROGRAMME SUPPORT TO SUSTAINABLE FOREST MANAGEMENT IN LOW FOREST COVER COUNTRIES

ROLE OF PLANTED FORESTS AND TREES OUTSIDE FORESTS IN SUSTAINABLE FOREST MANAGEMENT

ISLAMIC REPUBLIC OF IRAN COUNTRY STUDY REPORT

EXECUTIVE SUMMARY

By

Salah Rouchiche and M. A. Haji Mirsadeghi

Rome, August 2002

FOREWORD

According to FRA 2000⁴, 71 countries, most developing, have a forest cover of less than 10 % of their land area. The open-ended International Expert Meeting on Special Needs and Requirements of Developing Low Forest Cover Countries (LFCCs) and Unique Types of Forests, held in Teheran in October 1999, agreed to prepare proposals to secure international support to sustainable forest management in LFCCs. The Netherlands approved support to targeted outputs and activities as a follow up to the "Teheran Process". Country studies for Africa and the Near East regions were selected to outline the causes and effects of deforestation and degradation together with lessons learned and priority needs to enhance the role of planted trees. The Islamic Republic of Iran, as one of the country case studies selected, is detailed in this report.

OVERVIEW AND COUNTRY CONTEXT

Government and administrative set-up and organization

The 1979 Islamic Revolution resulted in the creation of the Islamic Republic of Iran. At the top of the government structure is the Faqih⁵ who is the ultimate decision-maker. Below the Faqih, a distinct separation of power exists between the executive and the legislative branches. As of 2000, Iran was divided into 28 provinces (Ostans) and 293 counties (Shahrestans) headed respectively by a Governor General (Ostandar) and a Governor (Farmandar).

Planning procedures

Regional Development Programmes proposed by provincial ministry offices are submitted to the central government respective ministries for approval. After review and tuning, they are adjusted to amount to a National Development Programme that is submitted to the Majlis for approval. The individual programmes and associated budgets then are passed to each ministry for implementation.

Environmental characteristics

Iran covers an area of 1.65 million km², enclosed within 8,731 km of frontiers, of which 2,700 of coastline boundaries, and 6,031 of land borders. Almost 60% of the country is mountainous⁶, while deserts⁷ of the High Central Plateau cover one third of the territory. Environmental characteristics are as follows:

Climate: Owing to its highly contrasted topography, Iran displays a variety of climates ranging from hyper arid (centre and east regions) to Mediterranean semi-arid and sub-humid (mountain regions) and humid (Caspian coastal area, west Azerbaijan and southwest Zagros mountain range). Temperatures vary considerably $(-30^{\circ}C \text{ to } +50^{\circ}C)$. With its mean annual rainfall of 253 mm, Iran is drought-prone; precipitations being erratic and highly variable.

⁴ Forest Resources Assessment.

⁵ Expert in religious jurisprudence.

⁶ The main mountain ranges include the Alborz in the north, and the Zagros extending from northwest to southwest.

⁷ Dasht-e-Kavir and the Dasht-e-Lut.

Biological resources: Being endowed with a rich diversity of ecosystems, plant and animal species, Iran is one of the world's most important gene pools; it counts 8,200 plant species (1,900 endemic), over 500 bird species and 160 species of mammals. Five plant species, 20 mammals, 14 birds, 8 reptiles, 2 amphibians, 7 fish and 3 invertebrates are considered either endangered, or threatened and vulnerable.

Land and water resources: Historical evidence indicates that the vast, arid areas of central Iran were once covered with valuable range and forest vegetation. Human activities are believed to have strongly contributed to desertification. The main land use categories of Iran are the following:

- Forests [12.4 million ha 7.4% of territory];
- Rangelands [90 million ha 55% of the country];
- Deserts [34 million ha 21% of the country];
- Cultivated lands [23.6 million ha 14.4 % of territory]) exceed by far the forest land area;
- Urban and rural settlements, infrastructures and water bodies (4 million ha 2.2% of the national territory).

The total potential arable land amounts to 37 million ha (17 million ha under irrigation – 20 million ha rainfed).

Surface water and groundwater resources: Divided into 37 basins and 174 watersheds⁸, the country is drained by 3,450 permanent and seasonal rivers. The Persian Gulf and the Caspian Sea receive the highest flows. In 1996-97 precipitation generated 330 billion cubic metres (BCM) of surface water, 130 BCM renewable water and 126 BCM harvestable water resources, of which 87.5 BCM were harvested (94 % used by agriculture). About 70 BCM groundwater, were discharged in 1996 by 275,300 semi-deep wells, 100,700 deep wells, 46,700 springs and 32,000 qanats.

Population demography and employment

The population reached 63.9 million in year 2000 with a density of $38.77 \text{ persons/km}^2$. The growth rate has changed from 3.1% [1956-1966], to 1.5% [1991-1996]. It is estimated that 61.3% and 38.7% of the population live in urban and rural areas respectively. The 1999 literacy rate⁹ was 83 %. The 1996 economically active population¹⁰ amounted to 16,027,223 (26.68 %), of whom 90.9 % were employed. The 1999 manpower in agriculture was 3.5 million. About 17% of women are involved in farming activities, 46 % employed in the service sector and 34.5 % in the industries (1996 est.).

Main production systems

The main production systems are:

Agricultural cash crops: There are four agricultural crop production systems:

⁸ There are 37 major river watersheds.

⁹ Six years and above.

¹⁰ Ten years of age and above.

- Intensive, modern, and often irrigated cash crop production confined to the most fertile lands gained over forest and range area¹¹;
- Intensive, horticultural production of a vast variety of tropical, sub-tropical and alpine crops. The area under orchards is still growing, as is the modernization of the existing orchards;
- Mixed, generally rain-fed subsistence production based on subsistence crop cultivation and extensive livestock rearing practised on a permanent basis on small farms, in not too steep terrain; and
- Subsistence shifting cultivation mixed with extensive "free grazing" livestock rearing. Hardly productive, this very marginal subsistence cropping is practised by forests and rangelands dwellers.

Extensive animal husbandry: The extensive animal husbandry systems are:

- Nomadic, rare in Iran;
- Transhumant, practiced by 200,000 pastoralists who move between the summer and winter rangelands of the Zagros;
- Sedentary animal husbandry practiced by 1,473,000 farmers, in a mixed farming scheme with animals in support of agricultural production; and
- Pastoralists are granted usufruct-grazing rights or "grazing license" issued for the same land that was used by family ancestors, to avoid unnecessary conflicts.

Status of agricultural sector in national economy

Agriculture is one of the most important economic sectors in the Islamic Republic of Iran. Value added in agriculture increased from Rls. 5,585.3 billion in 1989 to Rls. 8,395 billion in 1999, achieving an average annual growth of 4.9 % during the decade. The share of agriculture in total GDP has been variable, ranging from 19.4 % in 1989, to 16.2 % in 2000. In terms of value added, the highest share within the sector occurred in farming, horticulture and animal husbandry. The share of forestry in added value within the agricultural sector has barely evolved passing from 1.2% of the total value added of agriculture in 1989, to 1.1 % in 1999.

CURRENT STATUS AND MANAGEMENT OF FORESTS AND RANGES

Forest and range data and information systems

A detailed, authoritative statement describing Iran's forest and range situation in quantitative terms is currently impossible. The Forest and Range Organization (FRO)'s capacity to manage land resources at national and sub-national levels is being strengthened to be able to operate and manipulate digitized geographic information and prepare digital land occupation maps at required scale.

Forest and range surveys

The first forest inventory was performed in the Caspian Forest in 1965; and the latest (1995), with a periodicity of 10 years, focused on the Caspian and Central Zagros Forests. At present,

¹¹ Land clearing for this type of production system is under control and does not constitute a threat to forests and rangelands.

a national inventory is being carried out based on random sampling, while the productive forests are surveyed based on systematic sampling. FRO's provincial offices are undertaking local land use planning studies and maps at scale 1:50,000; they have already covered about 20 million ha.

Forests and rangelands global estate

Forests and rangelands were nationalized in 1962 and their management entrusted to FRO. As a result of losing ownership and usufruct rights, the ex-owners and the traditional forest dwellers/users lost interest and sense of responsibility towards sustaining and protecting forests and rangelands, used since without restraint to face growing demands that came with population growth. Forests occupy 12.4 million ha (7.4 % of country) and include 1.9 million ha of productive commercial forests. The rest amounts to 5.5 million ha (West and Zagros), 2.5 million ha (South and desert), and 2.5 million ha in other regions. Rangelands include lands covered by natural grassland, shrub-land and a combination of both. Iran's rangelands occupy 90 million ha (54.8% of country area); the condition of 16% of the rangelands is excellent, whereas 66% are in favourable to fair condition and 18% are in poor and degraded form.

Deforestation

The overall deforestation figure for the period 1958–1994 is widely accepted as being equal to about 5.6 million ha. The presentation that follows gives the rates of deforestation according to the widely accepted classification of forests in Iran:

- Caspian broadleaf deciduous forest (1.5 million ha);
- Arasbaran broadleaf deciduous forest (100,000 ha);
- Zagros natural forests (1.7 million ha);
- Irano-Touranian Central Forests (2 million ha); and
- Semi-savannah subtropical forests (300,000 ha).

Rangeland degradation

The total rangeland area may have decreased by 10 million ha between 1972 and 2000. In terms of qualitative appreciation, the ratios have changed to the worse since the area of good rangelands dropped from 19 million ha to 9.3 million ha. While there is substantial rangeland improvement taking place under management schemes and livestock population control, there is also considerable degradation and clearing affecting the quality and surface area of rangeland and pastures.

Change in vegetation cover

No assessment has been made with regard to the forest annual cover change. However, considering that the present deforestation is limited, the average annual plantation rate of 63,000 ha should result in a slight positive change in national vegetation cover.

Extent of natural and planted forests, rangelands and planted resources

Natural forests

From a forestry point of view, Iran is divided into five vegetation regions as follows:

- Hyrcanian broadleaved forests¹² [1.905,000 ha] along the Caspian coast;
- Arasbaran forests [150,000 ha] of North Western Iran;
- Irano-Touranian arid forests [2,895,000 ha] in the Central Plateau Region;
- Zagrosian forests [5,050,000 ha]; and
- Persian Gulf and Sea of Oman tropical arid forests [2,400,000 ha].

Planted forests

During the period 1960-1999, afforestation amounted to 2,221,000 ha total area planted (all categories inclusive). The annual rate forest plantations establishment is 63,000 ha, the majority being implemented under government investment. Tree species planted are generally limited to indigenous or acclimatized exotic species. To ensure maximum success, most plantations are irrigated during 2-3 seasons. Water shortages are a major constraint to planting, particularly in arid zones. Site preparation costs are high, and establishment of irrigation facilities very expensive. The State grants substantial support to promote private investment in fast growing tree species plantations (poplar), which amount to 150,000 ha of which, 35% are young stands.

Trees outside forests (TOFs)

The present evaluation of TOFs in Iran is incomplete for lack of comprehensive data and information. In 2000 it was estimated that orchards accounted for 1,704,000 ha, about 14 % of the total forest area of Iran. Collaborative efforts between FRO, municipalities, NGOs and citizens' groups have led to the establishment of a quite dense network of urban and peri-urban forests in Iran, estimated in 1996 to be 530,288 ha (mean annual area treated 3,760 ha). Urban and peri-urban forestry is gaining momentum in the country and many provinces have developed their own urban forestry establishment programme.

Rangelands

The Technical Office of Rangelands (TOR) puts rangelands into Mountainous and Plains categories. Mountainous and upland summer grazing rangelands, characterized by their cool summers, cover 23 million ha and produce over 6 million tons of dry matter; they are able to support 54 million animal units for 100 days per year. Plains and lowlands winter and fall grazing rangelands cover 67 million ha and produce 4.5 million tons of dry matter equivalent to 2.47 million tons useable total digestible nitrogen.

Socio-economic significance of forests rangelands and planted resources

Natural forests and rangelands

According to the TOR (2000), some 916,000 households regularly utilize rangelands, of which 200,000 are transhumant families of the Zargosian region. About one half of the sedentary livestock breeders (1,473,000) depend partially on natural rangelands and pastures to meet their animal feed requests. The livelihoods of some 464,000 dwellers of the Hyrcanian depend on overgrazing, illegal exploitations and converting forests to agriculture and rangelands. The human pressure on the Irano-Touranian, Persian Gulf and Ommanain regions is less intensive;

¹² The Hyrcanian broadleaved forests receive mean annual precipitations ranging from 1,000–1,500 mm and extend from sea level to 2,500 m altitude.

however, degradation persists owing to poverty that compels communities to make full use of the resources. The national wood production saves the state economy about US\$ 437,048,000 of hard currency annually while 31% of the annual meat production of Iran, equivalent to 218,000 metric tons (MT), is associated with rangelands. The main socio-economic issue is related to the 1962 land nationalization process, which failed to put in place effective state alternatives to the former traditional protection/management/utilization systems, leaving a void that still persists in some areas.

NWFPs

The actual consumption and levels of exploitation of non-wood forest products and range byproducts appear to be very important, given their popularity and regular presence in rural as well as urban markets. This justifies that FRO has prepared and is implementing management plans for NWFPs over an area of 2.2 million ha. The main NWFPs are dye extracts, medicinal plants and exudates. Other NWFPs include aromatic plants and essential oils, honey and edible foods, particularly nuts. The internal marketing value of NWFPs and range by-products is difficult to assess, as to their commercial value; it was estimated at US\$ 10,119,382 and US\$ 7,811,338 respectively for 1988 and 1999.

Contribution of forests and rangelands to employment and revenue generation

More than 5 million people live in forests or in their vicinity. There are 7,453 permanent and 12,831 temporary employments related to forestry activities, while some 40,000 persons are employed in connection with wood industry. With regard to rangelands, some 452,000 persons live permanently on the rangelands, while 2,500 individuals have a permanent job and 2,122 others benefit from temporary jobs. The exploitation of 28 items of NWFPs and range by-products has provided 12.8 billion Iranian Rials of revenues that could be equated to 3 months of wages provided to 25,108 households every year.

Management, rehabilitation and extension objectives, achievements and perspectives

Forest management: Forestry has been initially developed with a strong emphasis on introducing exotic tree species and using western European silviculture to manage the commercial broadleaved forests of the Caspian Sea region, which have long been at the heart of Iran's forestry. It was only with the second Five-Year Development Plan (1994-1998) that all due consideration was given to the forests outside the Caspian region and that the socio-economic reality surrounding them was taken into consideration by attempting to introduce integrated participatory approaches to forest rehabilitation and management. With reference to 1999, the total forest area under management amounted to 3,905,440 ha, equivalent to 31.5 % of the total forest estate. The main forest types outside the Caspian are gradually brought under two major forms of management, i.e. conservation (569,000 ha) and multipurpose (1,440,440 ha). The areas managed there, are in decreasing order: 867,400 ha, 807,500 ha, 223,800 ha and 101,740 ha respectively for the Irano-Touranian, the Zagros, the Khalij-Omanian and the Arasbaran forests.

Forest area extension: Forest plantations are established to compensate for the loss of natural forests and to extend the area of the global national forest estate. The total planted area up to 1999 has been estimated at 2,221,100 ha. The long-term afforestation programme aims at implementing 4,000,000 ha for plantations, with 1,900,000 ha for forest development,

730,000 ha for green spaces' development, 370,000 ha for wood production and 1,000,000 ha for multipurpose tree planting.

Range management and extension procedures, objectives and achievements

Range management rehabilitation and extension: Prior to 1995, there were no range management activities implemented even though diverse management approaches and plans had been formulated. Since then, FRO has formulated 6,893 range management plans covering 16.4 million ha, of which 3,838 plans are being implemented over 8.8 million ha. The technicians elaborate the plans, which are the basis for the establishment of thirty-year legally binding contracts with the grazing license holders. Following their management, production of rangelands has increased by factors ranging from 1.4 for the best rangelands to 3.0 for poor rangelands. Activities leading to range rehabilitation have consisted of the following:

- Range inventory and land tenure assessment (56,400,000 ha);
- Planting fodder species (1,875,000 ha);
- Re-conversion of abandoned rain-fed agricultural fields to rangeland (1,119,000 ha); and
- Establishment of enclosures for rangeland protection over 6,128,000 ha.

Combating desertification: FRO's achievements are as follows:

- Regeneration by direct seeding over 3,300,000 ha;
- Dune fixation using petroleum mulch spray over 130,000 ha; and
- Windbreak establishment over 2,000 km.

Rehabilitation is achieved with such success: native vegetation recovers so well that some areas are re-designated for controlled grazing and cautious fuelwood gathering.

Promoting participation: Participatory approaches to planning and management have become the foundation to sustainable integrated natural resources management policy in Iran. Participatory management plans are prepared by the administration for forests traditionally utilized by local families who implement them on a contractual basis. They aim to:

- Encourage forage cultivation inside the forest, in exchange for livestock removal from the forest to enhance natural regeneration;
- Enrich forests by seeding and planting¹³ operations; and
- Distribute land outside forests with 30 years land tenure rights.

The beneficiaries organized into forest cooperatives execute the diverse management prescribed operations as a voluntary contribution. Participation is however still understood as a counterpart effort from the "beneficiaries" to manage their resources as formulated by Local Forest Offices, according to a top-down approach.

¹³ Multipurpose native species.

INSTITUTIONAL, LEGAL, POLICY AND PLANNING FRAMEWORKS

The Forest and Range Organization

The Forest and Range Organization (FRO) is the main governmental institution responsible for planning and implementing desertification control, forestry and range management, and development programmes. It manages all public lands covered by the Forest and Range Nationalization Law and enforces policies, legislation and regulations pertaining to land use, forestry, conservation, range management and desertification control. Projects and plans are prepared by the central bureaus and referred to the 30 FRO provincial institutions for implementation.

Research Institute of Forests and Rangelands

The Research Institute of Forests and Rangelands (RIFR) was founded in 1968 as a national institute with mandatory responsibilities to lead research activities on natural resources of Iran. Its former strategy was founded on afforestation, using exotic and fast-growing species. It is now more focused on forest ecology and genetics, silviculture and afforestation by native and exotic species. Independent from the RIFR, the Soil Conservation and Watershed Management Research Centre carries out research activities related to:

- Soil erosion;
- Integrated watershed management;
- River-training; and
- Floodwater harnessing and utilization.

Forest and range training and education institutions

Currently, more than 30 faculties and universities with over 10,000 students are actively teaching agriculture, animal husbandry, desertification control and dry-land rehabilitation. Forestry education dates back to almost 60 years. At present six Natural Resources Faculties provide training to 436 students (1995 est.); 75 candidates train for a post-diploma, 369 students for a BSc. degree, 65 candidates for an MSc. degree and four applicants for a PhD degree. Two modern Natural Resources Training Complexes with a combined capacity of 230 candidates, teach high school graduates to become forestry or rangeland management technicians.

Policy and strategy framework for forest and range

The forest policy aims at conserving, rehabilitating and sustaining the use and development of natural resources. It also aims to:

- Balance the livestock population in harmony with the rangelands' actual carrying capacity;
- Settle livestock owners and nomads; and
- Settle land ownership demarcation at national level.

Six principles guide the forest and rangeland development policy. They include: integrated approach to planning and development, participatory approaches to resource management,

promoting institutional reform and capacity building to strengthen programme implementation and ensuring continuous monitoring and evaluation of forestry policies.

Forest, range and environmental protection strategies

Forests and range: The government is pursuing a strategy of multiple forest utilization and is launching a vigorous national reforestation and afforestation programme to reclaim degraded forests and rangelands, protect watersheds and manage industrial forests on a sustained-yield basis. It also aims to involve private enterprises to obtain long-term concessions for large forest areas, with the objective of industrial utilization and sustained yield management. In the tree plantation programme, the objective is to move towards more people participation and involvement as several programmes are carried out on sub-contract basis with private enterprises.

Environmental protection: The national environmental protection strategy's goal is to put 10% of the national land area under protection. At present, 8.2 million ha are being protected by the Department of Environment, which manages the following categories of protected areas:

- National parks (11 sites 1.3 million ha);
- Wildlife refuges (25 sites 1.9 million ha);
- Protected areas (47 sites 5.3 million ha);
- National nature monuments (5 sites); and
- Biosphere reserves (9 sites 1.9 million ha).

In addition, the FRO manages 131 reserves with a total area of 111,000 ha.

Legislative framework for environmental protection

Forestry and environmental legislation: The first legislation of forestry was enacted in 1924; it was strongly oriented towards the regulation and control of forest exploitation and management. The recent amendments to the law allow for better land tenure arrangements in forest and range protection, rehabilitation and management (Article 45). The law is being presently reviewed to make possible more community commitment through participation. As other environmental laws, the LPEFR is weakly enforced. Other laws related to environment are: The Environmental Protection and Enhancement Act; and the Game and Fish Law and Regulations.

International cooperation and adhesion to international conventions: Iran has taken several measures to enhance international cooperation with relation to environmental affairs and has accepted international legal responsibilities by adhering to a number the international conventions such as the United Nations Desertification Control Convention, the Convention on Biodiversity, the Convention on Wetlands, the UN Framework Convention on Climate Change, the World Heritage Convention.

Forestry and range development Country Vision 2020

Forests: The forestry development vision programme up to the 2020 horizon consists of: Forest rehabilitation and enrichment (management of 1,650,000 ha of degraded forests), Forest extension (4,000,000 ha of forest plantations, including irrigated plantations, urban and peri-urban forestry, agroforestry, sylvopastoral plantations).

Range: With regard to range, the long-term development vision includes:

- Grazing management prescriptions over 23 million ha of summer rangelands;
- Executing watershed management and range improvement activities on 2 million ha of rangelands;
- Converting low yielding cereal dry-land to intensive fodder and forage production fields over 1 million ha;
- Balancing livestock numbers to rangeland carrying capacity;
- Increasing forage production and supply; and
- Promoting extension and participation in range rehabilitation and management; and promoting research on range management improvement.

CAUSES AND EFFECTS OF DEFORESTATION AND DEGRADATION

Indirect (root) causes

Some of the salient indirect causes to deforestation and rangeland degradation are:

Land and water tenure and users' rights and incentives: These include:

- Incentives granted to enhance agricultural production, which have constituted an encouragement to extend the areas cultivated by converting, with the State's consent significant forest and rangelands to agriculture land;
- Indirect incentives granted for forest and rangeland exploitation, through omitting to tax products and incomes derived from such operations;
- Promoting excessive water mobilization as an encouragement to the extension of productive irrigated agriculture, mostly implemented through forest and rangeland clearing; and
- Land nationalization, which is held responsible for the breakdown of traditional systems of forest and range management, resulting in the disintegration of the forest and range resources.

Poverty triggering factors: These include:

- Unchecked population growth which inevitably results in extreme pressure being exerted on the limited natural resource base available to the country;
- Poverty, which concerns 40 % of the rural population that attempt to maintain basic living standards by increasing livestock numbers on the already overcrowded rangelands; and
- Lack of investments and on off-farm job and revenue opportunities that compel more people to depend increasingly on marginal lands, at the expense of former forest and rangelands for their crop production.

Response capacity to forest and range misuse issues: The response capacity is weak because:

• Inability to react on a timely basis to misuse and calamity impacts, for lack of timely and reliable data and information;

- Top-down approach adopted to trigger community involvement in the process of natural resources rehabilitation has not set in motion the required sense of ownership of, and responsibility for, the resource that may lead to sustainable success; and
- Some gaps in knowledge related to natural resources, participatory procedures.

Policy, legislative and regulatory issues: Among those issues indirectly responsible for degradation, the following:

- Legal/regulatory tools did not incorporate the human dimension and consequently failed to promote the protection and sustainable management of the land resources;
- The form of conservatism that prevails within the forestry and range sector makes it impossible to delegate fully the responsibility to its traditional users to administer, manage and sustain the resource; and
- Despite commendable efforts, the government's commitment to sustainable natural resources management remains insufficient.

Direct causes: The main direct causes to deforestation and range degradation are:

Natural causes: Direct natural causes to degradation include:

- climatic conditions, which limit vegetation's establishment and resilience and constitute hostile conditions for rehabilitation;
- accentuated topography, which triggers acute erosion processes; properties of soil which often hamper the emergence and survival of natural regeneration;
- natural destructive calamities, such as floods, wind, temperature and drought extremes; and
- pests and diseases.

Causes linked to human activity: Land degradation and loss of vegetative cover are closely associated with human activities such as:

- Allocation of forest, woodland and rangeland for the purpose of agricultural and urban development;
- Misuse of forest resources through excessive fuelwood, construction, wood gathering, grazing and browsing;
- Misuse of rangeland resources resulting from increased livestock numbers, well beyond carrying capacity;
- Inadequate agricultural practices, particularly abusive utilization of unsuitable farm machinery for subsistence shifting cultivation combined with "free grazing" on marginal steep sloped lands;
- Agricultural land abandonment;
- Infrastructure construction; and
- Man-made catastrophes such as fires, wars, refugee influxes.

Effects and extent of deforestation degradation

The effects of deforestation and degradation are manifested in:

Loss of land productivity: Deforestation and degradation result in loss of land productivity, which is translated by decline in biomass¹⁴, in species diversity and in genetic resource; decline in habitat caused by loss of vegetative cover, erosion, salinization, waterlogging, lowering of water tables ; and soil erosion increase.

Increase in poverty: Natural resources degradation results in poverty expansion. Besides the traditional "underclass" often identified among forest and rangeland dwellers, the new population groups affected by poverty are the rural-to-urban migrants, the landless and near landless, the disabled, and the rural female group. The collapse of various production systems, which are not economically viable anymore, forces more rural population to migrate to cities. Regarding the extent of deforestation, clearing forest for agriculture, forage production and firewood and charcoal has reduced forests by 30 % over the last 40 years¹⁵. According to the Technical Office of Rangelands, the country's range area has decreased from an estimated 100 million ha in 1972 to 90 million ha at present.

STATUS OF KNOWLEDGE

Lessons learned

Several lessons learned have been brought to the surface; they are related to the following:

Development choices and issues

- Planted forests are for the most planned and implemented without insight into the future and in isolation of their socio-economic context;
- Any form of rural development must consider making the best use of the existing traditional knowledge and know-how;
- In Iran, there is no particular silviculture developed for either natural or artificial stands outside the Caspian forest zone;
- A need to improve the existing environmental information systems and to establish a common network for better planning and sustainable development of natural resources; and
- An important network of urban and peri-urban forests has been established often at very high costs, with long-term dependency on irrigation.

Institutional and legislative aspects: Valuable observations have been made, among which the following are among those that call for immediate attention:

- Programme planning and decision-making functions are highly centralized and leave little initiative to the provincial Natural Resources General Directorates;
- Laws and regulations pertaining to natural resources protection and development are totally inadequate when it comes to promoting decentralized planning and decision-making or supporting community participatory to natural resources development;
- International contact and exchange opportunities for FRO technical staff and officers are too limited;

¹⁴ Total annual biomass production expressed in usable dry matter yield is estimated to have decreased from 13.98 million tons in 1972, to 10.7 million tons nowadays.

¹⁵ **Source:** National CBD Report for the Islamic Republic of Iran.

• Inter and intra-sectoral coordination of the development activities initiated by FRO need to be initiated.

Gaps in knowledge

Some gaps in knowledge have been identified including:

- Lack of reliable data on the extent of deforestation and natural resources degradation;
- Consequences of the cumulative effects of decades of misuse of forests and rangelands in terms of social, economic and environmental damage incurred;
- Difficulty for Iran's research¹⁶ system in capturing traditional farmers' experience and reacting to unsustainable land use practices of small farmers particularly emanating from forests and rangeland dwellers;
- Inability to initiate full participation partnership in development of rural communities; and
- Lack of common networks of statistical monitoring and planning databases; public awareness of environmental degradation and its implications is fragmentary and simplistic and is not founded on comprehensive information on ecosystems and land use methods.

Experience gained, capability developed and shortcomings

Iranian forestry achievements to protect, rehabilitate and manage forest and range resources are significant, but the challenges ahead are colossal because the forest and range development policy objectives aim not only at conserving the resources, but also at alleviating poverty. With this in mind, new concepts and methods are being tested, including the participatory approach to integrated forest and range management. Besides this, it is correct to state that forestry still faces shortcomings in training and land allocation.

Training, where the qualifications' pyramid is totally inverted since the number of academic level graduates exceeds by far that of technicians.

Land nationalization has constituted a powerful factor of misuse of the natural resources. It appears indeed, through various reports and studies undertaken in connection with natural resources degradation, that land nationalization has constituted a powerful factor of misuse of the natural resources. Traditional land users being deprived of their traditional land tenure security and former rights, tend to use the natural land resources as common resources, on the basis of "first come first served" leading to overexploitation and eventually serious degradation. With an improved land tenure security provided through participatory management schemes, the situation is gradually improving.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The conclusions of the mission are summarized as follows:

¹⁶ Iran's research system is oriented towards raising production of the better-off farmers.

Development choices

- Iranian foresters have gained much valuable experience in such fields as sand dune fixation, mangrove regeneration, poplar and other fast-growing species plantation, management of NWFPs, development of extensive urban and peri-urban forests, development of intermediary forms of participation to forest and range sustainable management;
- Despite imposing resource rehabilitation programmes, FRO has not significantly and sustainably contributed to poverty alleviation among forest and rangeland dwellers;
- The ambitious Vision 2020 of the forestry sector demonstrates the will of the government to pursue its efforts towards improving and rehabilitating the country's forests and rangelands; and
- Following nationalization of all lands, rapid population growth as well as unsustainable human activities and other natural causes, Iranian forests and rangelands have lost very substantial areas in the last decades.

Institutional and legal

- Planning and decision-making are highly centralized, leaving little space for provincial and local initiatives to programme and project formulation, planning and decision-making;
- Need to re-assess the country's training needs for participatory forest and range protection, rehabilitation, management and development;
- Research needs to focus on integrated participatory agroforestry, community forestry and smallholder forestry and should be better prepared for the dissemination of its results;
- Legislation is not adequate as it does not spell out with force the need for effective protection and for decentralized and participatory programme development and decision-making;
- The Islamic Republic of Iran has engaged in important regional cooperation programmes;
- Inter- and intra-sectoral coordination are inadequate; and
- Coordination within the FRO institutions and with other stakeholder bodies and organizations is weak.

Natural resources use and management

- Socio-economic value of forests and rangelands is very significant as more than 5 million people live in forests or in their vicinity, while 450,000 persons live permanently on the rangelands; and
- Planted forests are established without any preconceived idea of their future sustainable management.

TOFs are not yet well perceived in terms of their actual or potential contribution to the national economy and to the well being of people.

General conclusion: The current situation of Iran's natural resources is a reflection of its past and present social, ecological, technological, economic, political and administrative measures. Technical or engineering solutions are not enough; they need to take into account the needs, priorities and aspirations of the rural poor.

Recommendations

Development choices: Recommendations with regard to development choices and issues include:

- *Biodiversity conservation:* Adopt participatory planning and resource management approaches to sustainable forest resources management, with due regard for biodiversity conservation;
- Assessing and monitoring ecosystems: Complete the assessment and monitoring system by providing funds, staff and equipment to implement the project UTF/IRA/024/IRA formulated in May 1999;
- *Popular participation:* Participatory planning and management become a standard approach to understand the needs and aspirations of communities and individual families to contribute in those matters that directly impact upon their sustainable livelihoods;
- *Tenure rights:* Develop a people-oriented policy, planning and technical support system in contrast with traditional planning, management and production systems;
- *Poverty alleviation and support to local communities:* Enhance and promote long-term employment and revenue opportunities among forest and rangeland dwellers by strengthening stakeholders' interest and investments in sustainable resources management; and
- *Development and widespread distribution of alternative domestic energy:* Provide alternative domestic energy sources to cover the entire rural countryside.

Institutional and legal: Recommendations with respect to institutional and legal improvements include:

- *Need for decentralization*: Ensure genuine community commitment as expressed by the recently formulated forest policies and strategies, more decentralization at planning and decision-making;
- *Need for a better adapted legislation:* Review legislation and regulations to incorporate the human dimension and recognize the right of traditional land users to access and share management over resources;
- *Cross-sectoral coordination and co-operation:* Establish national and provincial crosssectoral coordination and co-operation mechanisms involving all institutions and organizations concerned with rural development in general and natural resources rehabilitation, conservation and development in particular;
- *Regional cooperation between LFCCs:* Initiate cooperation programmes between Iran and other LFCCs including follow up by the Secretariat of the LFCCs to ensure that various cooperation proposals as detailed in the main report materialize; and
- *Training and research:* Adjust and normalize the balance of qualifications between professional graduates and technicians trained; diversify the training curricula and research topics to include tropical semi-arid, and arid environment protection and forest and range rehabilitation, management and development; and use the national training capability to help the neighbouring LFCCs.

Resource use and management: Recommendations with respect to resource management include:

- *Improved agricultural production systems:* Promote more environmentally and people friendly approaches to agricultural development and expansion, by adopting efficient and non-destructive production systems, particularly in mountain areas, and rehabilitating lands that have been exhausted of their productive potential, to their initial land-use choice; and
- *Land productivity improvement:* Improve land productivity and soil fertility in rehabilitation of degraded lands, including incorporating trees and planted forests in the landscape.

Enhancing the role of planted forests: The recommendations with respect to enhancing the role of planted forests in sustainable forest management include:

- Integrated planted forests in a broader land-use context in an attempt to respond to the priority needs and aspirations of people;
- Maintain or increase the present rate of afforestation/reforestation; and
- FRO and RIFR prepare arid, semi-arid and tropical silvicultural and management models as well as guidelines for the rehabilitation, silvicultural treatment, management and development of mangroves, fodder tree plantations, and *Haloxylon persicum* stands developed through plantations and seeding.

Enhancing the role of trees outside forests: The recommendations with respect to trees outside forests include:

- Recognize TOFs as a valuable resource and introduce their concept and issues as points of discussion for the coming LFCC workshops;
- Grant more support to farmers to maintain and expand poplar and fast growing species' plantings for shade, shelter and other uses;
- Promote TOFs in private holdings, particularly in agroforestry where trees support agriculture and livelihoods;
- Develop an adapted silviculture for the specific needs of urban/peri-urban forests and publish silvicultural guidelines for various species in different ecological contexts;
- Consider the productive capacity of the urban and peri-urban forests and prepare management plans accordingly;
- Promote the planting of trees outside forests, mainly fodder trees in sylvo-pastoral systems; and
- Arrange a short training course on the silvicultural treatments of fodder tree and shrub species and on sylvo-pastoral management of recently rehabilitated wooded rangelands.

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (FAO) GOVERNMENT OF THE SULTANATE OF OMAN

FAO-NETHERLANDS PARTNERSHIP PROGRAMME SUPPORT TO SUSTAINABLE FOREST MANAGEMENT IN LOW FOREST COVER COUNTRIES

ROLE OF PLANTED FORESTS AND TREES OUTSIDE FORESTS IN SUSTAINABLE FOREST MANAGEMENT

SULTANATE OF OMAN COUNTRY STUDY REPORT

EXECUTIVE SUMMARY

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FOREWORD

According to FRA 2000¹⁷, 71 countries, most developing, have a forest cover of less than 10 % of their land area. The open-ended International Expert Meeting on Special Needs and Requirements of Developing Low Forest Cover Countries (LFCCs) and Unique Types of Forests, held in Teheran in October 1999, agreed to prepare proposals to secure international support to sustainable forest management in LFCCs. The Netherlands approved support to targeted outputs and activities as a follow up to the "Teheran Process". Country studies for Africa and the Near East regions were selected to outline the causes and effects of deforestation and degradation together with lessons learned and priority needs to enhance the role of planted trees. The Sultanate of Oman, as one of the country case studies selected, is detailed in this report.

OVERVIEW AND COUNTRY CONTEXT

Brief geographical description

One of the Gulf countries, the Sultanate of Oman is bordered by the Arabian Sea to the east, the Gulf of Oman and the Persian Gulf to the north, Yemen to the south and the United Arab Emirates and Saudi Arabia to the west. The coastline and the land boundaries are respectively 2,092 km and 1,374 km long. Oman is devoid of any significant water body.

Governmental and legislative framework

Government institutions include the Council of Ministers (CM), the National Defence Council and the National Development Council. Headed by His Majesty Sultan Qaboos, the CM includes a cabinet of 27 Ministerial Departments. There are seven government institutions, among which the Ministry of Agriculture and Forestry (MAF) and the Ministry of Regional Municipalities and Environment (MRME), have major responsibilities in environmental protection. The country is divided into five Regions, three Governorates and 59 Wilayates. Being an absolute monarchy, Oman has no formal constitution. Since 1996, the country has a bicameral legislature, which includes the Consultative Council (elected members) and the State Council (appointed members). The legal system¹⁸ subscribes to the Islamic Law, Sharia; it guarantees basic civil liberties for Omani citizens.

Planning procedures and state of economy

Planning and decision-making are highly centralized, many decisions being taken by Royal Decree or by the government, which is headed by the Sultan. Some level of decentralization exists at governorate level, where specific programmes and projects are formulated, implemented and managed by the local authorities. Since 1970 the sultanate has moved from an underdeveloped, poor country, towards a modern wealthy nation with a GDP per capita of US\$ 9,500. Indices of development, per capita gross national product, infant mortality, literacy rates and availability of social services validate the positive change brought about by the government's policies. Sultan Qaboos holds concurrently the functions of Prime Minister, Minister of Foreign Affairs and Minister of Defence and controls all ministerial appointments and cabinet reshuffles.

¹⁷ Forest Resources Assessment.

¹⁸ Laws are issued by Royal Decree.

Environmental characteristics

The Sultanate of Oman's main environmental features are:

Geology: Oman consists basically of two geological regions: the Oman mountains and their adjacent areas in the north, and the desert area and the southern mountains. The predominant formations, which are of interest from the point of view of collecting water resources, belong to the post-nappe autochthonous and autochthonous units.

Landscapes and soils: The main landscape and soils classifications are:

- The Musandam Peninsula at the extreme north which is a deeply fissured fjord-like landscape;
- The rugged Hajar Mountains with their limestone sediment structure, which allow water to flow regularly in the deeply cut ravines of the wadis;
- The Batinah coast referred to as the garden of the Sultanate is a fertile plain. Of alluvial type, the silt and fine sand soils are the most suitable area of the country for agricultural activities;
- The Ja'alan region, which is home to the Wahibah sands, extends 200 km to the Indian Ocean shoreline. The soils here also form the most suitable agricultural lands;
- The vast, environmentally hostile flat wasteland plains of Central Oman extend 800 km from the Hajjar to the Dhofar Mountains; and
- Home to the frankincense trees and to the most lush woodlands and rangelands of Oman, the region of Dhofar covers 100,000 km² of diverse landscapes comprising the high dunes of the Rub Al-Khali, the dry plateau, the steep mountain escarpments, the foothills and the coastal plains.

Climate: Oman has three major climatic zones:

- Northern coastal sub-tropical climate with very hot and humid summers, mild winters and heavy rainstorms;
- Dry climate (scarce rainfall, high temperatures) dominant in the deserts and gravel plains of central Oman; and
- Tropical climate under the influence of the light southwest monsoon that brings cool winds, rainfall and dense clouds and fog from the Indian Ocean to the southern Dhofar region.

Precipitations along the coast and on the interior plains range from 20-150 mm/year reaching up to 700 mm/year in the mountains.

Biological resources: Despite its arid climate, Oman is a country of high biodiversity, particularly in regions with greater precipitations. Rangelands and woodlands harbour 1,208 plant species, of which 78 are endemic. Oman counts 70 mammal, 461 bird, 75 reptile and thousands of invertebrate species.

Land resources: Recent evidence indicates that sizeable woodland and rangeland areas have been lost to agricultural and urban development in the last decades. Despite the surveys and studies carried out, the status of cultivable lands in Oman is not clear as it varies from

2.223 million ha¹⁹ to 269,000 ha²⁰. Al-Batinah coastal plain accounts for about 40% of the land area under cultivation in the country.

Surface water and groundwater resources: Unreliable, surface water flows mostly in the form of intermittent and ephemeral watercourses. Spate flows are important for recharging the aquifers of the coastal region and interior plains. Wadi Dayqa (30 km) is the only perennial flow, besides some springs originating from the Hajar Mountains' limestone and the Dhofar Jabals. Annual groundwater recharge and abstraction are estimated at 1,239 Mm³ and 850 Mm³ respectively. The capacity for water desalination was 41 Mm³ in 1991, representing about 4.5% of the annual water consumption of the Sultanate. In 1993, treated wastewater effluents amounted to 25.6 Mm³. Agriculture uses 94% of the total water consumed in the country. A water deficit of 286 Mm³ was recorded in 1990.

Population, demography and employment

Oman's fast growing population (growth rate = 3.49%) reached 2,264,590 in 1997 and its density 10.65 pers./km². The population includes significant minorities of Indians, Pakistanis, and East Africans. The net rural-urban migration rate is estimated at 1.42 migrants/1,000 inhabitants. Women play an active role; they are given career opportunities and the right for equal pay. The 1995 labour force (which includes a high percentage of foreigners) was 430,000, of which 40% had an agricultural occupation. A high proportion of the Omani population is employed by the government, or works in the wholesale and retail sector. Economic development has resulted in social transformation, decreasing the importance of the tribal element.

Economic overview

The country's economic performance is closely tied to the oil industry's fortunes. Petroleum accounts for 75% of export earnings and government revenues, and for 40% of the country's GDP of US\$ 20.8 billion, whose composition by sector in 1994 was: 3% agriculture, 55% industry and 42% services. Development priorities aim at reducing dependency on oil exports by encouraging non-oil income-generating projects and private sector investment and correcting regional imbalances.

Main agricultural production systems

Oman's agriculture occupies 100,000 ha (60 % irrigated). With 10 million trees planted, date palms make up 45% of the total cultivated area or 70% of the area under fruit cultivation (40,000 ha). Grains (barley, wheat) and vegetables represent 19.2% (11,092 ha) and 16.8 % (9,732 ha) of the total area under cultivation respectively. The 1982 livestock population was estimated at over 1 million heads (831,000 goats and sheep, 126,000 cattle and 126,000 camels).

Status of agricultural sector in national economy

Despite agriculture's 9.6% mean annual growth rate, the country depends largely on imported food. Self-sufficiency in 1988 ranged between 0% for rice, beans, sugar, and plant oil, to 64% for vegetables, 105% for dates, 408% for some fruit and 26% for animal products. During the

¹⁹ Source: MAF, 1990.

²⁰ Source: JICA, 1990.

period 1967-1989, the monetary contribution of agriculture and fisheries to the GDP increased from 14.3 to 117 million ORIs.²¹ However, its share declined from 34.6 - 3.6 % of the GDP. The sector is given priority by the government, which intends to further encourage its development.

CURRENT STATUS AND MANAGEMENT OF FORESTS AND RANGES

Forestry and range data and information systems and surveys

Thematic maps are scarce and often outdated and the development of digital geo-spatial databases is proceeding slowly and without coordination with other stakeholders. Except a few, often outdated qualitative descriptions of the country's natural resource base, basic data on area occupied by woodlands and rangelands, available biomass, and wood volume stocks is severely lacking. The important shift in vegetation cover and land occupation following deforestation, rangeland degradation and woodland/rangeland distribution allocation is impossible to assess in terms of area loss or environmental impact. The existing basic authoritative studies and documents published following project implementation and special expeditions are difficult to trace, due to poor archiving systems in the public administration.

Forestry and range surveys

Except for a qualitative investigation²² carried out for Ash-Sharqia region, there has been no comprehensive survey of the woodlands/rangelands estate in the country. Rough estimations derived from an approximate vegetation map of Dhofar show that rangelands and woodlands occupy about 400,000 and 100,000 ha respectively, with stocking rates ranging from 10 to 1,500 trees per ha.

Characteristic features of Oman's woodlands and rangelands

The arid and semi-arid lands of Oman can hardly be differentiated into "single purpose use" categories; it is difficult to differentiate woodland, bush, shrub-land, forestland and grassland since trees, shrubs, herbs and forbs tend to be closely inter-mixed and ecologically inter-dependent. Vegetation is open, ranging from woodlands composed of more or less continuous cover of trees and shrubs, to scattered or isolated trees and shrubs sheltering meagre grass. Predominant in Oman, these forms of vegetation cover (at times rather dense), remain principally seen and used as a source of forage and browse as well as a source of energy and construction wood. They belong to an overlapping woodland and rangeland land use system. There are however a number of extensive woodlands communities, that form an important natural resource. The State owns woodlands and rangelands. Practically, however, these are managed and controlled by tribes. Oman's man-made forests amount to 920 ha²³. Little is known about the products/services available from woodlands/rangelands, though they contribute much to fodder needs. The revenues and employment secured from rangelands/woodlands are not documented, though undoubtedly very important.

²¹ Omani Rials

²² Carried out by the Royal Geographical Society's Wahiba Sands Project.

²³ FRA 2000.

Woodland/rangeland degradation

Woodlands/rangelands rate of degradation is alarming. Some formerly densely covered woodland areas of Dhofar have now only scattered trees. Many range/woodland areas in northern Oman have lost much of their vegetation cover, and some palatable species and display poor regeneration ability. Levels and extent of degradation are not known as there has been no inventory or monitoring activities carried out to quantify the status or change in these. But, on account of visual descriptions, degradation must affect more or less intensely all the woodlands and rangelands of the country. Woodland/rangeland degradation as a result of shifts in vegetation cover and land use are believed to be considerable. However they have not been well assessed in terms of area loss and environmental impact, due to the absence of national survey and monitoring capacity. This is due to mismanagement subsequent to land nationalization, and woodland and rangeland allocation to urban and agricultural development of the country in its modernization phase.

Structure and importance of trees outside forests

Trees outside forests include:

- Orchard plantations covered 36,990 ha in 1990;
- There are no official data on the total urban and peri-urban forest areas planted. These constitute the greater part of tree planting in the country and include line tree-plantings, parks, gardens; and
- Road plantations, often composed of water-demanding species, exist over hundreds of kilometres throughout the country.

Woodland/rangeland environmental significance

The national biodiversity is credited with over 1,200 plant species, most of which make up the natural woodland and rangeland vegetation estate, which constitutes vital habitats to a large community of animal life. The importance of natural rangelands and woodlands with regard to biodiversity is reflected by the precedence the National Biodiversity Strategy sets upon protecting all forms of natural vegetation.

Economic and social significance of woodlands and rangelands

The populations depending on the range and woodland estates are chiefly pastoral nomadic communities estimated at some 70,000 people thinly spread over the entire country. The economic viability of a pastoral household depends upon having enough manpower to manage the livestock it owns. Increasing numbers of herders are recruiting foreign labour to tend their animals. Rangelands and woodlands form the major source of nutrition for livestock, which constitute a chief basis of rural community income. Their steady degradation and loss of productivity and carrying capacity have a profoundly negative impact on rural peoples' livelihoods. The country's modernization has increased the dependence on imported agricultural products, which compete strongly with the national production, affecting even more deeply the pastoral communities and some farmers. Natural rangelands/woodlands supply 8 % and 47 % of the total animal requirements of the northern and southern regions of Oman, respectively. No information is available either regarding the wood production capacity of woodlands or the level of wood products' consumption national woodlands and rangelands. NWFPs are still harvested, processed and utilized in various ways, though it is

difficult to assess accurately their production capacity and actual consumption per category. The main products used to satisfy local community requirements or to generate family revenue are:

- Oleo-gums-resins, of which frankincense is the most important economically and socially;
- Medicinal plants, which constitute the main NWFPs of Oman;
- Dyes and tannins used in cosmetics and tanning; and
- Handicraft products.

Forestry, in the sense of a sector aiming principally at the production of forest resources, mainly wood products, is practically non-existent in Oman. Rangelands and woodlands, particularly in Dhofar, make an important contribution to the agricultural economy and food security by providing feed for livestock, and constituting an important source of income for the country. The contribution of rangelands to livestock rearing, thus to meat production, may be important, but it does not meet the consumption needs.

Woodland and rangeland management and participation

There is a comprehensive or extensive management programme implementation in the rangelands and woodlands. There is no capacity for the introduction of an authentic participatory approach to woodland/rangeland management along with no significant conservation, rehabilitation or management programme, where such an approach could be implemented. The Rangeland Department of the MAF is nevertheless developing management tools by undertaking the following:

- Periodic ecological assessment of rangeland resources since 1995;
- Forest nursery development in Salalah with an annual production capacity of 80,000 seedlings and publishing a forest nursery manual;
- Pilot reforestation demonstrations in 21 fenced plots totalling 178.6 ha;
- Arboretum of 4 ha, in Salalah, comprising 60 species and 1,220 trees; and
- Development of a vegetation map indicating the importance and distribution of rangeland/woodlands in Dhofar region.

INSTITUTIONAL, LEGAL, POLICY AND PLANNING FRAMEWORK

State institutions in charge of woodland, range and desertification control matters

Several State institutions are concerned with forestry and range matters, particularly:

Desertification control matters: The MRME has the overall responsibility over environmental protection, including some form of control over range and forest resources, whose utilization and allocation require the delivery "No Environmental Objection" certificate. It also has prime responsibility for desertification control vested in its General Directorate of Environmental Affairs (GDEA). Other institutions claiming responsibility in desertification control are the MAF, the Ministry of Water Resources (MWR), the Development Council and the Planning Committee for Development and Environment for the Southern Region; **Woodland & rangeland administration and management:** The MAF has the responsibility for the country's natural rangelands, which include pastures, wooded rangelands and woodlands. The General Directorate of Animal Wealth (GDAW) controls livestock breeding programmes and woodlands and rangelands. The conservation and management of the latter is vested in the newly established Rangeland Resources Department. This responsibility is also decentralized to the Directorate General of Agriculture, Animal Wealth and Fisheries (DGAAWF) of Dhofar, which includes a Forest and Range Department²⁴, which has carried out the essential studies and some research related to forests and range in Dhofar and has implemented a number of projects namely in forestry and rangeland improvement.

The main duties of the Department of Rangeland Resources (DRR) are:

- Planning and implementing range and forest resources surveys;
- Protection of the range and forest resources and preparation of necessary plans for their proper management;
- Planning and implementing programmes for reforestation, shelterbelts and windbreaks establishment;
- Developing agroforestry and silvicultural practices and treatments;
- Enforcing the Range and Forestry Law;
- Planning and implementation of an extension-education programme; and
- Preparing and implementing training programmes, seminars and conferences in rangeland management and forestry.

Forestry and rangeland research

Some 15 project proposals for achieving forestry and range research have been included in the Sixth Five-Year Development Plan of the country (2001-2005). They focus on topics in which the present knowledge is inadequate or on the main problems related to range and livestock. The research programme comprises basic studies on:

- Woodland and rangeland resources;
- Range and browse utilization and production systems;
- Livestock husbandry systems;
- Range improvement practices;
- Rangeland/woodland and livestock management; and
- Fodder crops and fodder trees and shrubs.

The Nutrition Division of the Rumais Livestock Research Station has initiated a programme that aims at formulating satisfactory animal feed rations that would include fodder from the indigenous tree species found in natural rangelands and woodlands.

Legal framework of forestry and range and environment

The legal framework can be summarized as follows:

Forestry and rangeland legislation and regulation: The preparation of a law for the conservation of range and forest resources and for grazing regulations is to be published soon.

²⁴ Initially, this Department of Forest and Range was the only institution that dealt with forests and rangelands conservation and management. The Department of Rangelands Resources at the MAF is of recent creation.

It aims at controlling the human and livestock utilization patterns of both forest and range resources and monitoring their impact. The law envisages conserving the woodland/rangeland resources by preventing their abusive utilization and conversion to other land use types. The proposed law takes into consideration the traditional "Hema" and "San" protection customs. Consultation with local administrators, technical units, local communities, "Firqat" and police is anticipated during the preparation phase of the law.

Other environment-related legislation and regulation: The existing legislation for wildlife and nature conservation is largely based on Decree 26/79 of 15 May 1979 providing authority to establish national parks and reserves and on the Ministerial Decision No. 4 of 6 April 1976, which prohibits hunting, shooting, capture and molestation of "all species of birds in all parts of Oman's shores and islands at all times".

Planning framework for forestry and range

Planning and decision-making are highly centralized.

External assistance and cooperation related to forestry and range

External assistance and cooperation include:

International assistance related to forestry and range: The only assistance on record took place through the project "Rangeland Management Programme" (OMA/87/013), executed partially by FAO, 1988-90.

Commitment to international conventions: The Sultanate of Oman signed its commitment to the CBD in 1992 and ratified it by Royal Decree. The Ministry of Regional Municipalities, Environment and Water Resources (MRMEWR) is the key agency responsible for the formulation of the National Biodiversity Strategy and Action Plan. Oman has also ratified other UN Conventions and International Agreements such as the Convention on Climatic Change and the Convention on Combating Desertification.

Country vision

The country vision with relation to woodlands and rangelands resources protection and development is documented in:

National and regional action plans: The National Action Plan to Combat Desertification (NAPCD) formulated in 1993, detailed a long-term strategy (2020) including a number of programmes, which address the woodland and rangeland related issues, including introduction of:

- Rangeland/woodland and livestock management;
- Integrated approaches in land resources utilization and management;
- Improved rangeland husbandry/management systems;
- Major afforestation programmes;
- Campaign of stabilization of shifting sands; and
- Public participation programme to ensure people's involvement and support.

The NAPCD has experienced little implementation, in part due to a lack of institutional capacity to carry out the programmes aiming at introducing improved land use systems.

Desertification Control Symposium: The Symposium, held in Salalah in March 2002, had the objectives to: review the desertification process in the Governorate of Dhofar; evaluate the efforts undertaken in combating desertification and appreciate the constraints faced in the process; formulate new desertification control plans and programmes. The recommendations of the symposium of interest to the sector included:

- Implementing the objectives and actions formulated by the NAPCD and the National Strategy for Environmental Protection;
- Promoting participatory approaches;
- Reduction of rangeland rehabilitation and grazing pressure; and
- Development of remote sensing and GIS units for environmental assessment.

National and regional strategies: These include:

- National Strategy for Environmental Protection whose implementation has been constrained by institutional/conceptual/financial constraints; and
- National Biodiversity and Action Plan aim at: safeguarding habitats and productive renewable resources; improving the understanding of ecosystems and increasing resource management capacity; developing a legislation that insures the conservation of biodiversity together with the sustainable use of biological resources.

CAUSES AND EFFECTS OF DEFORESTATION AND DEGRADATION

Indirect (root) causes

Some of the chief indirect causes to deforestation and rangeland degradation are:

Land and water use ecology as grounds to deforestation and degradation

Factors, which often set in motion degradation processes, include:

- Land and water tenure and users' rights: Tribal rights of usage, management and protection of woodlands and rangelands were abolished in 1976, without being substituted by socially and economically viable, as well as environmentally friendly modern users' rights. Instead, the State has provided incentives to local herders and multiplied water points and road infrastructures. This has encouraged the adoption of sedentary lifestyles, causing excessive pressure that has put the existence of the range resources into jeopardy.
- *Incentives in agricultural production:* Incentives provided to livestock breeders in the 1970s, in the hope to decrease the animal population, have instead resulted in a drastic increase of livestock numbers. These incentives have been stopped since and despite efforts to control the animal population, rangelands and woodlands are still confronted with excessive pressure, far in excess of their carrying capacity. The government has also encouraged farming by allocating land and granting subsidized loans to purchase machinery, as a result of which large tracts of woodland and rangeland have been lost. Erosion processes have been prevalent, freshwater reserves and underground aquifers depleted, and land abandoned.

• *Incentives in water, woodlands and rangelands exploitation:* Boreholes and water supply facilities developed in rangeland areas are permanently available, which makes rangelands accessible all year round, leading to levels of fodder and forage uptake far exceeding the carrying capacity of rangelands.

Society transformation as foundation to deforestation and rangeland degradation

The following factors related to society transformation have affected natural resources:

- Unchecked population growth, and limited environmental resource base: Rural human and animal populations have expanded far beyond the absorptive capacity of the natural resource base. The lack of new employment and revenue opportunities, compel the rural poor to depend even more on the scarce woodland and rangeland resources, aggravating their state of degradation.
- *Economic situation and investment patterns:* Because it has given priority to the development of modern agriculture and infrastructure and in spite of its wealth, the Sultanate has not invested adequate efforts and budget to ensure a suitable management and development of the national natural rangeland and woodland estate. There are also some shortcomings in the long-term policy vision, which tends to be more in support of biodiversity preservation and conservation, overlooking the fact that these can only be achieved by sustaining livelihoods, through sustainable resource management and development.
- Social response to modernization: The rapid modernization of the country and its infrastructure development (e.g. roads, wells) have eased and encouraged large livestock concentrations. Opportunities for more easy and comfortable income sources among herders have promoted animal hoarding and the maintaining of non-viable and uneconomic livestock rearing practices, allowing rangelands to become open to excessive, uncontrolled animal concentrations all year around.

The capacity to respond on a timely basis to misuse is closely related to the following:

- *Economic and financial context:* Despite its financial capacity, Oman has not allocated substantial funds for rangeland/woodland management and development programmes. The national policy promoting private investment in the sector has not made substantive progress.
- Degree of dependence on external technical assistance: Oman does not have the skilled human resources to lead rangeland/woodland management and derive and teach incountry training curricula. The pressing need for qualified personnel, both at the planning and field implementation levels, calls for external technical assistance in various disciplines at various levels.
- *Institutional set up and capabilities:* The institutional capacity is in dire need of improvement within most of the national institutions entrusted with environmental resources management and development missions. Public initiatives related to woodland/rangeland are not founded on consistent and comprehensive policies, strategies, legislations, regulations and standards. The current over-centralized nature of the public administration system has marginalized regional and local authorities, leading to a reduction of their capacity to plan and implement rural development programmes.
- *Environmental information and monitoring systems:* Information on natural resources degradation and desertification processes and data concerning their potential versus actual utilization are totally inadequate. Therefore it is impossible to react on a timely basis to the destructive processes taking place in natural resources over-exploitation.

Legal, customary and regulatory instruments: The legislation on biodiversity conservation does not cover adequately the aspects related to environment and natural resources such as

woodlands and rangelands. The penalties for offences against the environment and the mismanagement of natural resources are not a sufficient deterrent and they are not enforced due to lack of officers monitoring compliance in the field.

Degree of community involvement: The degree of community and farmer involvement through adoption of participatory planning and decision-making approaches is non-existent.

Policy related issues – significance in terms of deforestation and degradation

- Degree of policy perception of the role and importance of woodlands/rangelands: The country's priorities have been set upon developing a modern agriculture and infrastructure network, rather than on achieving the sustainable management and development of natural woodlands and rangelands. Though the excessive development of agriculture is starting to backfire in major agricultural regions, such as Al-Batinah, woodlands and rangelands are still being steadily converted to cropland. Only in Dhofar does there seem to be an awareness of the acute necessity to remedy the present situation.
- Widespread attitude considering woodland and rangelands as free public goods: Since lands have become national property, there has been a breakdown in the traditional systems of community woodland/rangeland management. These are to a large extent used privately, without consideration for sustainability.
- *Degree of commitment to sustainable resource management:* Despite the government's formal commitment to sustaining natural woodland and rangelands use, it does not have the capacity to supervise and manage them properly. Moreover, in the case of woodland and rangeland conservation, the focus has been so far, solely on reducing the number of livestock heads and not sufficiently on protecting and managing rationally the natural resources.

Direct causes

The main direct causes to deforestation and range degradation can be classed as natural or human-induced:

Natural causes: Direct natural causes include:

- Climatic conditions contribute to make plants' growth, endurance, regeneration and establishment so restraining that they can hardly survive any form or degree of misuse;
- Soils: Large areas are covered with sandy soils which, when disrupted, are responsible for massive sand drifts;
- Topography, which plays an important role in soil erosion and flooding in the mountain areas;
- Floods are responsible for much land resources devastation; and
- Pest epidemics do inflict very serious damage to plant resources as is the case with the *Prosopis cineraria* stands.

Human-induced direct causes: Human-induced causes work hand in hand with the forces of nature:

• Infrastructure construction: Since the construction of roads and the digging of wells in rangeland the herds have ceased moving, causing aggravated overgrazing and trampling;

- Man-made catastrophes: Pasture fires are among the most frequent voluntary or accidental man-made catastrophes affecting woodlands and rangelands. In the case of Oman, the Jabal war that broke out in 1965 in Dhofar has resulted in much destruction of woodlands and rangelands;
- Misuse of rangeland resources resulting from increased livestock numbers, well beyond carrying capacity;
- Extensive woodland and rangeland allocation for agriculture and urban development; and
- Inadequate agricultural practices such as unrestrained use of unsuited machinery in agriculture, excessive irrigation, inefficient drainage, excessive groundwater extraction.

Effects of deforestation and range degradation

The effects of deforestation and range degradation are what one tends to see and focus upon because they impact upon livelihoods:

- Loss of land productivity;
- Decline in rangeland and woodland biomass and species diversity;
- Soil erosion increase;
- Surface water wastage and decline of groundwater recharge; and
- Widespread poverty.

STATUS OF KNOWLEDGE

Lessons learned

It is critical to learn from past experiences as a guide to the way forward. The lessons learned include:

- The country's valuable woodland and shrub-land natural stands are increasingly recognized as under threat;
- MAF has focused priorities to increasing animal wealth but less so to the sustainability of the natural resources base on which it depends;
- Animal production ignored in the past the importance and urgency of addressing the issue of sustainable management of the natural pastures, rangelands and woodlands;
- Undue emphasis has been placed on livestock reduction alone, rather than a comprehensive approach addressing the rangeland degradation in a more holistic manner;
- Unclear and inconsistent policy for sustainable rangeland and woodland use, management and development;
- Ineffective and unenforceable legal and regulatory frameworks;
- Failure of Government institutions to address the legitimate goals and needs of the traditional woodlands and rangelands users;
- Confusion of institutional responsibilities at the national level with regard to conserving, managing and developing the woodland/rangeland natural resource;
- Recognition of the need to adopt participatory approaches to understand the needs and aspirations of livestock and rangeland dwellers;
- Insufficient funds and investments have been allocated to woodland and rangeland management and development; and
• Insufficient numbers and quality of trained senior and field staff of RRD/MAF in forestry, rangeland management and desertification control.

Gaps in knowledge

Acknowledged gaps or lack of knowledge related to range and woodland resources include:

- Sound inventory of the quantity and quality of the woodland and rangeland estate;
- Climate and weather data incomplete for the country;
- Extent and impacts of deforestation, degradation and desertification;
- Management information systems related to the above points, to assist politicians, policy makers and managers, to make sound decisions and monitor change;
- Participation with and incorporation of scientific and traditional knowledge, experience and managerial skills of pastoralists in land-use;
- Integrated natural resource management incorporating inter-sectoral and multidisciplinary approaches;
- Insufficient number of planning and field practitioners with a heavy dependence upon expatriates to formulate and implement environmental development and protection strategies, programmes and activities;
- Public awareness and extension systems necessary for sustainable natural resources management and to prevent environmental degradation and desertification;
- Participatory planning in rural communities to understand their needs and aspirations for rural development; and
- Networks and decentralized technical support systems and information to allow informed and sound decisions in the field.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The conclusions drawn from the case study are the following:

Development choices and issues

- Rural development programmes initiated so far have resulted in important improvements in the fields of irrigated agriculture, fisheries and water resources mobilization. They have however been of little assistance in improving the conservation and sustainable management of the natural woodland and rangeland national estate;
- Five-Year Development Plans from 1976 to 1995 did not include desertification and natural resources degradation control issues among the government's aims and priorities;
- Dhofar has been the focus of efforts to preserve and manage rangelands and woodlands in Oman, while other regions are largely neglected;
- Development policy needs to consider giving more attention and efforts to safeguarding the remaining, extremely misused natural woodlands and rangelands; and
- Lack of realistic land use and tenure policy with respect to rangeland and woodland management discourages herders from investing in rangeland and woodland protection and improvement.

Institutional set-up, capacity and capability

- Institutional capacity is weak in most national institutions entrusted with environmental resources management and development;
- There is excessive centralization of planning, decision-making and budget allocation: there is a lack of comprehensive policies, strategies, legislations, regulations and standards that spell out clearly the precedence to give to woodlands/rangelands conservation, management and development, and the need to formulate without ambiguity the institutions' shared responsibilities in that regard; and
- Lack of an effective forestry and range institution contributes to natural resources degradation.

Natural resources and resource use and management

- Biodiversity: Conservation of natural resources and the biodiversity they encompass is vital to Oman, where ecosystems are fragile and the renewable natural resources are scarce;
- The national rangeland and woodland estate does exist and plays a very important socioeconomic and environmental role, however modest the area covered may be;
- Range resources are a multi-purpose resource protecting soils, providing fodder, wood, fuelwood, NWFPs, water seepage from monsoon mist and in the past the land bank for expansion of agriculture;
- The inefficient, uneconomical and unsustainable livestock management and breeding programmes negatively impact upon natural forest resources, causing deforestation, degradation and loss of productivity of rangelands and woodlands; and
- The role of planted trees has long been recognized as important, while that of natural woodlands/rangelands is gradually gaining recognition.

Recommendations

1) Development choices and issues

- *Decentralized planning:* In view of the uncertainty of future oil prices, utilizing wisely the scarce natural resources will necessitate careful decentralized planning giving priority to local capacity building and institutional build up in the next decades;
- Assess and monitor resources: The need to assess and monitor urgently and over the entire country, the structure, state and importance of the natural woodland and rangeland estate to allow for future wise development planning;
- *Popular participation:* Because community and particularly individual family-based tenure systems are generally more effective than government-sponsored forms of management, involving local communities and families in efforts to manage and conserve natural resources for their own benefit makes good sense; and
- *Poverty alleviation:* In order to prevent rural to urban migration and achieve sustainable natural resources protection, management and development, it is indispensable to instigate, enhance and promote sustainable employment and revenue opportunities among those of the forest and rangeland dwellers that constitute the "poor of the poor" of rural Oman.

2) Administrative and legislative improvements: The development of an appropriate and wellcoordinated institutional and legislative framework with clear mandates, responsibilities and resources to support more efficiently and sustainably, the initiation and implementation of rangeland/woodland, and watershed management, environmental protection, desertification control, and rural development programmes.

- *Institutional arrangements between MAF and MRME:* Clarify the respective duties and responsibilities of the MRME and the MAF and promote their coordinated efforts in safeguarding, managing and developing woodland and rangeland resources;
- Institutional arrangements within MAF: Upgrade in a mid-term perspective, the Rangeland Department to the level of General Directorate of Forestry, Range and Desertification Control within the MAF, with decentralized departments distributed over the main regions of the country; and enhance its capacity, making use of all training and cooperation opportunities;
- *Institutional coordination:* In order to improve the functioning of the existing coordination institutions and mechanisms, define with accuracy the respective assignments, duties, responsibilities and specifications of all the institutions concerned with environmental matters, particularly those concerned with the protection, management, utilization and development of woodlands, rangelands and pasture lands;
- *International Cooperation:* Request FAO's cooperation and backstopping in developing training programmes, and strengthening the MAF's capacity in the fields of woodland, and rangeland rehabilitation, protection and management, watershed management and desertification control, and in promoting sustainable rural development, by developing woodland and rangeland sustainable participatory management approaches and models; and
- *Legislation:* Prepare and adopt a very comprehensive Forest and Range Law, to be well coordinated with the already existing environmental laws. There is a need for the promulgation of related decrees and regulations regarding woodland and rangeland protection, utilization, management and development. Furthermore, legislation needs to be put in a broader perspective, with clear objectives in terms of integrated and community-based development and management, so as to promote sustainable growth and improved social and environmental conditions.

3) Changes in resource use and management

- Land tenure in woodland and rangeland management: Government to formulate and approve a land use and tenure system, that gives organized groups of herders official title to the land utilized by their flock, granting them enough tenure security and motivation to invest and actively participate in the conservation and the development of their woodlands and rangeland resources;
- *Land distribution:* Existing urban and agricultural land allocation system to be reconsidered in order to ensure that land is allocated in a way that reflects market demand cost-wise and at the same time safeguards the national biodiversity, particularly the plant diversity and gene pool; and
- *Management and regeneration of natural woodlands and rangelands:* Give high priority to safeguarding the regeneration and the sustainable use, management and development of the natural woodlands and rangelands. It is recommended to develop a woodland/rangeland extension programme, and set up sustained planting and seeding operations, under all possible favourable conditions and approve the proposed five-year, 1,250 ha fodder species' planting programme for the Dhofar region.

4) Enhancing the role of planted forests and trees

- *Tree planting and water constraints in urban forestry:* Water being a very scarce and expensive resource in the Sultanate of Oman, all tree planting schemes in urban and periurban areas need to be carefully scrutinized with respect to their own impact on water consumption, particularly considering that irrigation operations may be permanent in nature;
- *Promote reforestation and afforestation in potential areas of Oman:* Plant annually 100,000 seedlings, equivalent to 200 ha in the monsoon affected mid to high altitude areas of the Jabal Dhofar; and implement a 250 ha reforestation programme based on frankincense trees during a five-year period, in the Gerbib area of Salalah; and
- Promote TOFs in agroforestry and sylvo-pastoral land-uses.

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (FAO) GOVERNMENT OF THE REPUBLIC OF TUNISIA

FAO-NETHERLANDS PARTNERSHIP PROGRAMME SUPPORT TO SUSTAINABLE FOREST MANAGEMENT IN LOW FOREST COVER COUNTRIES

ROLE OF PLANTED FORESTS AND TREES OUTSIDE FORESTS IN SUSTAINABLE FOREST MANAGEMENT

REPUBLIC OF TUNISIA COUNTRY STUDY REPORT

EXECUTIVE SUMMARY

By

Salah Rouchiche and Habib Abid

Rome, August 2002

FOREWORD

According to FRA 2000²⁵, 71 countries, most developing, have a forest cover of less than 10 % of their land area. The open-ended International Expert Meeting on Special Needs and Requirements of Developing Low Forest Cover Countries (LFCCs) and Unique Types of Forests, held in Teheran in October 1999, agreed to prepare proposals to secure international support to sustainable forest management in LFCCs. The Netherlands approved support to targeted outputs and activities as a follow up to the "Teheran Process". Country studies for Africa and the Near East regions were selected to outline the causes and effects of deforestation and degradation together with lessons learned and priority needs to enhance the role of planted trees. The Republic of Tunisia, as one of the country case studies selected, is detailed in this report.

OVERVIEW AND COUNTRY CONTEXT

Geography

Tunisia is a North African country located in the centre of the Mediterranean basin. It covers an area of $162,155 \text{ km}^2$, limited to the north and the east by the Mediterranean Sea for a stretch of 1,250 km, to the west by a 1,050 km border with Algeria and to the south by a 450 km border with Libya.

Population

Sixty-two percent of Tunisia's population is urban, where the growth rate is stabilized at 1.15 percent, reaching 9.4 million inhabitants in 1999. The rural population seems to have reached its maximum and should progressively decrease, representing no more than 24 percent of the total population by 2025.

Gender issues

Basic rights for women have been achieved since Independence and have been reinforced during the Seventh and Ninth Plans (1992-2001).

Employment

The labour force is 3.3 million people and the unemployment rate is 15 percent. Agriculture employs 22 percent of the working population, while the commerce and service sector employs 44.1 percent.

Economic data

According to its economic plan, Tunisia has noted a progress in the average rate of sustained growth of GNP of 5.4 percent, leading to a 2.7 percent inflation and observed a progression in investment at the rate of 13.5 percent. The agricultural and fisheries sector contributes to between 11 and 16 percent of the GNP.

²⁵ Forest Resources Assessment.

Policy and Planning Frameworks

Tunisia was declared an Independent State in 1957 and its first Constitution was adopted in 1959. It chose the planning approach to carrying out its development work, which is characterized by it adopting a liberal political economy, dominated by the concerns of reducing the regional disparities and to developing private investment.

Geology

Tunisia has a folded structure to the North and a monocline structure in the South with generally sedimentary lands.

Physiography

There are three large national regions:

- Northern Tunisia, composed of mountain chains (400–1200m) and forests in the northwest; agricultural low valleys in the northeast; and High Tell more toward the south, which is composed of medium altitude plateaux (500-800 m);
- Central Tunisia with a mountain range of medium altitudes (Dorsale) to the north, and vast spaces in the south that include low steppes of the east, high steppes in the west and the agricultural Sahel; and
- Southern Tunisia, which is a transitional region towards the Sahara.

Climate and soil

The Mediterranean and mild climate covers five bioclimatic stages, going from humid to arid, according to the north-south cross-gradient of aridity. The pedological cover also shows a succession of soils that represent this gradient, going from brown soil to regosols and lithosoils.

Biological resources

The dense and rich forests of the north give way to open and low formations to the centre, and rare, fragile and scattered forests in the south. There are 5 500 species and sub-species of flora, 20 of which are endemic, 240 rare and 103 very rare. Fauna includes 75 species of reptiles, batrachians and fish, 45 of which are endangered (26 mammals, 10 reptiles and 9 amphibians).

Land and water resources

Natural resources uses are limited, fragile and unevenly distributed. The main land use categories of Tunisia are:

- Territory [16.5 million ha, including 2.9 million fertile lands 570,000 ha irrigable];
- Weak-medium potential land rangelands [6.5 million ha]; and
- Wasteland [71 million ha, of which 3.2 million ha are of sandy accumulations].

With approximately 36 Mm³ of rainfall per year, Tunisian potential water resources are 4,540 Mm³, of which 3,844 Mm³ can be used. These are divided into 2,700 Mm³ (60 percent) of

surface water and 1,840 Mm³, of subsurface water (40 percent). The volume of water liable to be used without restriction represents just 50 percent of the available resources.

Main production systems

Agricultural production

There are five agricultural crop production systems:

- *Cereal growing*: The average annual sown surface is 1,598 million ha. This system generates a great deal of erosion due to mechanized labour on a gradient and to the destruction of the forest vegetation;
- *Foraging crops*: These cover 270 000 ha and produce 900 million Forage Units (FU) per year, which are 14 percent of the livestock needs. The rest comes from concentrated foods (13.5 percent) and from natural grazing (72.5 percent);
- *Industrial crops*: sugar beet and tobacco make up 5,730 and 4,072 ha, respectively;
- *Tree Cultivation*: The area reserved for tree cultivation covers 50 percent of cultivated areas: it is greater than 2 million ha, with olive trees as the chief crop (1.5 million ha); and
- *Market gardening crops*: They account for 148,300 ha (of which 13,000 is rain-fed), contributing to up to 15 percent of the value of total agricultural production.

Farm breeding management

- Intensive breeding of animals associated with intensive foraging crops; and
- Extensive breeding: This is more common among small- and medium-sized farms that use the local breed of sheep and goals and make use, above all, of the natural vegetation formations without any form of management.

The role of the agricultural sector in the economy

Despite a gradual lowering of agriculture's role in the GNP, the agricultural sector receives significant public investments and continues to have a substantial place in the national economy, contributing 9 percent of exports in 2000.

The role of forestry in the national economy

National forestry production is estimated at 150 million dry tonnes. Non-Wood Forest Products make up 30 percent of users' annual income. Woodlands continue to play a decisive role in satisfying domestic energy needs, particularly in rural areas.

CURRENT STATUS AND MANAGEMENT OF FORESTS AND RANGELANDS

National forest and rangeland inventory

Tunisia uses a mapping base of information and planning system, which contributed to improving forest and pastoral land management. It allowed for the creation of the first national forest and rangeland inventory (1995). According to this, the area of vegetation cover in Tunisia is 5,744,000 ha, of which 743,000 ha are esparto grass formations, and 4,031,000 ha of natural rangelands. A programme to update the inventory is currently underway.

Characteristics of the Tunisian national forest

The national forest estate: The country has 970,000 ha of natural and planted forests, of which 51.8 percent are productive, 33.8 percent form maquis and garrigue, and 14.40 percent are made up of fire-breaks and clearings. The rate of vegetation cover of the northern, centre and south of the country are 15 percent, 10 percent and 1 percent, respectively. The national inventory of natural forests did not make the distinction between natural and planted forests, which total 457,000 ha of coniferous trees, 179,000 ha of deciduous wood and 194,000 ha of maquis-garrigues.

The estates of planted forests: Before 1990, the plantations were estimated at 285,000 ha²⁶, while those between 1990 and 2000 cover 123,000 ha. In 1999, 94 forest nurseries produced 51 million of different plant species, of which 42 percent were forest lands, 36 percent pastoral, 15 percent windbreak, 6.5 percent ornamental and only 0.5 percent of agroforestry species. The multiple-use species category has been strongly developed since 1995, with the production of olive, fig, carob and nut trees. Off-soil plant production was adapted successfully. Annually, 70 million plants are produced in the framework of the new reforestation strategy.

Evolution of the national forest cover: From 1920 to 1964, the forest decreased 1.1 million ha to 690,500 ha and spart grass formations from 1.8 million ha to 743,000 ha. This trend has been compensated for by reforestation and the development of natural resources. There is no systematic follow-up of modifications of forest cover; however, on the 1997 database, it appears to have a positive annual balance amounting to 30,000 ha. The loss due to forest fires (1,280 ha), clearing and changes of land-use (210 ha) equal 1,490 ha, while the forest plantations carried out during the same year reached 31,513 ha, of which 16,974 ha are pastoral plantations.

Global estate of trees outside forests (TOF): The new concept of TOF is not taken into consideration in rural management strategies. The Tunisian TOF estate essentially consists of urban and peri-urban plantations, wind-break plantations, multiple-use trees, rangelands, soil and water conservation plantations, roads. The national forest inventory did not make an inventory of the forest and pastoral population of areas less than 0.5 ha, but many TOF categories (pastoral plantations, CES (*Conservation des Eaux et du Sol*) plantations) are included in the rate of forest cover in the country. The lack of inventory of TOF, the confusion and the problems of definition, as well as undervaluation of their role, production and their economic importance has made them a hidden resource, meriting discussion within the workshop that should conclude this case study.

Urban and peri-urban forestry: Since 1992, The Ministry of Environment and Territorial Management (MEAT) has participated in a National Programme (NP) of urban reforestation in collaboration with partners, notably the Ministry of Agriculture and the Ministry of the Interior. The National Programmes include:

- Monitoring afforestation/reforestation activities and creation of green areas;
- Environmental boulevards;
- Urban parks (management of 100 parks);

²⁶ It is difficult to have reliable figures on the reforestation carried out before 1990, whereas one knows precisely what has been done since then.

- Green itineraries;
- Esplanades;
- Road plantations (afforestation of highways); and
- Hundred-year old trees.

Wind-break plantations: These are estimated at close to 17,000 km to 2000, which only covers 12.5 percent of the needs of irrigational perimeters.

Agroforestry plantations: Relatively recent, they cover weak surfaces in mountain zones and forest clearings. The Tenth Plan formulated a programme of 25,000 ha of public and private plantations.

Pastoral plantations: According to the national forest inventory, pastoral plantations cover 208,000 ha, of which 91,000 ha are in forest and 117,000 outside forest.

Cactus plantations: These have not been included in the national forest inventory but cover 198,000 ha, of which 82,000 ha are in forest and 116,000 outside forest.

Soil and water conservation plantations: The 1990-2000 Soil and Water Conservation Strategy planned for the management of 0.6 million ha of watersheds with 230,000 ha of plantations aimed at strengthening of the structures. The plantations until 2001 include 224,265 ha.

Road plantations: Data on these plantations are almost absent. A national commission of the road plantations in 1993 created their technical specifications.

Riparian environments: The national forestry inventory identified vegetation situated along water courses and rivers, covering 45,788 ha.

Environment and Range of forests

The Tunisian ecosystems are diversified and fragile, and have often-conflicting economic, social and ecological features.

Preservation of biodiversity: The country has appreciable assets in term of biological diversity that it tries to preserve through the protection of many humid zones and management of its 11 national parks, 20 natural reserves and 4 fauna reserves.

Water and soil protection: The importance of the role of forests in water and soil protection is proven by the fact that one always resorts to forest plantations in water and soil conservation.

Management, conservation and extension of forest and pastoral land resources

Criteria and indicators for sustainable forest management: In 1998, Tunisia tested 134 indicators for sustainable forest management, elaborated by the *Commission Nationale de Développement Durable* (CNDD). The 121 indicators are deemed relevant to the Tunisian context where 21 indicators cover water, fish, soil, natural resources, desertification, pesticides, agricultural education and forestry.

Management of forests and range lands: Roughly 500,000 ha represent 80 percent of manageable natural and artificial forests are in the process of being managed. Three stages characterized management evolution:

- *The first generation plans: Forest management*: Inspired from the French School of Forestry, these forest management plans started in 1964 and were only partially implemented;
- The second generation plans Sylvo-Pastoral Management: Considering the social constraints the revised first generation plans identified areas for exclusive pastoral use to compensate for the grazing exclusions implemented to enhance forest protection; and
- The third generation plans Integrated Management: Based on a more global assessment of the situation, these management plans take advantage of the publication in 1996 of a decree specifying the regulatory instruments of the new forest law; and the creation of the Forestry Groups with Common Interest and the Opération Pilote de Développement Intégré (OPDI) (Pilot Area in Integrated Development) to engage the villages in the negotiation process on integrated agro-sylvo-pastoral management of forestry resources.

Support in participatory approaches: Participatory forest and rangeland resources management by now constitutes a strategic option in forest administration, concerned about involving populations in sustainable resource management that it employs. The Government has begun 10 OPDIs with the aim of perfecting and adapting participatory approaches and ways of communal intervention for sustained management in the field of forestry.

Production of wood and cork

This sector consists of 50 private forest industries companies (400 million m^3) and transformation of raw materials, as well as forest uses practising carbonisation. The regulations are poorly adapted to the development of forests and the economic development of their products.

Wood products: The production of industrial timber and sawn timber is weak. The deficit in supply of sawn timber is estimated to be more than 650,000 m^3 . Pulpwood experienced a constant progression as did construction (service) wood, whose demand increased significantly particularly in the agricultural sector.

Fuelwood and charcoal: The products supply/demand ratio is well balanced at national level. The supply of renewable of wood energy is 2,626 metric tons (MT) and the demand is stabilized at 2,650 MT (1997). The underlying projection to 2010 foresees a slight improvement in the national balance sheet.

Cork: A quantity of 80,000 to 100,000 quintals, the annual production of cork brings more than 9 million Tunisian Dinars (DT) to the *Régie d'Exploitation Forestière* (REF).

Non-wood forest products (NWFPs)

There is a diversified range of NWFPs in Tunisia, primarily by traditional users and by semiindustrial exploitation by businesses. NWFPs' exports earn the equivalent of US\$4,250,000 per year. The exported products are:

- Essential oils;
- Food products (game, mushrooms, carob, umbrella pine, honey, capers.) and
- Craft products, mainly of esparto goods and basketwork.

Importance of NWFPs to the administration: Revenues are estimated as follows:

- Fourteen NWFPs provide 209,591 DT of annual revenues coming for the rights of use given to companies; and
- Direct incomes of hunting are about 600,000 DT per year.

Importance of NWFPS at community and family level: NWFPs contribute about 28 percent of the annual revenue for 620 families surveyed (580 DT per family, per year). Excluding forage harvest from forests, the most economically interesting products for users are decreasing in importance. These include Alep and Umbrella Pine seeds, nut roots, tubers, mushrooms, rosemary, honey, capers, snails, bay leaves, oak acorns, mastic tree oil, thyme and carob.

Contributions of forests at the social level

The forest is a source of income for 900,000 neighbouring farmers who live from livestock production, agriculture, forest use and fruit harvesting, as well as work on associated with forest management.

Neighbouring farmer populations of forest zones: These represent almost 10 percent of the Tunisian population where 23 percent of the rural population (150,000 households) are without private property, therefore depend heavily on limited natural resources. Their annual incomes are low in comparison with the national average.

Contribution to generating jobs and income: The forestry sector contributes on average of 7 million working days per year (8.3 million in 1999), which includes 35,000 permanent positions. Roughly 100,000 households benefit from 70 working days per year with an annual income of 340 DT per family.

Forestry and food security: The forest is essential for neighbouring farms, particularly those that are poor and marginal, because it is a main source of energy, food, livestock fodder and income from sales of forest products of all kinds.

TUNISIAN FOREST SECTOR

The institutional framework of Tunisian forestry

Two Ministries share the main responsibilities regarding environmental administration. The Ministry of Agriculture manages the natural resources. The Ministry of Environment and Territorial Management (MEAT) is responsible, with its partners, for national policy formulation and implementation for protection of the environment, natural ecosystems and land management.

Within the Ministry of Agriculture, the organizations active in forest and pastoral domains include:

- The Forestry Head Office (*Direction Générale des Forêts* [DGF]) is responsible for applying the forest code and the management code for protecting and developing the State forests and the lands under forest management. It is composed of the Offices for Forest Conservation; Sylvo-pastoral development; Socio-economic development of the Forestry Population; and Regulation and Control;
- The "Sylvo-pastoral Development Office for the North West (ODYSEPANO) is responsible for promoting the agro-sylvo-pastoral development in five regions of the North-West;
- The Office of Livestock and Grazing ensures development of livestock production and its contribution to economic development; and
- The Agency of Agricultural Training and Extension implements and applies the national policy of extension and professional training in the sectors of agriculture, forestry and fisheries.

Land statistics

The forestry administration administers 2,793 million ha of land, of which 1,055 million ha is under state ownership, 1,691 million under community rangelands and 47,000 ha as private forests. The situation of the forestry land of the State is not always audited since 188,627 ha are in process of registration, while there still needs a registration of 2,014,746 ha.

Study and work projects

Until 1987, all forest activities planned and organized by the forestry frameworks were implemented by the State. Since then, the tendency has been to encourage private companies to invest in forest developments. Forest management studies are carried out primarily by national and international educational institutes. The General Director of Forestry and the forestry districts supervise inventories, study and approve management plans, carry out tree marking operations prior to forest exploitation, and implement management plans.

Forestry research

Forestry Research comes under the National Institute of Urbanization, Water and Forests (*Institut National de Recherches en Génie Rural, Eaux et Forêts*) (INRGREF) which is equipped with two laboratories and three research units in:

- Silviculture, protection and development of forestry resources;
- Improvement and development of agro-sylvo-pastoral systems; and
- Agricultural mechanisms.

Since the intervention of the second *Projet de Développement Forestier* (PDF), the real problems of development have been taken into consideration in terms of human as well as forestry and rangeland aspects. The private sector seems to stand out in terms of improved communication, but there remains much to do to disseminate the research results more effectively.

Forestry training

Specialized technicians in silviculture and rangelands are trained by the *Institut Sylvo-Pastoral de Tabanka* (ISPT). High-ranking forestry officers are trained at the *Ecole Nationale du Génie Rural, des Eaux et des Forêts* (l'ENGREF - France); l'ENFI (Maroc) and the French Institute of Forestry, Agricultural and Environmental Engineering (*Institut National d'Agronomie de Tunisie* - INAT). Tunisia began a system of continued training to pass to the higher levels in the public office, essentially for the benefit of technicians and forest engineers.

Legislative framework

Forestry legislation: The forestry code (FC) that governs the forest estate remains, despite successive amendments which are strongly biased towards conservation and less oriented to social development. For the first time in 1988, the FC put emphasis on the promotion of forest users by resorting to the creation of Collective Interest Forestry Groups. The state ownership of the forests is not always sufficient to guarantee the preservation of the National State forestry. Private appropriation in certain cases and partnership management of forest and pastoral areas should be seen favourably.

Legislation on the rangelands: This dates from the submission of community and stateowned rangelands in the forest system, which aimed mainly at conserving rangelands through tight State control. There was resistance of communities to the prevalent State ownership, incorporated in legal texts precluding their formal rights and functions in management and administration of rangelands.

Law on the protection of agricultural lands: This deals with the type of agricultural lands that are in prohibited, safeguarding and authoritative zones: the state-owned forests subjected to the forest system are in the prohibitive zones. Olive trees, tree growing, fruit cultivation, the forests not subjected to the forestry regime and the managed rangelands are included in the safeguarded zones.

Environmental code: Tunisia has a diversified legal environmental framework, consisting of, among other, the Law relating to the Conservation of Water and Soil and the Code of Territorial Management and Urbanization.

Law on the Conservation of Water and Soil: This law relating to conservation of water and soil offers a framework of relevant participatory planning. However, at the local level, it meets with resistance from technicians who see difficulties and delays in its application.

Planning framework

The mechanism of centralized planning: Planning at the national level is ensured within the five-year plans of economic and social development, prepared by the regional and national commissions after evaluating the former plan.

Decentralized planning: At the regional level, planning is ensured through forest and range management plans that determine the activities to be undertaken. The administration resorts more and more to programmes prepared in collaboration with local groups following a participatory approach.

Inter-sectoral planning: The Ministry of Economic Development secures inter-sectoral and inter- ministerial coordination. CNDD is responsible for promoting the sustainable development approach. There are inter-ministerial commissions, such as those responsible for follow up campaigns of reforestation, protection of nature.

Technical assistance and cooperation

Projects and programmes providing technical assistance are primarily by the Food and Agriculture Organization of the United Nations (FAO) and the German Agency for Technical Cooperation (GTZ).

Multilateral international support: The Tunisian Government channels the most important part of the support to the fields of conservation and development of natural and forest resources. Financial cooperation through investments and donations of organizations such as the International Bank for Reconstruction and Development (IBRD), European Community (EC), FAO, United Nations Development Programme (UNDP) also exist in-country.

Bilateral support: Cooperative programmes in these sectors are involved with Germany (GTZ and KfW), Canada, Spain, France, United Kingdom, Italy, Japan (JICA), the Netherlands and Sweden.

Other support: Tunisia is also active in the League of Arab States, the Arab Maghreb Union, as well as with Mediterranean countries according to the Barcelona Convention and the Action Plan for the Mediterranean.

International conventions: Tunisia is a signatory to CITES; RAMSAR; United Nations Conventions to Combat Desertification and Conservation of Biological Diversity; and other international conventions.

Policy and strategy of development in the forest sector

Evolution of forestry policy: Since its Independence, the forestry policy in Tunisia went through three significant stages:

- 1956-1970: The priority aimed at erosion control through the implementation of watershed management policy;
- 1971-1987: The community lands were subjected to a forestry system and importance was given to the development of forestry potentials, encouraging employment, creating natural reserves and national parks, forming frameworks of development and of research; and
- 1988-1996: Emphasis was placed on mountain forests, encouraging the promotion of their socio-economic role, and on the formulation of a sand dune stabilization strategy and a National Plan to protect forests against fires.

National strategy of reforestation and the struggle against desertification (1990-2001)

Forestry plantations (320,000 ha), pastoral plantations (600,000 ha) on State lands are considered reliable estimates but pastoral management (2.2 million ha) is considered an overestimate on private and community managed lands (pastoral management).

National Development Strategy in Forestry Sector (2002-2011)

The new strategy includes forest and pastoral reforestation, improvement of the management of forest ecosystems, conservation of the flora and fauna as well as constitutional, legal and organizational considerations. Taking into account former constraints, the management programme of rangelands and of implemented plantations: 190,000 ha of reforestation, 210,000 ha of fodder and pastoral plantations; 165,000 ha of spineless cactus plantations and 275,000 of rangeland managements.

Main Forestry and Rangelands Development Plan: This details the forest sector orientation of development, reorganization of the sector and the definition of new objectives to:

- Increase the economic role by promotion of industrial forest production; and
- Increase participatory planning and job creation.

CAUSES AND EFFECTS OF DEFORESTATION AND DEGRADATION

Indirect causes: Some of the less apparent root causes of deforestation and rangeland degradation:

Competing water and land use: The main cause of the activating of various phenomena of land degradation lies in their excessive demands for other purposes. Anthropogenic pressure exercised on natural environments has been multiplied by a factor of five in one century owing to demographic growth. This has resulted in land occupation and excessive pressure on forest and the natural environment. Despite the attempt at perpetuating forests on mountain zones and rangelands on the steppe areas, their occupation has caused loss and degradation of forests.

Constraints and challenges in water use: The high, growing real needs of water resources by the Government services sector, the maintenance of costs that are lower than real costs, the devalued agricultural infrastructure and the weak efficiency of irrigation techniques are responsible for the waste of 30-40 percent volume of water for agricultural use.

Land ownership rights: Although the settlement procedures have been going on for a long time, 188,627 ha are still being registered for formerly State lands, without the formal land-use rights. Many problems have been registered as being linked to the application of the judgements of courts on the illicit occupation of State Forestry property. There remains a feeling of mistrust with resultant over-exploitation and abuse of natural resources.

Problems linked to forestry policy: The process of sedentarization and development of agriculture at the expense of forest and rangeland was common. The break up of family units and community structures often resulted in encroachment and abuses on natural resources. Farmers often looked for short term benefits for their activities, without concern for the longer term consequences to the land which they did not own.

State incentives and the allotment of land resources: State incentives encourage agricultural development, which continue to expand at the expense of forest and pastoral lands.

Competing land-uses on forest and rangeland: Financial incentives mobilize investors to carry out competing land-use projects in the steppe lands best maintained in forestry and rangeland

management. These can have a negative impact, particularly when combined with adverse climatic conditions which cause accelerated, severe and irreversible deforestation and degradation.

Poverty: The struggle against rural poverty is a major national objective. However poverty persists in forest and pastoral zones that are disadvantaged by high population density²⁷, over-exploitation of lands causing deteriorating productive potential; and meagre income and investment potential. The use of forest areas is essential to the majority of people living on the subsistence margin, as well as constituting an opportunity for investment in the form of livestock or a source of speculative activity (such as charcoal making) both of which cause degradation.

Inability to respond to over-exploitation: Although Tunisia has considerable capacity and competence in natural resource management, this does not always result in timely addressing environmental problems. There is a strong dependence on external assistance which does not always address priority needs. The need to achieve minimum investment returns often precludes support to rehabilitation of degraded forest and pastoral lands.

Limited empowerment and participation of people: The evaluation of the first integrated development projects show that forest users respond to their getting direct benefits from their labour (personal gain), but do not respond in a similar manner to the less direct communal or longer term benefits (collective gain). Although a new generation of implemented projects is based on the concept of integrated land-use by adopting participatory approaches, the degree of participation among the people remains insufficient to curb the rate of forest and range degradation.

Direct causes: The more apparent causes of deforestation and degradation are as follows:

Natural Causes

- Adverse climate negatively affects the resilience of vegetal formations and is hostile to the rehabilitation processes;
- Soils introduce edaphic constraints that predispose them to various kinds of degradation;
- Steep topography of forest zones of mountains predispose them to degradation; and
- Natural calamities such as fire, floods, parasites and illnesses.

Causes linked to human activity

- For a long time, the forest and range lands underwent strong human pressure (clearing, overgrazing, illegal use, fires), which still today translates into deforestation and degradation affecting the quantity and quality of vegetation formations;
- Infrastructure development to improve transport, communications, access to markets, commercialization can constitute a serious cause of erosion, landslide and degradation of forest and rangeland resources;
- Reckless fires and land clearing;
- Excessive allocation of forest and range land and overexploitation of forest, pastoral, and water resources; and

²⁷ Great human pressure is clearly shown by the fact that the population lives in and off of 900,000 ha of forest land. This population is estimated at between 800,000 and 1million people.

• Unsustainable agricultural practices resulting in abandonment of agricultural lands subsequently subject to excessive erosion and desertification.

Effects of deforestation and forest/rangeland degradation

The effects of deforestation and range degradation are:

- Loss of land fertility and productivity;
- Decline of basic resources through the reduction of biomass and of the diversity of forest and pastoral areas;
- Decline in quantity and quality of surface water and subsurface water;
- Excessive water and wind erosion;
- Salinization of lands;
- Negative social and economic impact on traditionally poor user groups; and
- Reduced air quality.

STATUS OF KNOWLEDGE

Deforestation and degradation of forests and range land formations

There is a recognition that the accuracy and reliability of national forest inventory data needs to be improved to reflect the situation on the ground and trends in forest cover change. The national forest and rangeland cover data and trends do not readily reflect that severe losses due to deforestation and degradation in some areas may be compensated by reforestation in other areas.

Consequences of deforestation and degradation

Degradation of vegetation formations affects the ecosystem, resources, habitats and infrastructures, as well as the economy and well-being of local people. There has not been sufficient recognition of the value of forests and rangelands, and of the uses of traditional wood and NWFPs, to improving the quality of life.

What has been learned in the forestry sector?

Key lessons learned in the sector include:

- Forest and rangeland management techniques developed, demonstrated and documented;
- Need for quality education and training of personnel to impart knowledge and technology;
- Growing awareness on social and environmental issues previously not focused upon;
- Positive disposition towards international assistance; and
- Need for sound and consistent policy, legislation and planning promoting partnerships, participatory and integrated approaches and to encompass wider land-use management issues.

Technical initiatives recognized as being valuable in future forest and rangeland management include:

- Production of improved quality forest plants;
- Development of networks for collection and treatment of data and information for planning of resources and forest and pastoral activities;
- Regeneration of shrubs; and
- Strategic studies on non-wood forest products, wood energy and wood industries sector.

Gaps in knowledge

Deficiencies in the fields of participation and partnerships:

- Weak processes of sustainable integrated management of forest and pastoral ecosystems and weak involvement and organization of populations;
- Weak knowledge of participatory planning, management and monitoring procedures and practices;
- Limited experience in demonstrations and documentation of success stories of various mechanisms of forest and range land use and limited dissemination of information related to these; and
- Limited understanding of the dynamics of forest and rangeland deforestation and degradation with traditional users.

There are acknowledged technical deficiencies in:

- Non-wood forest products;
- Genetic tree improvement;
- Improved techniques for regeneration (nursery and field);
- Management of private lands (and their facilitating factors); and
- Information on the concept of trees outside forests and agroforestry.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Development choices

- The incorporation of the environmental, social and economic dimensions into forest and range land planning, management and monitoring is in its infancy;
- Forestry and rangeland policies, legislation and planning alone can not address sustainable land-use and sustainable livelihoods as these need to be integrated across other sectors including agriculture, industries, transport and communications;
- Problems relating to reforestation of private lands intended for forestry are difficult to resolve in the social, legislative, statutory contexts and current policy incentives;
- The forest and rangeland estate and ownership remains confusing and settlement issues complex, resulting in perpetuating conflicts and conditions of abusive exploitation of resources;
- Forest and steppe environments remain disadvantaged; and

• Foresters remain reticent about the participatory approaches, considering them to increase costs and slow completion of their work without clear benefit to them personally.

Institutional

- Lack of multi-disciplinary and of inter/intra-sectoral coordination of the diverse interventions in the forest and pastoral estate; and
- Insufficient political commitment for implementing the integrated planning and participatory development programmes and ensuring that the facilitating policies, legislation and regulatory framework are in place.

Technical

- Definitions, concepts, data, responsibilities and stakeholders for sustainable management of planted forests, trees outside forests and agroforestry are causing debate and the way ahead is unclear;
- Transfer of knowledge and technology to the main stakeholders remains weak;
- Wood products and non-wood forest products are under-used and poorly developed; and
- Mobilization of water resources (small and medium hydraulics) assisting the forest and pastoral villages remains weak.

Recommendations

Development choices

Recommendations to support participation and partnership in the framework of integrated sustainable management of forest resources:

- Develop and disseminate participatory planning, management and monitoring tools;
- Reform institutional frameworks and strengthen capacity to adopt and apply integrated land-use and participatory approaches;
- Define the key roles of the public and private sectors and of the other stakeholders and ensure that the appropriate policy, legal, regulatory, planning and institutional frameworks are established to ensure that each stakeholder can play their part effectively; and
- Empower and engage traditional land users by addressing their needs and aspirations, allocate appropriate lands, transfer technical knowledge and technologies, provide rural finances and access to markets for sustainable livelihoods, including sustainable forest management.

Rational use of water resources

Recommendations for rational use of water resources in the future include:

- Implement a policy for sustainable water management for economic costs in the real usage;
- Develop the work of CES and improve the techniques for collecting rainwater;
- Preserve water quality;
- Preserve groundwater by artificial recharge; and

• Promote the re-use of treated sewage effluent.

Poverty reduction

Recommendations relating to reducing poverty include:

- Improve knowledge of poor and vulnerable people and create job opportunities and diversified and sustainable income as well as profitable participation in the management of forest and pastoral resources;
- Increase NGO participation to support local communities and traditional land-users; and
- Resolve issues relating to uncertainty and conflict relating to forest land ownership.

Institutional

Recommendations relating to strengthening institutional frameworks include:

- Adopt inter-sectoral, multi-disciplinary approaches and collaboration to respect and understand the needs and aspirations of the full spectrum of stakeholders including the different authorities of the State, private sector, traditional land-users and NGOs;
- Integrate sustainable forest management to support sustainable land-use and livelihoods;
- Corroborate research studies, enquiries and investigations regarding conservation, valorisation and development of biological reserves and the designation and delineation of forest resources and pastoral ecosystems, as well as the development of activities liable to improve income and the well-being of traditional users;
- Improve training and awareness of land-use and forestry issues, transfer knowledge and techniques through strengthened extension services to traditional users, participatory planning, gender analysis, communications and integrated approaches to natural resources management;
- Simultaneously target, youth, teachers and academics before affecting all the social levels of the rural and urban populations;
- Instil awareness and reform actions in policy and decision makers to sustainably manage the forest and pastoral estate through participatory approaches and inter-sectoral engagement to provide the key facilitating factors for a more clearly defined role of the private sector (corporate and smallholder); and
- Strengthen agricultural and forest training/extension for managers, ensuring application of new scientific research and participatory approaches into field applications on a progressive upgrade training basis.

Resource use and management

Recommendations relating to changes in resource use:

- Monitor and report status and trends in forest cover, deforestation, degradation and desertification; and
- Implement policy and organizational plans to support sustainable forest resource management to cater for continuous supply of wood, fodder, fuelwood and charcoal, non-wood forest products (including cork) and conservation of local woodlands.

Enhancing the role of forests and planted forests

Recommendations to enhance the role of planted forests and trees outside forests include:

- Clarify the concept and definition of planted forests, trees outside forests;
- Evaluate and classify existing planted forests according to their purpose and ownership and derive management plans and implement programmes of work to implement operations to achieve their objectives;
- Target the most suitable ecological zones and priority sites for future development of planted forests and trees outside forests development and encourage investment in suitable areas;
- Define the principal objectives in future reforestation (primarily productive or protective purpose) and encourage appropriate and flexible mechanisms and ownership by documentation of success stories and demonstrations; and
- Provide the necessary technical support systems to increase the quantity and quality of nursery management and reforestation; increase productivity, reduce costs.

Recommendations within the framework of the Teheran Process

Recommendations relating to support to the Tehran Process include:

- Promote exchanges, experiences and knowledge among LFCCs, as well as set up common networks, projects and programmes of development;
- Improve the knowledge of the causes of low forest cover and identify alternative solutions to overcome this situation, taking into account the unique political, social, economic, environmental, cultural and physical characteristics prevailing within the LFCCs;
- Incorporate the objectives and key components of action of the Teheran Process into the forestry policy of LFCCs;
- Incorporate policies, strategies and plans to enhance planted forests and trees outside forests within the overall national forestry programmes in LFCCs;
- Promote exchanges of knowledge and experiences, bilateral and multilateral cooperation among LFCCs;
- Developing collaborative research on LFCC priority issues (social, cultural, economic and environmental aspects);
- Develop demonstrations and document success stories for sharing with other LFCCs;
- Establish a monitoring and reporting system to gauge follow up actions to the Tehran process; and
- Support and strengthen the Secretariat to LFCCs based in Tehran.

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (FAO) GOVERNMENT OF THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

FAO-NETHERLANDS PARTNERSHIP PROGRAMME SUPPORT TO SUSTAINABLE FOREST MANAGEMENT IN LOW FOREST COVER COUNTRIES

ROLE OF PLANTED FORESTS AND TREES OUTSIDE FORESTS IN SUSTAINABLE FOREST MANAGEMENT

FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA COUNTRY STUDY REPORT

EXECUTIVE SUMMARY

By

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Addis Ababa, 27 March – 23 April 2002

FOREWORD

According to FRA 2000²⁸, 71 countries, most developing, have a forest cover of less than 10 % of their land area. The open-ended International Expert Meeting on Special Needs and Requirements of Developing Low Forest Cover Countries (LFCCs) and Unique Types of Forests, held in Teheran in October 1999, agreed to prepare proposals to secure international support to sustainable forest management in LFCCs. The Netherlands approved support to targeted outputs and activities as a follow up to the "Teheran Process". Country studies for Africa and the Near East regions were selected to outline the causes and effects of deforestation and degradation together with lessons learned and priority needs to enhance the role of planted trees. The Federal Democratic Republic of Ethiopia, as one of the country case studies selected, is detailed in this report.

GENERAL OVERVIEW AND COUNTRY CONTEXT

Brief geographical description

Ethiopia covers a land area of around 1,120,000 square kilometers stretching between $3^0 - 15^0$ N latitude and $33^0 - 48^0$ E longitude. The country occupies a significant portion of the Horn of Africa and shares boundaries, to the east and southeast, with Djibouti and Somalia, to the north with Eritrea, to the south with Kenya, and to the west with Sudan.

The highlands and the lowlands present marked differences in terms of climatic conditions, vegetation and soil types, demographic characteristics, economic activities, and cultural traits. The main three physiographic regions of Ethiopia are:

- The North, Central, and Southwestern Highlands and the associated Lowlands;
- The Southeastern Highlands and the associated Lowlands; and
- The Ethiopian Rift Valley, an extension of the Great African Rift Valley, divides the Ethiopian highlands into two parts and has a number of lakes along its floor.

Government and administration

The Federal Democratic Republic of Ethiopia has 64 nations and nationalities, composed of fourteen National Regional States: twelve largely rural nations and regions and two urban regions of Addis Ababa and Harar. The two legislative houses are the Council of Peoples Representatives (CPRs) and The Federal Council. The former has a maximum of 550 members elected for five years from districts, and the later is composed of representatives of nations, nationalities and peoples. One member, at least, represents each nation nationality and people in the Federal Council for a five-year term.

Policy and legal framework

A national development strategy is to achieve rapid and sustainable economic growth by improving the productivity of the agricultural sector and by building up an agriculturallybased industrial sector, which is labour-intensive and utilizes local raw materials. The strategy focuses primarily on agricultural development to be attained through improved productivity

²⁸ Forest Resources Assessment.

of peasant agriculture and the establishment of large-scale commercial agriculture, particularly in the low lands.

- The Environmental policy approved in 1997, focused mainly on arresting soil degradation and reversing the poor household's asset base depletion negative trend;
- Support to soil and water conservation efforts in marginal areas is now a Government priority as is food security, on which it encourages donors to focus;
- The Government is preparing a national food security strategy, which involves many stakeholders and the local people at large; and
- Each regional state is also expected to prepare a regional food security strategy.

In Ethiopia, the Federal Government ministries are responsible for preparing national development plans. Even though, an agricultural sector policy does not yet exist, the Government has designed the Agricultural Development-led Industrialization, which constitutes the framework for the Government's five-year agriculture program. The overall objective of this programme is to close the food gap, and, hence, contribute to poverty eradication in Ethiopia.

Environmental characteristics

Geology: The present physical features of Ethiopia (mountains, the Rift Valley, plains) were mainly formed during the Tertiary period of the Cenozoic era. They result from a series of orogeny and volcanic activities that formed peneplains, faulting and deposition over the years. Igneous rocks that cover most of the Ethiopian Highlands, sedimentary and metamorphic rocks are all found in the country.

Physiography and soils: In Ethiopia, 11 major soil types cover about 87 % of the land. The cambisols that cover 13% of the country are the most represented soil type, and are followed by the lithosols (12.2%). The other soil types include the vertisols (10%), the xerosols (8.5%), the acrisols (8%), the luvisols (6%), the xelonchakes (5%), the regosols (4%) and the yermosols (3%).

Climate: The climate in Ethiopia is mainly controlled by the seasonal migration of the Intertropical Convergence Zone (ITCZ) following the position of the sun relative to the earth and the associated atmospheric circulation. The dominant climatic types are the Hot Arid Climate, the Hot Semi-Arid Climate, Tropical Climate with distinct dry winter, Tropical Monsoon Rainy Climate with short dry winter, Warm Temperate Rainy Climate with dry winter, and Warm Temperate Rainy Climate without distinct dry season.

Mean annual rainfall decreases northwards and eastwards, ranging from about 2000 mm over some pocket areas in the Southwest to less than 250 mm over the Afar lowlands in the Northeast and Ogaden in the Southeast.

Biological resources: Ethiopia's richness is due to the existence of a variety of environmental features ranging from semi-desert to mountain forests. The wide range of ecological, edaphic, and climatic conditions accounted for the rich biological diversity, both in terms of flora and fauna. There are more than 7,000 species of flowering plants recorded in Ethiopia, of which 12 percent or more are probably endemic. Natural forests and other woodlands cover 31.5 million ha and plantations around 255,000 ha. These wooded areas are sources for construction wood, fuelwood, and non-wood forest products.

Water and land resources: The country is classified into lowland and highland areas. However, because of the heterogeneity of the land resources, one distinguishes diverse agroecological conditions. There are 12 major geomorphologic units further divided into 70 subunits, 18 soil associations, 6 climatic and edaphic vegetation associations, 6 rainfall patterns, 10 thermal zones, 14 length of growing period zones and 14 production regions. There are also 15 land use patterns, 48 cropping patterns, 19 livestock patterns and at least 6 farming systems. The major land use forms in Ethiopia are grasslands for grazing and browsing, lands for cultivation, and bush and shrub lands. Grazing and browsing occur in more than 50 % of the country's total land area because it is found in cultivated areas, in woodlands and forests, and in other land use forms. Forests and woodlands cover about 7 % of Ethiopia and over 16 % of the total land area is covered by exposed rocks, salt flats and sands.

Land-use distribution according to the Ethiopian Mapping Authority (1988) can be summarized as follows:

Land-use Classification	Area (%)
Intensivaly outivated	10
Intensively cultivated	10
Moderately cultivated	13
Afro-alpine and sub-afro-alpine	
vegetation	-
High forest	4
Woodland	3
Riparian wood land and shrub	1
Bush and shrub lands	20
Grassland	30
Water bodies	1
Others	18
Total	100

Socio-economic characteristics

Population, demography: In 1999, the population was 61.7 million, 85 percent of which were rural and 15 percent, urban. The current annual population growth is 2.9%, and average population density 47 inhabitants per km^2 . The population is projected to increase to 129 million by the year 2030. The current life expectancy at birth is estimated at 50.7 years. The structure of the population reflects a high dependency ratio because 48.6 % of the population is within the age groups '0-14' and 'over 65' which are economically inactive. In 1994, only 23 % of Ethiopians older than 10 years were literate, with a large discrepancy between the literacy rate in urban areas (69 %) and in rural areas (15 %). This high rate of population growth leads to increasing demands for crop and grazing lands, construction materials, fuelwood and charcoal, and is an important factor responsible for the decline of forest areas.

Poverty: An estimated 50 percent of the country's population suffers food insecurity, or live below the poverty line, and more than 40 percent of them survive with less than one dollar per day, therefore they have severely limited purchasing power. Moreover, only 10 percent of the rural population has access to safe water. Both chronic and transitory problems of food insecurity are severe in Ethiopia arising from drought, conflict, and displacement of people.

This results in low productivity, low-level development of transport systems and infrastructure.

Economic features: Ethiopia is one of the least developed countries in the world. The gross domestic product (GDP) in 1994 was US\$6,108.60 million and per capita annual income of under US\$120.00.

- The growth rate of GDP varied from an average of 6.0 % during the 1980/81-1990/91 period to 11.1 % during the 1992/93-1997/98 period. Most of this improvement has been due to economic reforms since political changes were introduced in 1991;
- The major export items of the country include coffee, hides, oilseeds, beeswax, and sugarcane;
- Agriculture accounts for 46 % of the GDP and as such is the dominant sector of the Ethiopian economy, providing 90 % of total exports. The contributions to GDP of the next two dominant sectors are 11.2 % for industry and 39.1% for services; and
- Agriculture, which includes crop production, animal husbandry livestock, forestry, fisheries and apiculture, directly supports about 85 % of the population in terms of employment and livelihood. It is the main source of domestic food supply, hence the prime-contributing sector to food security, and supplies around 70 % of the raw material requirement of agro-based domestic industries. Agriculture is also the major source of foreign exchange earnings.

Main agricultural production systems: Ethiopia has considerable land resources for agriculture with about 73.6 million hectares potentially suitable for agricultural production to support a large population. However the country has remained unable to feed its people for many years due to inappropriate agricultural practices and climate variability.

The farming system in Ethiopia can be classified into five major categories:

- Highlands mixed farming system (constituting 45 percent of total area and inhabited by 80 percent of the population, it also supports 70 percent of the livestock population);
- Lowland mixed agriculture;
- Pastoral system;
- Shifting cultivation; and
- Commercial agriculture.

Status of agricultural sector in the national economy: Crop production is estimated to contribute on average about 60 percent, livestock accounts around 27 percent and forestry and other sub-sectors around 13 percent of the total agricultural value. Small-scale farmers using low input/output rain-fed mixed farming with traditional technologies dominate the agricultural sector.

Once self-sufficient, Ethiopia has become since 1981 a net importer of grain. However, diverse agro-ecological conditions enable crops such as: cereals; spices and herbs; pulses (lentils, beans); stimulants (coffee, tea, chat, tobacco); fruits; sugarcane; fibres (cotton, sisal); vegetables (onion, tomato, carrot, cabbage); root and tuber crops (potatoes, sweet-potatoes, beets, yams) to be grown.

CURRENT STATUS AND MANAGEMENT OF FORESTS

Forest inventory and information systems

The available information on the forest and other woody biomass vegetation cover is limited. This has been a major impediment to planning and implementing sustainable forest management. The most recent national surveys of forest and land use are those carried out by FAO in 1984 and by Cesen in 1986. The results from these two surveys are now outdated. In 1990, the State Forest Conservation and Development Department (SFCDD) carried out a desk study of forest resource base, which reported 3.5 million ha of natural forest cover. Most of these above studies indicated that the climax vegetation has disappeared in most areas in the country.

Characteristics of the forestry sector

About 42 million ha or the equivalent of 35% of the land area might have been covered with forests. However, with the inclusion of the savanna woodlands, the estimation rises to some 66% of the country. Forest cover (16% in 1950) has declined to 3.6% in the early 1980s. Later in 1989, the forest cover was estimated at 2.7%. Including 5 million hectares of savanna woodlands, the total forest area was 7%.

The forest cover is classified into:

- Natural forests (high forests, slightly disturbed, highly disturbed);
- Woodlands;
- Bushlands;
- Forest plantations; and
- Farm forests.

Estimates on forest cover change range from 62,000 ha per year, 150,000-200,000 ha and 59,000 ha. Between 1973 and 1990, it was estimated that the area coverage of closed forest stands had been reduced from 2.64 % to 0.2 %. On the contrary, the heavily disturbed high forest, which was only 0.87% in 1973-1976, increased to 3.08 % in 1986-1990. The species composition and the tree density have been decreasing in almost all forested areas characterized by deformed and over aged trees. Natural regeneration is scarce due to the high impact of livestock.

The main factors of forest degradation include:

- High rate of population growth;
- Subsequent increasing demands for crop and grazing land, construction materials, fuelwood and charcoal;
- Low agricultural productivity;
- Low standard of living;
- Lack of alternatives, and
- Lack of appropriate land use and forest policies.

Natural forests: Ethiopia's remaining natural forests include:

- Various types of montane forests concentrated in the less populated Southern and South Western parts of the country;
- Humid, mixed forests occur in Southern Ethiopia;
- Broad-leaved forests in the Southwest;
- Mostly deforested Central and Northern parts;
- Woodlands and bushlands that are largely restricted to the agro-pastoral and pastoral zones; and
- Lowland woodland.

The latest estimate of the remaining area of closed high forests is 4.1 million hectares or 3.4 percent of the country.

Planted forests: Plantations are mainly of exotic tree species with *Eucalyptus* covering the largest area of hardwood plantations mainly for construction and fuelwood. The emphasis is on short rotation plantations and little in growing valuable indigenous trees due to their slow growth rate and low economic return. These plantations include industrial and peri-urban afforestation activities established and operated by the Government, as well as community woodlots and plantations for watershed protection.

FRA 2000 estimated a total forest plantation of 216,000 ha, however, in-country gross estimates are 255,214 ha, which comprise around 76,050 ha of industrial forest plantations and 179,164 ha of forest plantations for the production of fuelwood and poles. Of these, 79,500 ha represent plantations established by farmers and communities and 99,664 ha represent public sector plantations for fuelwood and pole production. Peri-urban plantations are created to supply urban centres with poles and fuelwood. They are mainly located around Addis Ababa and other major towns.

The annual planting rate is estimated at 17,000 ha which is 10 % of the annual deforestation rate. If this planting rate remains the same, the area of industrial plantations would be around 500,000 ha by the year 2020. The projected sustainable fuelwood supply from all forest types is 8.8 million m^3 without any intervention but the projected supply would reach 21.8 million with proper management by 2014.

Trees outside forests: Trees outside forests are important sources of wood and non-wood forest products. Most household needs for fuelwood and construction timber are obtained from these trees. They are trees on roadside, trees planted in and around fields, trees around homesteads and windbreaks around agricultural fields. The total area covered by trees outside forests is not known. The MOA (1998) estimated supply of fuelwood from farm homesteads at about 80,000 tons per year based on an assumed number of five mature trees per rural household. The same source indicated that there are some 140,000 hectares of woody vegetation in patches less than 200 hectares in size that are contributing nearly 100,000 tons per year. There has been a very significant increase in on-farm planting of trees, related to the change of state policy on individual tree tenure.

Environmental values of forests

Biodiversity conservation: The flora of Ethiopia consists of between 6,500 and 7,000 species of which 12 % are considered endemic. The forests host the major portion of the flora, including about 25 % of families or close relatives of cultivated crops. Some efforts in biodiversity conservation include:

- Government-formulated policies for the sustainable use of genetic resources;
- 40 Wildlife Conservation areas comprising nine National Parks (2.3 million ha.), four wildlife Sanctuaries (1 million ha), eight wildlife Reserves and 18 Controlled Hunting Areas;
- Protected areas covering 14 % of the country and contributing significantly to *in situ* conservation of wild coffee in the southwestern part of the country; and
- The collection and storage of about 804 accessions of seeds of 14 tree and shrub species by the Institute of Biodiversity Conservation and Research.

Soil and water protection: Land degradation through soil erosion remains the greatest threat to sustainable land management in the country. Erosion by water alone is estimated to cause an annual loss of 1.9 billion tons of soil from the high lands. The soil conservation research project results show that the maximum soil loss on cultivated land is in the order of 300-400 tons per ha per year. In response:

- Trees and shrubs in agricultural and grazing land can increase both crop and livestock productions by reducing wind speeds and water loss;
- It has been estimated that one hectare of eroded land with 40 % slope looses as much as 150 m³ of top soil each year. Conversely, if forestry is chosen to be the best alternative form of land use, not only is the loss of such an amount of soil prevented but, also that it is not deposited in river bottoms, lakes and dams; and
- Forests and trees lessen the impact of rainfall thus allowing water to percolate instead of being lost through run off. In areas receiving an annual rainfall of 600 mm per year, the afforestation of one hectare of steep slope and eroded land (40%), allows an estimated 5,000 m³ of water to seep into the ground thus preventing the filling up of waterways and the incidence of floods.

Initiatives for sustainable forest management

Management criteria for sustainable forestry have been developed within Ethiopia's Forest Action Program but have not been implemented. According to this programme, the remaining natural forests are primarily used for conservation, and commercial utilization as a secondary objective. For this programme, two million ha of natural forests are selected as priority for development but have not been effective. Management plans have been prepared for eight forests but only two of them have been put in place. The forests are under stocked with estimated annual incremental yield well below the optimum. The national forest program has proposed 60% of natural high forests to be designated for conservation and 40% for production purposes.

For the last two and a half decades, the public sector has been responsible for the management of forest resources. This resulted in uncontrolled deforestation of the natural forests, encroachment by the farmers and desertification. Regional bureaus have managerial responsibility for planning, utilizing and developing natural forests, woodlands and Government plantations. The preparation of management plans rests on the regional bureau of agriculture. However, no concerted management planning effort has been made except the preparation of eight management plans. The legal status of forest areas has not been established thus leading to increased encroachment and depletion of the forest resources.

Forest management practices: Poor logging practices and techniques carried out in natural forests without any control or management plan, and the narrow range of selection of tree species have all contributed to the fast depletion of forest resources in Ethiopia. The average sawlog volume per ha is 50 m³/ha of a potential 200 m³/ha. There is a great loss of energy in producing charcoal by the widely practised earth mound kiln technique that results in 50% of waste. Approximately, 6% of the gross supplies of wood are converted to charcoal.

Forest production

Wood products: Forests are the main sources of building materials in Ethiopia and this poses a substantial threat to the fragile forest ecosystems with the ever-increasing population.

Industrial roundwood: Production and consumption of primarily non-coniferous trees, is one of the lowest in the world. The production of logs has declined from 130,000 m^3 in 1980 to 6,000 m^3 in 1999. Current demand for industrial wood is estimated at about 400,000 m^3 per year but is expected to jump to 1.6 million cubic meters by the year 2014.

Sawnwood production averaged about 23,000 m^3 per year from 1980 to 1990. The production of wood-based panels is estimated at 12,000 m^3 with an average import of 1,000 m^3 per annum. Veneer sheets, paper and paperboard, plywood, particleboard are also produced, but there is no external trade in wood products.

Construction wood: The annual demand for construction wood is estimated to be 2.1 million m^3 , and is anticipated to reach 4.2 million m^3 by 2014.

State of supply and demand of forest products: Every year about 24 million cubic meters of wood are harvested from natural forests. Overall, 80% of this wood production is consumed as household fuel, in the form of firewood or charcoal, another 10% as building material and transmission poles, leaving the balance for other uses. The annual demand for wood production, as measured by annual extraction of wood products, exceeds the annual growth and exerts heavy pressure on the remaining forests.

Imported woods include sawn wood, veneer sheets, wood-based panels, pulp and paper products.

Fuelwood and charcoal: Most households depend almost exclusively on wood to meet their energy needs with average daily per capita consumption of fuelwood varying from 7 kg in the biomass rich regions to 0.8 kg in the arid areas. More than 50 % of all primary energy used in Ethiopia is for baking Injera, a large pancake, which is the main food in the country. This energy intensive activity accounts for more than 75% of the total energy consumed in Ethiopian households.

Important energy sources: Traditional biomass fuels such as wood, agricultural residues, charcoal and animal dungs are prevalent. The household sector accounts for about 93% of the

biomass fuel consumption and there are ample signs of shortages of fuelwood in both urban and rural areas.

Natural forests and woodlands are the most important sources of *woody biomass resources*. An estimated 38 metric tons of fuelwood was consumed in 1995/96. However, there are huge variations in the per capita energy consumption depending on the availability of woody biomass resources or other alternative options.

Non-wood forest products (NWFPs)

The main NWFPs in Ethiopia include:

- Food products (nuts, fruits, vegetables and mushrooms);
- Resins, incense, spices and condiments (nutmeg, cinnamon, cardamom);
- Industrial plant oils and waxes;
- Plant gums (Arabic frankincense, gum myrrh);
- Natural honey and bees wax; and
- Animals and animal products (game, skins, bones).

Medicinal plants: Constitute the only medicines available to a large majority of Ethiopians who depend heavily on the forests, woodlands and cultivated lands to meet as much as 75 to 90 percent of their requirements for primary health care. Medicinal plants include more than 600 plant species, which represent a little over 10 percent of Ethiopia's vascular flora.

Bamboo resources: These cover an estimated one million ha and are the sources for food, fodder, furniture and building materials. They could also be used as raw material for fibre board, pulp and energy requirements. However, the use of bamboo resources in Ethiopia is currently limited to housing construction, fencing and for the production of furniture, baskets, agricultural tools and house utensils.

Wild animal resources: Wildlife ranching and domestication, civet and ostrich farming and game hunting of large herds of big antelopes, gazelles and warthogs could be developed more for tourism. These contribute significantly to food production and household food security. However, the Catholic Orthodox religion forbids the consumption of many wild animals. Nevertheless, in some lowland areas of the country, hunting contributes to food security by providing meat for consumption and cash income.

Economic and social contribution of forestry:

The main roles for forestry in the country are the supply of wood for energy and of raw materials for wood based and construction industries. Wood provides some 78 percent of all energy consumed in the country, with an average yearly consumption estimated at 1m³ per capita for the rural households. Most households rely heavily on fuelwood from the forests to fulfill their energy requirements estimated at between 49 and 64 million m³ per year.

In the period 1982-1992, the agriculture sector accounted for 45 % of the total GDP, and over the same period, forestry accounted for about 5.5 % of the agriculture sector and 2.5 % of the total GDP (EARO, 2001). These figures, however, underestimate the total contribution of the forestry sector to the country's economy.

In 1988-1989, forest industries in Ethiopia employed about 2.2 % of the total work force in the country and contributed 2.8 % to employment in the agricultural sector. During the 1993/94 fiscal year, the manufacturing of wood products, furniture, paper and paper products employed 6,180 people.

It is currently estimated that the forestry sector employs directly some 35,000 persons in Government and industry, and some 400,000 persons in commercial wood fuel harvesting, processing and distribution.

In terms of revenues, the wildlife sector generates cash from sport hunting, export of live animals and tourism. The revenues collected from hunting alone are estimated at US\$ 530,000 per year from 1996 to 2000. On the other hand, the export of live animals has contributed to over US\$235,000 during the same period.

FOREST SECTOR

Institutional framework of forestry

The forestry sector in Ethiopia has undergone fundamental changes as a result of:

- Evolution from a centralized to a market-oriented economy;
- Decentralization of decision making processes;
- Re-organization of ministries at national and regional levels;
- Dissolution of the Ministry of Natural Resources Development and Environmental Protection in 1995; and
- Transfer of the forestry sector to the Ministry of Agriculture.

At the regional and local levels, there are agricultural development bureaux with two departments: the Regulatory Department and the Extension Department in which experts organized in forest conservation and development teams manage forestry. Forestry currently falls under a large Ministry of Agriculture. Budget allocations and staff resources are often inadequate to monitor forest resources effectively and to ensure sustainable management.

State institutions in forestry: Since 1940, the Ministry of Agriculture has been responsible for the organization of the forestry sector, conservation, development and rational utilization of the forest resources at the Federal level. The Regional Bureaux of Agriculture are now responsible at the regional levels.

- The whole forestry sector is under the Department of Natural Resources Development and Regulatory Department of the Ministry of Agriculture;
- The Environmental Protection Authority is in charge of environmental monitoring and protection, and is also responsible for compiling an environmental information system, for conducting environmental research, and for controlling of atmospheric pollution and climate change;
- The Water Resources Development Ministry is responsible for undertaking water resources development projects;
- The Ministry of Education is involved in environmental education;
- The Ministry of Mines and Energy is involved in energy resources development;
- The Ethiopia Agricultural Research Organization is responsible for conducting research related to agriculture and forestry; and

• The Institute of Biodiversity Conservation and Research (IBCR) is responsible for the conservation and development of biological resources.

The Private Sector and Forestry: Due to the comparative long-term nature of investments in forestry, private investors are less attracted. On the other hand, more involvement is reported in harvesting, processing and marketing of forest products. The Government has developed policies that encourage and attract the private sector in the forestry sector. The Government is leasing land outside farmers' possession to private investors who are willing to engage into activities that contribute to the improvement of the environment. So far, eight investment projects in forestry with a capital outlay of 17.29 million ETB are currently operating.

Forestry Research: In acknowledging the importance of research and the various problems encountered in the agricultural research system, in 1997 the Government enacted a proclamation establishing the Ethiopian Agricultural Research Organisation (EARO). The Forestry Research Center, which is organized under EARO, is responsible for generating appropriate technologies for the development, sustainable use and conservation of trees and forests. Among the proposed national research programmes are:

- Forest plantations;
- Farm forestry/agroforestry, including trees outside forests;
- Non-wood forest products; and
- Biomass-based energy.

Forestry training: From 1997 to 1999 expenditure was estimated at between 3,962,000 and 16,950,000 ETB. However, the number of graduate foresters is still below what is needed to carry out the challenging responsibilities of managing the forest resources of the country. Programmes include:

- Debub University in the Southern region provides training in forestry at MSc. level;
- Ministry of Education takes on training responsibility, with budget allocation mainly from Swedish bilateral assistance (SIDA) that has been assisting the sector since 1978; and
- Wondo Genet College of Forestry provides up to PhD level training with the collaboration of the Swedish University.

Policy framework

The country has developed the following national policies that are in effect and relevant to sustainable forest management: Environmental Protection of Ethiopia, Ethiopian Forestry Action Program, Conservation Strategy of Ethiopia, Biodiversity Conservation and Development Policy and Strategy.

Proclamation No. 94/1994 provides for the conservation, development, protection and utilization of forest resources, recognizes three types of ownership of forestlands: State forests, regional forests and private forests. In addition, cutting of trees, grazing of domestic animals, bee-keeping activities and harvesting of any other forest product requires a written permit from the appropriate regional Government or Ministry.

In order to preserve the remaining natural forest, protect the environment, and the genetic pool reserve, 58 National Forest Protection Areas (NFPAs) covering an estimated area of

3.6 million ha have been selected. However, these protected NFPAs suffer from heavy pressure from increasing demands for new agricultural lands and fuelwood. It is prohibited to cut products or perform activities in NFPAs.

Legal, customary and regulatory instruments

Ethiopia has made significant achievements in terms of elaboration of a framework to address issues related to deforestation and land degradation. The Environmental Protection Authority has developed a National Action Plan to Combat Desertification with priority set for specific areas in 40 administrative zones of the country. Financial and technical assistance from the Office to Combat Desertification and Drought (UNSO), IGAD and the CCD Secretariat supported the formulation of this plan that will be implemented by the various relevant federal and regional executive organs.

Planning framework

Central planning mechanisms: Recent changes in the policy and institutional framework for forestry emphasized reducing the role of Governments in productive activities, stressing decentralisation in forest management and administration with special attention given to participatory approaches. However, the Federal Government ministries are still responsible for policy issues, for preparing plans and budgets, and conducting studies and research. They also ensure enforcement of laws, regulations and directives of the Government, and provide for technical assistance.

Decentralized planning: The Regional agricultural bureaus are responsible for the preparation of plans and budgets for their respective regions. The regional states have power to raise their own revenues and plan their own development activities following the policies of the federal Government. The decentralization and devolution continue to the lowest decentralized level of formal state structure within the regions.

International conventions

The Government is committed to UN International Conventions and Agreements.

External assistance

Multilateral international support: Financial cooperation through investments and donations of organizations such as the Global Environment Facility (GEF) and the World Bank were undertaken.

Bilateral support: Cooperative programmes in these sectors are involved with Germany (GTZ), Norway, the Netherlands, Sweden and Italy.

CAUSES AND EFFECTS OF DEFORESTATION AND DEGRADATION

Root causes

Land degradation in arid, semi-arid and dry sub-humid areas leads to desertification, which results from climatic variations and human activities (deforestation, overgrazing, inadequate agricultural practices leading to soil erosion and deterioration) due to rapidly increasing
population. Environmental degradation and deforestation have been taking place for hundreds of years.

Land tenure and user rights: Grazing and browsing occur over more than 50 % of the country's land area. This major land use form puts a heavy pressure on forests and woodlands vegetative cover, which, with the complexity of topography, constitutes the biggest threat to the environment in Ethiopia.

Pasturelands are not owned by individuals or by specific groups of people and this leads to the 'tragedy of the commons': grazing lands are exploited well above their carrying capacity.

Water tenure and use rights: Given the lack of information concerning the occurrence of ground water, it has not been possible to address the water tenure and user rights issues nor to link water scarcity in some parts of Ethiopia to deforestation and land degradation. However, insecurity of access to these rights affects how rural populations manage natural resources. Without security, there is a tendancy to over-exploit now, forgoing tomorrow.

Incentives/constraints in agricultural production: Although agriculture (crop production, animal husbandry, livestock production, forestry and fishery) supports 85 % of the population, until recently there has been very limited investment into this vital sector. Despite the considerable land resources availability, the Ethiopian agriculture depends largely on low input/output rain-fed mixed farming and is characterized by the absence of integrated diseases and pest control, and the utilization of primitive varieties of crops and farm technologies.

Poverty: Poverty affects more than half of the inhabitants of Ethiopia and this situation is probably responsible of many activities contributing to deforestation and land degradation in the country. The Government of Ethiopia has set the alleviation of poverty as a national priority and has developed a national poverty eradication strategy.

Economic situation and consumption patterns: Most Ethiopians in rural areas rely on forest resource products for their daily subsistence to face the chronic food insecurity that exists in many parts of the country. These increasing demands due to poor performances of traditional agriculture practices, lack of reliable transport system, drought, and frequent displacement of people because of conflicts contribute to deforestation and land degradation.

Direct causes

Natural causes: Climatic factors such as high temperatures and prolonged rainfall deficit lead to drought periods and subsequent losses of vegetative cover in fragile environments. Other natural factors such as altitude, wind, topography, and soil type that determines the characteristics of forests can also be direct causes for deforestation and land degradation in Ethiopia.

Causes linked to human activity: Human activities have induced environmental degradation and deforestation for centuries mainly through:

• Cutting forests to open land for agriculture and to satisfy fuelwood needs of a rapidly increasing population (over 90 % of Ethiopia's total energy needs come from biomass, with fuelwood being the largest component);

- Private investment in agriculture in the southwestern parts of the country has contributed to the current deforestation in Ethiopia where some regional Governments are leasing the moist evergreen montane forests to investors to convert to coffee and tea plantations;
- Grazing pressure has increased the rate of forest degradation and deforestation throughout the country;
- Deliberate setting of fires every year in large areas of lowland forests and grasslands in the drier parts of the country which start out as conversion fires but end up as highly destructive wildfires; and
- Over harvesting of wood and non-wood forest products; and
- Urbanization.

Effects

The two most important effects of deforestation and forest degradation are the loss of productive forest lands and the revenues following the loss of wood and non-wood forest products. Deforestation and land degradation have immediate consequences in Ethiopia where they exacerbate poverty, leading to further desertification.

Loss of land productivity: In Ethiopia, farmers have practised shifting cultivation as the main traditional farming system whenever there was a decline in the fertility of their farmlands. This farming system exposes the soil to erosion and wind and is causing large losses in some of the NFPAs that are not protected because these forests are not yet gazetted.

Resource base degradation and decline: What was once an immense natural forest resource has been depleted mainly by the human factor at an alarming rate of 150,000 - 200,000 ha/year. This resource base degradation and decline goes along with losses of species diversity, reduction and/or decline of grazing lands, and intensification of erosion problems. Moreover, this decline of the resource bases exacerbates poverty and, in turn, forces people to put more pressure on the already fragile remaining patches of natural forest vegetation, contributing over the long run to desertification.

STATUS OF KNOWLEDGE

Lessons learned

The lessons learned include:

- Reduction of the role of Government in productive activities and towards decentralization of forest management with special attention given to local people participation;
- Creation of an enabling environment to enhance the role of the private sector in forest development is essential;
- Integration of forestry with other land use practices and sectoral integration in sustainable development is necessary for balanced and coordinated development in collaboration between sectors;
- Role of forestry and the use of non-wood forest products in poverty alleviation and food security have been recognized and technical support packages to support the rural poor are needed;

- Sustainable forest resource management can only be done hand in hand with security of land tenurial rights, crop ownership and access to land and forest resources;
- Equitable benefit sharing with the local people is necessary to conserve and develop forest resources;
- Consistent, clear and achievable policy and legislation are necessary, however the key is implementation in the field in harmony with the needs and aspirations of local people;
- Low economic returns from forestry activities constitutes a major obstacle to developing local micro-enterprises and cooperatives for forest products (both wood and non-wood forest products);
- Adding value locally (that is, near the source) often by processing or packaging (agroprocessing enterprises) is a potential alternative for solving this issue of low economic return from forestry activities, because product revenues are distributed more evenly in the market chain encouraging re-investment in resource management;
- Inseparable links are necessary between forest products raw material supply, appropriate wood processing technology and feedback from domestic and international markets;
- Close communication and collaboration are necessary between policymakers and researchers to ensure synergies between them for economic growth, forest and woodland conservation and poverty alleviation; and
- The full value of wood and non-wood forest products is not fully appreciated so the forestry and woodland management sector does not receive the resources and priority attention that it deserves (rural trade is often not through the formal cash economy).

Gaps in knowledge

There are acknowledged technical deficiencies in:

Extent and impacts of desertification: Ethiopia is experiencing soil erosion and fertility loss due to intensive cultivation on steep slopes and the expansion of cultivation onto fragile lands. Accelerated desertification is recognized as the main cause of food insecurity. It has been estimated that 27 million ha of agriculturally productive land are eroded and an addition of about 14 million ha of the land seriously eroded, and another two million ha completely eroded to support any production. The country has limited capacity to monitor ecological degradation and provide reliable information on the process and dynamics of resource degradation that lead to desertification.

The arid, semi-arid and dry sub-humid areas of Ethiopia account for about 70 percent of the total landmass and 46 percent of the total arable land. Information regarding the state of the natural resources and the socio-economic situation specific to the arid areas of Ethiopia is limited.

The Government has been making quite significant budgetary allocations for environmental protection out of which most went into the prevention of land degradation. There is still lack of coordinating and integrating institutions so that the National Action Plan to combat desertification will be internalized and projects and activities will be taken into account in the five years planning exercise of the various relevant federal, regional and zonal level executive organs.

Capturing farmers' experience, technical and managerial skills: State directed approaches for forest conservation and development have often undermined the capacity of the communities to manage and conserve their forest resources. As a result, traditional

management methods and rules have been eroded. There are many examples concerning the use of indigenous technological knowledge much of which has never been documented and is being forgotten, lost or replaced by modern technology. Such methods include ones to control erosion, traditional medicine and traditional conservation practices such as inter-cropping, mixed cropping.

Initiating full participation and partnership in rural community development: In Ethiopia, the Government's approach for forestry development was not people centred but was largely based on the command system with little attention to local community involvement. This approach failed to achieve sustainable forest management because it did not address the socio-economical constraints and issues related to the conservation and management of forests. The attitude of the Government has started to change towards participatory approaches in the management of forest and other natural resources.

Establishing networks of decentralized statistical planning databases: Data collection and analysis constitutes a major bottleneck for the establishment of reliable statistical planning databases in Ethiopia. Furthermore, weak institutional linkages through networking by electronic communication limit the dissemination of relevant information to many potential users. There is no mechanism in place for bringing together available information because there is no institutional set-up that organizes databases.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The degradation of the environment in Ethiopia due to the destruction of forest resources and the subsequent loss of ecosystems are the biggest threats to the development of the forestry sector. It is therefore urgent to:

- Increase efforts to protect and improve the management of natural forests;
- Establish new forest plantations;
- Promote the growing of trees and other woody vegetation in order to secure and increase the supply of scarce forest products; and
- Improve upon the collection, processing and marketing of forest products through capital investments on a small scale in order to increase employment and income opportunities for the populations in rural areas.

The importance of wood and non-wood forest products for the economy of rural households should be highlighted and integrated in all food security programs. Examples include the promotion of small forest product enterprises through small credit loans, trade of bamboo baskets in urban areas or of Arabic gum and incense, carving and traditional medicine activities. These rural non-farm activities can provide employment, income, and subsistence goods to the majority of the people in the country.

Recommended actions

Development choices and issues: To promote the use of trees outside forests, it is recommended to:

- Encourage the introduction of trees into agricultural landscapes in Ethiopia;
- Emphasize the importance of NWFPs and their commercialization at the household and community levels for income generation and food security;
- Create awareness at all levels on the use and value /contribution of forests and trees outside forests to the GDP; and
- Organize a national workshop on *Forests and food security in Ethiopia* to address issues related to the economic importance of NWFPs for rural livelihood diversification and the roles of women in forest-based activities.

Technical initiatives: In recognition of the value of future forest and rangeland management it is recommended to:

- Monitor physical changes in land use, especially with respect to the area of forests, woodlands, plantations and trees outside forests. The Woody Biomass Inventory and Strategic Planning Project can be used as an entry point for the development of harmonized manuals on data collection, aggregation methodologies, and the introduction of networking among data producers and users to share experiences;
- Shift consumption patterns in wood fuel and the promotion of alternative sources of energy;
- Develop more efficient woody biomass resource uses through projects which fully involve the rural community;
- Develop an integrated Forest Fire Management System; and
- Conduct training to enhance the skills of professional forest managers to sustainably manage their remaining forests and to understand the participatory processes of involving local populations who can share their traditional knowledge.

Administrative and legislative aspects

It is recommended to:

- Review the existing policies and legislation so that they are socially and environmentally focused, clear and consistent;
- Transfer, through decentralization, the management of forest and other tree resources to the local people;
- Limit the involvement of the Government in production forestry, promote and enhance the involvement of the private sector (corporate and smallholder) in the commercialization of wood and non-wood forest products;
- Put in place appropriate land use, and forest policies and develop stable and competent institutions for the conservation, development and sustainable utilization of forests and trees outside forests;
- Develop systems that allow the re-use of revenues generated from conservation and development of forests into the development of new environmentally sound forest activities; and

• Create local fund-raising mechanisms to establish forestry assets.

Cross cutting issues

It is recommended that:

- Women and women's groups have greater direct support in forest products programmes because of their important role as key resource managers in rural areas of Ethiopia; and
- Target rural credit and training packages for women's groups in non-wood forest products, participatory methods of planning, market incentives, policy reformulation, monitoring and enforcement and income diversification.

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (FAO) GOVERNMENT OF THE REPUBLIC OF MALI

FAO-NETHERLANDS PARTNERSHIP PROGRAMME SUPPORT TO SUSTAINABLE FOREST MANAGEMENT IN LOW FOREST COVER COUNTRIES

ROLE OF PLANTED FORESTS AND TREES OUTSIDE FORESTS IN SUSTAINABLE FOREST MANAGEMENT

REPUBLIC OF MALI COUNTRY STUDY REPORT

EXECUTIVE SUMMARY

By

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Bamako, Mali, 28 February – 26 March 2002

FOREWORD

According to FRA 2000²⁹, 71 countries, most developing, have a forest cover of less than 10 % of their land area. The open-ended International Expert Meeting on Special Needs and Requirements of Developing Low Forest Cover Countries (LFCCs) and Unique Types of Forests, held in Teheran in October 1999, agreed to prepare proposals to secure international support to sustainable forest management in LFCCs. The Netherlands approved support to targeted outputs and activities as a follow up to the "Teheran Process". Country studies for Africa and the Near East regions were selected to outline the causes and effects of deforestation and degradation together with lessons learned and priority needs to enhance the role of planted trees. The Republic of Mali, as one of the country case studies selected, is detailed in this report.

OVERVIEW AND COUNTRY CONTEXT

Brief geographical and historical description

The Republic of Mali is situated in the centre of the Sahel, between 10^{0} and 24^{0} N latitudes, covering a vast surface of 1,240,192 km². It is deeply landlocked within Western Africa, bordered in the Northeast by Algeria, in the East by Niger and in the South by Burkina Faso, the Côte d'Ivoire, Guinea, and to the west by Senegal and Mauritania.

Economic and demographic characteristics

The agricultural sector dominates the economy of the county, employing 80 percent of the working population. With 42 percent of GNP, it comes in second place after the service sector (44 percent of GNP). Revenue from country exports are mainly from cotton, livestock and recently, gold. The dominant imports are energy products and capital goods.

The population is estimated at 9.2 million in 1996 and has one of the highest demographic growths in the world with an average natural growth rate of 3.2 percent. Despite a relatively low population density (about 7 habitants per km^2), its capacity to support the environment is rather limited due to severe agroclimatic conditions. There is high urbanization, and one in five persons in Mali live in Bamako. About 46 per cent of the population is less than 15 years old. Life expectancy is 58 years.

Governmental and legislative framework

The Republic of Mali adopted a Constitution on 12 January 1992 and is divided up into eight regions and the capital district of Bamako, each of which is under the authority of an appointed governor. There are 51 Circles (districts) administered by the commandants, which are divided into rural communes and then, in turn, into villages or quarters.

Decentralization: Decentralization plans began in June 1992. This will give people greater control over their own affairs in terms of administration and other economic, social and cultural issues. There have already been profound changes in the services of State, notably in rural affairs. These changes have been supported by legal texts and regulations, including the Code of the Territorial Communities, the laws on taxing communes and communal personnel. The next steps of the decentralization process include implementing a High Council of

²⁹ Forest Resources Assessment.

Collectives, transferring expertise, accelerating the division of areas of collectives, and working out management and development plans.

Decentralization and land management aims at reinforcing the democratization process and adapting the Government missions. The Government organization promotes local initiatives by considering the struggle against poverty and the needs of populations regarding their environment. It promotes women in action plans, national policy of communication for development to implement dialogue among decision-makers and the populations, and sector policies, such as the General Plan for the Rural Development Sector. This Plan considers the value of water resources, the domestic energy strategy, policies of urbanization and transportation, public health and hygiene, mining, and commercial and home industries.

Policy-institutions framework, national development plans

The first structural adjustment programme, implemented in 1982, leaned toward a liberal policy in economic development and undertook reforms aimed at ensuring economic growth in a favourable socio-economic and political environment that centred on the market.

The Economic and Financial Programmes (1992–1996), funded through the Triennal Public Investment Programme (1997–1999), have shown these positive results:

- Increasing exports of livestock, the recovery of industrial production and the rise in level of exports, especially cotton and gold;
- Keeping inflation down from 33 % during the 1994 deflation to 12.7 percent in 1995, and 6.5 percent in 1996. It is expected to lead to an inflation rate of less than 3 percent in 1999; and
- Reducing the global deficit from 13.7 % in 1994 to 10.5 % in 1995 and then to 7.9 % in 1996, finally reaching under 7 % in 1999.

Environmental characteristics: Mali's main environmental features are:

Geology: The platform is composed of metamorphic rocks, quartz, schists, gneiss and old eruptive rocks. This platform has been primarily re-covered by primitive sediments, especially of the sandstones and other more recent ones that formed sands from the Saharan part and those found in the alluvial system of the rivers.

Landscapes and soils: The main landscape and soils classifications are:

- Soils are strongly deficient in phosphate with a great spatial variability thereby providing a mosaic of soil units;
- The most widespread soils are arid brown forest soils and ferruginous soils of sandy matter; and
- The deep sandy and hydromorphic soils found in the Delta.

Climate: Mali's climate is characterized by:

• High temperatures (average annual of 26°C) with strong discrepancies (12 to 16°C) in the North and more moderate variations in the South (3 to 4°C); two minimum temperatures are observed in December and July;

- Rainy season controlled by the movement of the Intertropical Front. It lasts for seven to eight months in the South and only three months in the Sahelian area; and
- A dry season in which the Harmattan, a hot dry blowing wind from the desert, aggravates the moisture deficits.

Biological resources: There are varied biological resources due to diversity in the ecosystems that include 1,739 species of flora and fauna including 136 mammals, 640 species of birds and 143 species of fish.

These indispensable biological resources provide food, fuelwood, medicine, feed, and a large source of income for rural people. However, Mali suffers from degradation of its biological resources due mainly to a host of man-made factors (deforestation, overgrazing, poaching, illegal fishing, bushfires, agricultural use of pesticides) and extremes in climate (drought).

Surface water and groundwater resources: The water network is characterized by this hydrographic network:

- An important fossil network north of the 16th parallel with some rare, reviving rainfalls;
- Mali is divided in the South by the basin of the Senegal River, to the East by the Niger river with vast arid areas in the Central and North regions;
- The Senegal river joins Bafing and Bakoyé and is 1,700 km long, 800 km are within Mali, with an average flow of 669 m³/second; and
- The Niger River is a 4,200 km long, of which 1,700 km are within Mali, and has an average flow in Koulikoro of 1,550 m³/second.

Land resources: Mali's forested zones are used as valuable land banks for supply of critical food and income-producing crops in rather primitive manner, economically speaking. The land-use situation is characterized by:

- Potentially arable land could cover 24 percent of the total land area of 30 million ha, of which only 2.2 million ha are irrigated, primarily in the south. Land crops and fallow comprise only 11.4 million ha due to restrictions from the river blindness epidemic and inaccessibility due to a lack of infrastructures;
- Cropping lands are estimated between 3.0 and 3.5 million ha and have increased annually at about 15 percent since 1970;
- 24 percent of land are desert where economic activity is almost impossible; and
- There are strong agro-pedological limitations (deficiencies in organic substance and minerals).

Population, demography and employment

- The 1998 general census estimated 9.9 million people (roughly 80 percent living in rural areas), compared to 7.7 million in 1987. The average growth rate is 2.2 percent. More than 91 percent of the population live on 30 percent of the country. Densities per square kilometre vary from 0 to 1 in the North to more than 30 in the South;
- The population less than 15 years old represent almost 50 percent of the population, as opposed to 3 percent being more than 65 years old. Women count for approximately 51% of the population; and

• Unemployment prevails in urban areas. In rural areas, lack of employment seems less important because people cultivate crops if weather permits. Although under-employment and unemployment may be more disguised in rural areas, they are more striking here and constitute the main causes of poverty.

Economic overview

The economy mainly relies on the rural sector dominated by agriculture and livestockbreeding, contributing (between 1994 and 1998) an average of 45 % of GNP. The mean annual growth rate of 3.6 percent is due to the increase in cereal (particularly rice) production, cotton and products of animal-breeding, fruit and vegetables.

Main agricultural production systems

Production systems are grouped into two major systems - pastoral and agro-pastoral, according to the importance of livestock breeding or agriculture. There are also specialized peri-urban, semi-intensive and intensive systems that appear in the big cities. Rangeland systems are based on extensive livestock breeding by nomadic farmers looking for grazing and water, contributing to degradation of resources due to prolonged concentration of herds around watering places. Bread millet, sorghum, beans (Niébé), peanut, fonio and watermelons are found in almost all regions where there are systems based on rainfed food crops. Livestock breeding represents less than 30 percent of agriculture production due to lack of mineral or organic fertilization and lack of knowledge and technology.

Agro-pastoral systems based on rice crops are in areas inundated with the Niger, Bani and Senegal Rivers. The surfaces concerned and the yields according to irrigation, management, hydro-agriculture and control of water are:

- 150,000 ha of traditional irrigation producing rice are weak through free flooding; rice yields are low (700 kg/ha) and depend on rain and rises in water level;
- 50,000 ha of irrigation by controlled flooding in the flooded plains of the Niger and of Bani. The yield is also low (1 ton to 1.7 ton/ha) due in part to lack of fertilization;
- 8,000 ha rice in small irrigated areas of the village where, with support of the Rice Services, are from 4.5 to more than 5 tons/ha); and
- 50,000 ha with total control of water (by gravity) in hydro-agricultural areas according to the model of the Niger Office with obtained yields of more than 5 tons/ha.

CURRENT STATUS AND MANAGEMENT OF FORESTS

Introduction

Mali has demonstrated its commitment to sustainable forest resources management and has become involved actively in the formulation of the project of the Convention to Combat Desertification of the United Nations Conference on Environment and Development (UNCED) and that it ratified. It then organized an institutional framework and programmes, which favour local development, promotion of real partnerships at the local, provincial, national and international level. This struggle against desertification and the protection of the environment concerns all initiatives against soil degradation, the restoration of forest and rangeland ecosystems and their management, and the promotion of suitable means of rural production that perpetuate natural ecosystems and eradicate poverty. Mali aims at a 7 percent

economic growth in the upcoming years and developing of its agro-silvo-pastoral sector. It established a National Forestry Policy in 1982.

Forest inventory and inventory systems

Like other dry tropic African countries the status and trends in the quantity and quality of forest resources are not reliably known. Mali's only projects carried out in the centre of the country have been too localized and are now obsolete. Mali requires a national forestry inventory and regular follow-up to quantify all features of its vegetation.

Forest cover

There is great disparity in estimations of forest cover. The first study that evaluated wood resources, carried out in 1982 by FAO in a regional study, estimated forest cover at 15.5 million ha. Studies carried out under the framework of an inventory and surveillance project on forest and woodland resources (*Projet inventaire des ressources ligneuses et occupation agricole des terres au Mali* [PIRL]) carried out between 1985 and 1991 estimate total surface of forest formations on five regions as 32.4 million ha with standing volume of roughly 516 million m³, with very low productivity of about 0.86m³/ha/year.

Characteristics of the forest sector

According to the law that sets conditions of forest resource management, the forest estate covers 91 percent of national territory and is divided by the state into a forest domain of decentralized territorial collectives. The State forest includes reserved forest, forests, afforestation, reforestation and 16 protected zones, as well as artificial forests or natural transferred forests.

Natural productive planting is mainly found in the South and West in human Sudano-Guinean and Guinean zones. It consists of open woodland, forest galleries, trees savanna and shrubs savanna. Standing volume contained in the shrub savanna of the North is less than 10 m³/ha. Stripped bush covers 25 % of the south, with volumes often reaching 20 to 40 m³/ha. The open woodland of the Sudano-Guinean areas with wood availability is 50 to 80 m³/ha. Gallery forests and forest formations of the West are richer, sometimes containing more than 100 m³/ha.

According to FAO, forest cover has decreased about 100,000 ha/year due to the growing population's need for fuelwood and agricultural soils, overgrazing and bush fires, severe climatic conditions and to weaknesses in institutional capacity and capability.

Natural forests

Annual growth rates vary from 0.3 to 0.4 m^3 /ha/year in the Sahel zone; 0.5 to 1 m^3 /ha/year in the Sudanese zone; and 1 to 2 m^3 /ha/year in the Guinean zone.

- Participatory approaches involving local communities in natural forest management have achieved annual volume increments in the region of Siby at 1.017 m³/ha/year or 2.30 steres/ha/year and 7.195 m³/ha of deadwood; and
- Non-managed forests have a low average annual incrementy of 0.86m³/ha/year.

Income from natural forest is difficult to ascertain because commercial activities and networks for sales and marketing of forest are not well monitored.

Forest products

Forest products revenues are generated by:

- Consumption of fuelwood (more than 10 billion francs in 1997 for Bamako city);
- Industrial wood sales where controlled production is estimated at 60,000 m³; and
- Traditional and commercial trade of non-wood forest products for medicine, diverse range of fruits and plants, bushmeat, handicrafts and for improving life conditions of the rural areas.

Planted forests

Planted forests consist of trees deliberately planted or seeded for afforestion or reforestation, and composed of exotic of local species, one or two species, with even age class and regular spacing. From 1981, a vast afforestation project began. Village afforestation expanded in 1981 for one decade up until 1991 and achieved 40,000 ha and almost 4,000 km of linear plantings.

Trees outside forests

Trees outside forests contribute positively to food security and alleviation of poverty in providing various products (fruit, leaves, root tubers, animal fodder and wood), therefore improving household income. Additionally, trees outside forests contribute to improved agricultural productivity (shelter/shade), soil conservation, protection of crops, aesthetics and recreational areas in and around cities.

Agroforestry parklands: These cover 39 percent of the country and constitute the dominant system where various agro-ecological features according to the agro-ecological areas where they make up about 90 percent of agricultural land.

Fruit orchards: These are essentially mango and orange trees, primarily located in four main production zones.

Village and urban planted forests: These include roadside plantings, shaded trees, green spaces (parks and gardens) and greenbelts. Village planted forests were started in 1981 to satisfy the overwhelming fuelwood demand due to recurrent drought. They were assisted by the forest service that created nurseries.

Wood production from urban planted forests: This is a top priority for Malian organizations, NGOs, selected local groups, and administration frameworks to work on the problem of green space.

Agro-silvicultural plantings: These include wind-break, live fencing and the wildflower plantings. There is insufficient information on types of afforestation and reforestion due to variations in data in reports. The slightly better results of the total of planted forests up until 1999 show 60,296 ha; another report estimates it at 43,796 ha and 4,584 kilometres of linear plantings. There has been an emphasis in afforestation since 1998.

Legal, policy and planning framework

Since 1960, the legal and regulatory framework of forest resource management has undergone many changes. The texts still rest on the protection of resources and have a forbidding and repressive character. The periods of drought between 1972 and 1974 led to a revision of the forest texts and in particular an increase in penalties, to better protect forest resources. This gave the State restraining measures concerning people's access to forest resources.

A National Forest Action Plan was elaborated upon following a World Forestry Congress in Mexico in July 1985. The purpose was to stop the destruction of the forests and favour the use of sustainable resources to satisfy local and national needs. However, in 1992, the socio-political context stemming from March 1991 led to the *Direction des Eaux et Forêts* to work on a new national forestry policy. Then, in 1995, four Orientation Laws defined the conditions of forest resource management.

Criteria and indicators for sustainable management of forests

The criteria and indicators for sustainable management of forests currently used in Mali were adopted in the United Nations Environment Programme (UNEP)/FAO/Permanent Interstate Committee for Drought Control in the Sahel (CILSS)/*Centre de Suivi Ecologique* (CSE) meeting which took place in Dakar from 14 to 17 December 1999. This continued the work on criteria and indicators for sustainable forest management in a meeting in Nairobi, Kenya, from 21 to 24 November 1995. With the help of FAO and the *Direction Nationale de la Conservation de la Nature* (DNCN), the Government is validating these criteria and indicators and discussing and analysing available data regarding sustainable forest management.

Forest management plans

The main forest management plan guidelines include:

- *"Le Plan d'Aménagement"* (Management Plan) is for state-reserved forests that strongly use the traditional methods to simplify operations. It concerns forests with high commercial value that require high financial investments;
- *"Le Plan d'Aménagement simplifié"* (The Simplified Management Plan) is simplified for forests of communities and individuals to respond to needs and concerns of rural populations;
- *"Le Plan de Gestion"* (Management Plan) is an integral part of the Management Plan that programmes all activities throughout the duration of the management. It carries out technical and financial planning; and
- "*Le Contrat de Gestion*" (Management or Business Contract) is established by Article 38 of Law 95/004, concerning the implementation of management plans of reserved state forests.

Forest production and wood industries

Fuelwood and Charcoal: More than 90 percent of fuel consumed comes from wood products and needs are estimated at 0.9 m³/person/year. By the year 2010, it is estimated that about 7 million tons will be needed to satisfy woodfuel needs. An estimated 10 percent of all energy

needs in Mali come from wood energy, corresponding to almost 600,000 ha per year. Wood energy consumption generates more than 10 billion *Franc de la Communauté Financière Africaine* (FCFA) (7 billion FCFA for woodfuel and 2 billion FCFA for charcoal).

As in urban centres, use of fuelwood in the rural areas has recorded a growth of more than 60 percent. Household consumption accounts for 98 percent of production of fuelwood with an increase of roughly 18 percent between 1990 and 1998. The fuelwood consumption by industries and factories is low. Almost all production of charcoal is used at the household level with roughly 80,500 tons per year between 1990 and 1997. There is a trend of 10 percent increase per year. All production of charcoal is traded commercially. Rural areas are increasingly facing scarce raw material supply for fuelwood and charcoal production.

Construction wood and industrial roundwood: Industrial roundwood is restricted to 60,000m³/year. Production of construction wood is not restricted but at full capacity only represents 5-10% of sawnwood consumption. Logging currently supplies needs of small sawmills and shopkeepers using mechanized woodcutters (cutting rough lumber with chain saws).

About 75 percent of these wood products are self-consumed in rural areas and 25 percent are traded commercially in urban markets.

Traditional forest products: They are used in construction and handicraft. Rural villages have "round houses" and straw huts. The commercial trade of traditional forest products (domestic and export) are valued at about 10 to 15 billion FCFA in a normal year.

Non-wood forest products (NWFPs): Important products include harvest crops, fruit, grains, tubers, flowers, fruit-bearing forest trees, leaves of food plants, gums and resins, honey, the bushmeat trade (hunting) and fishing. The main harvested crops are for feeding the rural inhabitants, and primarily include: the African locust bean, the tamarind tree, and the baobab. Wild date, geb, borassus palm and doom palm are also harvested in the forest. There are also products for traditional medicine, raw material and fodder trees. Arabic gum is among the most important products, providing 190 tons a year.

The principal non-wood products are:

- Shea butter tree, production of 80,000 tons per year;
- Arabic gum, average 2,100 tons per year;
- Honey, production traditionally reaches 190 tons per year;
- Fruits of the African locust tree, almonds, tamarind;
- Leaves of the baobab;
- Doom palm and borassus palm;
- Herbaceous and tree fodder for animals;
- Incense and vetiver plant.

Hunting and fishing provide rural populations with their animal protein.

Fishing directly employs 70,000 people and indirectly almost 500,000 jobs, roughly 7 percent of the working population. This is a vital sector for the economy, generating almost 30 billion FCFA per year. It also contributes a 1.7 percent agricultural added value. Fishing products

represent 3 percent of GNP, that is, 8 percent of exports, making it the fourth most important sector after cotton, peanuts and beef.

Hunting products provide 20 to 50 percent of local needs for animal proteins, especially in rural areas. They are organized in associations with a traditional organization based on gerontocracy or influence. These associations protect hunting areas, safeguard activity and assure protection of the village against thieves and other criminals.

Beekeeping has contributed 300 to 400 tons of honey per year from 1997 to 1999. Wax production in the same period has yielded 3 to 6 tons per year.

Economic and social contribution of forestry

Forest resources satisfy fuelwood needs, construction wood and various non-wood products such as fruit and animal fodder. Economic activities linked to domestic and commercial trade generate more than 25 billion FCFA per year. Economic and social contribution of forestry is increasing, especially in crop products which have increased in revenue by more than 10 billion FCFA since 1999. In the same period, fuelwood, and industrial wood reached 5 billion FCFA.

Environment function of forests

In general, in addition to traditional products, forests provide environmental protection, especially in improving and maintaining soil fertility, protecting soils against forms of water erosion and wind erosion in the context of managing watershed and struggling against desertification.

Institutional framework

Five periods characterize the evolution of the forestry institutional framework:

From 1935 to 1960: During its creation, the Forestry Service responsibilities were to organize vast project sites of forest use to provide the Dakar-Niger train and the Bamako-Koulikoro boat with fuelwood.

From 1960 to 1970: The Forest Service operated under colonial legislation and was run by technicians in agriculture or war veterans. The Service was deemed repressive. In 1967, the National Forestry Foundation, and in the following year, the Forest Code (which constitutes the base of forest regulation) were created.

From 1970 to 1980: The forest estate accounted for 91 percent of national land area, of which 3.6 percent was reserved forest. The droughts of 1972 to 1974 led to the creation of the *Direction Nationale des Eaux et Forêts* in 1972. Its goals were the monitoring of forest estate, control over resource use, afforestation and reforestation, silvicultural works, evaluation of wood supply, and forestry research. Human resources were strengthened, managers were trained, and financial means increased (forest revenue, especially transactions of revenues from forest use, foreign funds coming for projects and the *Opérations de Développement Forestier* (Forestry Development Operations). There was an increase in logistic means relating to infrastructures (offices, lodgings, more than 4.5 million ha of reserved forests and 2,500 ha of planted forests, off-road and two-wheeled vehicles).

The Five-year Development Plan from 1974 to 1978 defined a National Forestry Policy with objectives based on the struggle against desertification and degradation of vegetative cover, and the improvement of life conditions of the populations in terms of food and energy needs.

From 1980 to 1991: The adoption of a new Forestry Code modifying the basic forestry regulations and previous legislation on bush fires and hunting. The issues concerned increase awareness of populations and decision-makers, carrying out vast afforestation and reforestation programmes.

From 1991: March 1991 led to profound changes in redefining policy on the environment, rural development and territorial organization, especially within the framework of centralization. The structures in charge of the management of natural resources were involved in defining new policy toward efficient and sustainable management of natural resources.

The Private forestry sector

The private sector is relatively recent as the State had exclusive management in the past. Not until 1995 did forest policy begin to favour private initiatives and the partnership of contracts signed between the Government and private operators in the framework of participative forest management including the French Development Agency (AFD), *Bureau d'experts pour l'auto-gouvernance et la gestion de l'environnement au Sahel* (BEAGGES). Other research institutes such as the *Service d'Experts des Ressources Naturelles* (SERNES), *Groupement d'intérêt* économique (GIE), *Aménagement pour la Gestion de la Forêt et de l'Environnement* (AGEFORE) became involved in creating implementing strategies of domestic energy and carrying out specific studies concerning forest management and the study of impacts on the environment.

Forest research

The Institut d'Économie Rurale (Institute of Rural Economy) (IER), the public establishment under the Ministry of Rural Development (MDR), conducts forest research. Additionally the "Ressources Forestières" and the "Equipe Système Programme Gestion des Ressources Naturelles" also conducts research in the forestry field. The IER was restructured at the beginning of the 1990s and its objectives were to act as a better support in response to users' needs, which are understood from development research. In 1994, a long-term research strategy was adopted and financed by many partners, including the Netherlands and Switzerland through bilateral assistance, and the World Bank.

Education and training

Mali has a complete education and training programme from the following Forestry institutions:

- The *Institut Polytechnique* Rural (Rural Polytechnical Institute) (IPR) of Katibougou to train managers;
- Water and Forest Engineering (5 years after high school);
- Advanced Technicians (2 years after high school); and
- The *Centre de Formation pour les Politiques Forestières* (Training Centre for Forestry Practices) (CFPF) for technical officers for Water and Forests.

Following a diagnosis of the situation of human resources involved in sustainable natural resource management, Mali defined a new training policy in line with sustainable development of the sector.

External collaboration in the forest sector

External collaboration in the forest sector revolves around institutional support for public services, government projects and community activities. Due to the numerous tasks assigned to the Department (which was responsible in the past for the equipment, land management, the environmental and urbanization) other Cabinet Ministries are responsible for planning and monitoring and evaluation. These include CPS (the Planning and Statistics Committee), The Permanent Technical Secretariat (STP), and the Project of Natural Resources Management (PGRN).

Multilateral international cooperation: Within the framework of ensuring sustainable natural resource management, Mali benefits from the support of the World Bank, UNICEF, UNESCO, UNDP, FAO, *Programme d'appui à la mise en oeuvre du schéma directeur de développement rural* (PAMOS), The European Union, IFAD, and the International Labour Organization (ILO).

Bilateral support: The Government receives bilateral support in forestry from the Netherlands, France, Switzerland, and the Federal Republic of Germany.

Other international support: Other support to the forestry sector is directed from the regional organizations - CILSS, West African Development Bank [BOAD], African Development Bank (ADB) and international NGOs such as IUCN, ICRAF, AGEFORE, SOS Sahel, CARE, WETLANDS, Club du Sahel, etc.

CAUSES AND EFFECTS OF DEFORESTATION AND DEGRADATION

Introduction

The analysis of the forestry sector reveals a constant degradation of forest and woodland flora and fauna. The relationship between people and the forestry service underwent a traumatic crisis from numerous conflicts of interests in terms of natural resource use. The forestry sector has not been integrated enough into the national economy nor has sufficient investment in forest products been made.

It is difficult to clearly ascertain the difference between direct and indirect causes for the phenomena because the issue of desertification, deforestation and forest degradation are very complex. Still, the main reasons include climatic conditions, bush fires, strong pressure exercised by forest use to supply fuelwood in urban centres and the competition for agricultural soils. The factors that have caused desertification and degradation of natural resources for 30 years can be crudely classified as either man-made or natural causes.

Strong pressure on ecosystems without any consideration of the possibilities of regeneration is at the source of deforestation and degradation. The consequences are the deforestation, forest degradation, loss of biological diversity, soil erosion, reduction of water resources and consequent lowering of income and increase in levels of poverty. Archaic and uncontrolled activities are responsible for the reduction of land productivity, the loss of forest biomass and biodiversity, the lowering of the groundwater, the increase in wind and water erosion, greater atmospheric pollution, increase in poverty and erosion of livelihoods.

Causes

Notwithstanding the lack of data on this phenomenon, causes of deforestation and forest degradation rapid population growth, precarious living conditions, increased poverty, uncontrolled harvesting (fuelwood, food and other wood and non-wood forest products), extension of crop lands to increase yields of cereal crops and income, systems of extensive livestock breeding, overgrazing, extension of urban centres, the development of infrastructure for roads, mining, and large hydro-agricultural developments.

Climate: Drought, reduction and irregularity of rainfall has been the situation for more than 20 years and among the causes of the decline of forest formation and continued degradation of natural resources.

Aridity, especially in the Sahara, affects 51 percent of the national territory where annual rainfall is irregularly dispersed and generally less than 200 mm. This makes the natural ecosystem particularly fragile. Even with these conditions and excessive human activities adding pressure, the vegetative species and animals have proven resilient.

Poverty: Rural populations are made poor by the low prices for farmer crops, the high prices of agricultural inputs, and the burden of agricultural credit. This results in misuse of natural resources (soils, water, flora and fauna) where there is free and easy access.

Mining: This deals mainly with gold washing linked to mining gold, especially in the South where forest formations have the highest wood potential and succumb to the strongest pressures. Both the traditional and modern methods of mining gold cause deforestation. Gold mining is practised in about 10-15 locations, covering between 5,000 and 10,000 ha each year. Between 50,000 and 150,000 ha are cleared or strongly degraded, adding damage to the surface due to human communities that live around or near the mining areas.

Irrigated agriculture development: The increase of irrigated rice crops is a significant factor contributing to deforestation. Rice production accounts for about 7 percent of GNP and is a priority in the agricultural development strategy of the country. The Government has opted to increase rice paddy production to 900,000 tons per year due to annual management of 6,000 ha of new agricultural areas.

Herding methods: Estimated livestock in 1995 was in excess of 13 million sheep and goats, and nearly 6 million cattle. Livestock breeding occupies an important place in the economy. However, traditional nomadic herding is generally of extensive stock raising that has led to degradation of natural resources through overgrazing.

Urbanization: Due to the erosion of rural livelihoods there has been a vast migration to large cities, particularly Bamako, which grew by a factor of 10 during the period 1972 to 2000. The extension of the cities damages the forest environment, particularly in Timbuktu where

reserve forest is now settled. Today it is estimated that the encroaching cities destroy about 50,000 ha annually of the national forest estate.

Road networks: The development of the network of road infrastructures, necessary to open up areas of production and for the circulation of goods and services, also contributes to the deforestation process. Considerable portions of the forest estate are deforested by construction works of national roads and opening up the rural paths. Each kilometre destroys an estimated 2.5 ha of forest area.

Misuse of forests: With increasing urban centers come increased human pressures from needs of forest products. This usually leads to over harvesting and foraging forest products (wood and non-wood) with consequences of forest degradation or even deforestation. There is a heavy demand for fuelwood and charcoal, industrial round wood and various other forest products to generate income and improve the quality of life in rural areas.

Effects

Reduction of the biomass and diversity of forest species: Significant clearings for the extension of crops, especially in areas of high population density, have incurred immediate deforestation and forest degradation. With this reduction, there is a loss of biodiversity, biomass and carbon absorptive capacity. Deforestation has been estimated at 300,000 to 400,000 ha per year, which combined with marginal soils, high population densities and severe climatic conditions, has very serious social, environmental and economic consequences. Needless to say, these also have serious impacts on loss of woodfuel, industrial roundwood, traditional wood and non-wood forest products.

Increase of erosion: Deforestation exposes soils to excessive sun damage and wind erosion and can result in excessive water runoff and loss, prevent infiltration of water to recharge groundwater layers, lead to siltation of soil porosity, reduce carbon sink capacity and reduce the environmental mantel and buffer values that forests provide.

Faced with the extent of desertification and forest degradation, erosion and atmospheric pollution also play an important role against wind erosion and advancing sand dunes. Despite the advanced state of forest degradation, forest formations play a very important role in biological and mechanical fixation of dunes. The North of the country is faced with serious threats of advancing sand dunes in certain cities, which contribute to reducing the effectiveness and value of hydro-electric dams and irrigation schemes along both the Niger and Senegal rivers. These have enormous impacts on loss of agricultural land and productivity.

Pollution: Due to pollution of the Niger and Senegal Rivers and the atmospheric disturbances created by dust hazes coming from the Sahara, air pollution is notable in the big cities. The Government has begun actions for the purpose of growing planted forests to store carbon and purify the atmosphere. However, the costs for doing so are high and remain a major constraint.

STATE OF KNOWLEDGE

Lessons learned

The lessons learned include:

- Mali's substantial natural potential has been undergoing severe deforestation and degradation, which has led the Government to undertake a series of actions to curtail the process. This political will has translated into many documents detailing the protection of the environment and the struggle against desertification, and into implementing institutional organizations that take on the responsibility, among others, of coordinating activities of the Environment National Action Plan;
- The approach relates the management of the environment inextricably with desertification issues and is based on participation of all actors (rural populations, private producers, professionals, technical supervisors);
- There is a huge collection of legal and regulatory texts, a national strategy to counter poverty, national programmes of rural development and support, and many projects in the management of natural resources and village lands, which all favour sustainable development of the natural ecosystems;
- Mali has a rich potential in forestry technicians and experts with experience and good will but human resources are dispersed in various state organizations or in NGOs. There is a lack of trained supervisors, and of necessary synergy for sustainable management;
- It is advisable to profit from these lessons by strengthening experience acquired in the silviculture and to note the mechanisms of applying new legal and regulatory text, above all in the current context of decentralization and local transfer of responsibilities. The logistic means of the DNCN would certainly contribute to highlighting the challenges concerning installing sustainable management of integrated natural resources and of efficient and successful production systems in response to issues of food security and desertification; and
- Marginal groups, and women in particular, should be considered at the conception and implementation stage of policy formation in the management of natural resources.

Gaps in knowledge

It is recognized that the gaps in knowledge include:

- Information on the status and trends in forest resources is obsolete (more than 25 years old) and concerns very limited geographical areas;
- Insufficient knowledge on land cover according to forest type (natural forest, planted forests, trees outside forests), standing volume, dynamics of growth, response of different types of natural and planted forests and trees to improved management (tree improvement programmes, application of modern silvicultural knowledge, forest protection, low impact/low intensity harvesting);
- The massive removal of unauthorized, uncontrolled and traditional or informal harvesting and utilization of wood and non-wood forest products in rural areas are not taken into account sufficiently;
- Insufficient knowledge concerning the extent of deforestation and degradation and their impacts (social, cultural, environmental, economic), particularly on food security and poverty alleviation strategies; and

• Insufficient attention and recognition of the immense richness in traditional knowledge of rural people tending the land.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Despite the increasing recognition of the benefits from forests, strong human pressure has continued to cause deforestation and forest degradation at alarming rates. If corrective measures are not immediately applied, there is a risk of creating an irreversible social, cultural, environmental and economic catastrophe where the livelihoods of both rural and urban populations will be severely eroded.

In search of appropriate solutions, the Government has reviewed the forest law to define a new national forest policy and to implement a strategy of domestic energy. Still, it does not have the proper means to elaborate on the Action Plan for 117 Reserved Forests of the National Territory, the protected areas of the State and of the communities. Therefore, it must rely on international cooperation, financial support and technical expertise of its partners to support its efforts. It is with urgency that the laws, policies, regulations and plans have to be translated through a more effective and efficient institutional framework into targeted priority actions in the field.

Further, it is reflecting on a form of collaboration with those responsible in the decentralized communities, to guarantee their interests in the framework of a better management of natural resources. The Government authorities need to identify simple intervention techniques that are operational, inexpensive and transferable in the context of decentralization. The current methods are lengthy and do not generate enough income for rural populations, thereby leading to misuse of natural formations.

Participatory methods of planning, managing and monitoring of forest resources have been insufficiently embraced so there is only limited engagement of rural communities striving to achieve sustainable forest management.

Recommended actions

Actions relating to issues and choices of development linked to legislative and administrative aspects are:

Choice and development issues

- Adopt participatory planning approaches to determine the expertise, needs, vision and expectations of rural populations to combine a top down and bottom up strategy to forest management;
- Identify needs in human resources, budgets, equipment and strategies aimed at implementing development options of the sector; and
- Implement a series of village demonstration or test sites, representative of main contexts encountered that relate to natural resource managements (in particular, forestry).

Intersectoral collaboration

- Set up networks of systematic exchange of knowledge and new ideas with the full sprectrum of main stakeholder goups;
- Widen multi-disciplinary and inter-sectoral dialogue across the public service and State projects and include community representatives; and
- Strengthen forums of communication to guide planning and evaluation.

Legislative, policy, institutional and administrative

- Review the legal, policy, regulatory and planning framework to reflect the vision, key initiatives, major stakeholders and target areas and the decentralization policies of the Government;
- Analyze the strengths, weaknesses and opportunities of decentralization concerning the management of natural resources and strive to reach a balance of central and local administrative planning, management and monitoring to suit the unique conditions prevailing, supported with the necessary delegation of authority, responsibility and resources (budgets, personnel, equipment, vehicles);
- Review the role of the public service, private sector, NGOs, IGOs, donors, communities and other stakeholders in the management of forests;
- Establish an institutional structure in the public service and mechanisms of collaboration with other stakeholders which can effectively and efficiently deliver the necessary support services at all levels to apply the priority actions to the priority target groups and areas;
- Conduct a human resource development plan to quantify the needs of the public sector for professionals, scientists, technicians, artisans and support personnel and to identify the specialist expertise needed; and
- Correct omissions or gaps in re-examined forest texts where afforestation or reforestation is practically ignored.

Resource management

- Evaluate the most appropriate mechanisms of forest management, successful species and varieties according to different agro-ecological conditions and purposes, document and share this knowledge with a wide range stakeholders whilst incorporating this information in implementation guidelines and codes of practice;
- Conduct a national forest assessment that would relate to reality and be a reference for a viable analysis of status and trends in forest cover and monitoring and reporting of criteria and indicators for sustainable forest management;
- Create a computer network of DNCD with regional representations to facilitate exchanges between the operating structures in the country;
- Pay greater attention to cultural diversity as well as rights and traditional knowledge of tree culture and melt this knowledge with scientific knowledge in implementation of policy and plans in a prudent manner;
- Focus the methods of collecting quantitative information on non-wood forest products, according to different times of the year and socio-professional categories (men, women, children) for the purpose of obtaining reliable statistics; and

• Strengthen organizational capacities of traditional medicines and develop mechanisms to establish credibility with their relationship with modern medicine. Make regulations concerning pharmacopoeia certifications for the products.

Research

- Stimulate the frameworks and networks of dialogue between forest researchers, professional foresters, local communities and other stakeholders in the forestry sector;
- Instal a network of permanent sample plots in all forest types for a better understanding of the dynamics of growth of various types of forest settlement;
- Introduce modern forest equipment, including computers and associated training for the treatment of statistical data and install a system to motivate those responsible for statistics;
- Build the technical systems of reference on methods of pruning of wood fodder trees; and
- Develop tools to relate management of selected trees on selected sites with the quantity and quality of fruit or animal fodder production.

Training

- Design a multi-level education and training programme to ensure upgrade training and graduation of the necessary, qualified professional, scientist, technician, artisan and other support staff for the sector; and
- Strengthen the experience acquired from the environmental education programme and extend it to all other sectors of activities.

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (FAO) GOVERNMENT OF THE THE REPUBLIC OF NAMIBIA

FAO-NETHERLANDS PARTNERSHIP PROGRAMME SUPPORT TO SUSTAINABLE FOREST MANAGEMENT IN LOW FOREST COVER COUNTRIES

ROLE OF PLANTED FORESTS AND TREES OUTSIDE FORESTS IN SUSTAINABLE FOREST MANAGEMENT

THE REPUBLIC OF NAMIBIA COUNTRY STUDY REPORT

EXECUTIVE SUMMARY

By

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Windhoek, Namibia, 24 April- 21 May 2002

FOREWORD

According to FRA 2000³⁰, 71 countries, most developing, have a forest cover of less than 10 % of their land area. The open-ended International Expert Meeting on Special Needs and Requirements of Developing Low Forest Cover Countries (LFCCs) and Unique Types of Forests, held in Teheran in October 1999, agreed to prepare proposals to secure international support to sustainable forest management in LFCCs. The Netherlands approved support to targeted outputs and activities as a follow up to the "Teheran Process". Country studies for Africa and the Near East regions were selected to outline the causes and effects of deforestation and degradation together with lessons learned and priority needs to enhance the role of planted trees. The Republic of Namibia, as one of the country case studies selected, is detailed in this report.

OVERVIEW AND COUNTRY CONTEXT

Brief geographical description

Located in the south-western part of Africa, Namibia covers a total land area of about 830,000 km² sharing boundaries with Angola and Zambia in the North, Zimbabwe at the eastern end of the Caprivi strip, Botswana in the East, South Africa in the South and southeast, and the Atlantic Ocean in the west for about 1,600 km. It covers nearly 3 percent of the total land area of Africa but accounts for only 0.2 percent of the whole African population.

Government and administration

The Government of the Republic of Namibia was officially recognized as a new, independent nation on 21 March 1990. The Namibian Constitution, unanimously adopted by the 72-member Constituent Assembly on 9 February 1990, lays down the division of powers between the legislature, the executive and the independent judiciary. Seventy-two members (elected for a 5-year term) of the National Assembly, and members (two from each geographical region) of the National Council, form the Namibian bicameral legislature. The executive branch of Government is headed by the President, elected by direct popular vote for a term of 5 years. The Cabinet headed by the Prime Minister assists the President. The judicial power, "subject only to the Constitution and the law", is shared by a Supreme Court, a High Court and a number of Magistrate and Lower Courts.

Policy and legal framework

The Government of Namibia has globally acknowledged the urgent need to conserve ecosystems and species within the country through Article 95:I of the Namibian Constitution that explicitly incorporates that the State shall "adopt policies aimed at maintaining ecosystems, ecological processes and biodiversity for the benefits of present and future generations".

The National Planning Commission is the main institution responsible for planning national development in Namibia. The National Development Plan II of Namibia 2000-2005 took into account the strategic objective and proposed actions for development of the forestry sector.

³⁰ Forest Resources Assessment.

Environmental considerations

The features of the Republic of Namibia are

Geology and soils: The complex geology of Namibia can be summarized as follows:

- *Namib Desert*: an 80 to 100 km-wide geo-ecological zone parallel to the coast of the Atlantic Ocean and bounded eastwards by the Namib escarpment that covers 16 % of the country's land area and receives less than 100-mm annual rainfall;
- *Namib escarpment*: a narrow transition zone between the desert and the central highland plateau, characterized by a highly variable topography with many ephemeral rivers and mountains;
- *Central plateau*: extends the full length of the country from north to south where most rivers in Namibia have their major watersheds. The north western Central Plateau presents a rugged topography with broad valleys and inselbergs whereas the South is a flat stony plateau with few deep valleys; and
- *Kalahari sandveld*: east of the Central Plateau is characterized by deep sandy soils on top of bedrock and flat topography. The soils are mainly thick red layers, except in the North where they are brittle alkaline, and in the northwest where the sandveld forms low, undulating dunes and shallow ephemeral river valleys.

Climate: Namibia's climate is characterized by the scarcity, extreme variability, and unpredictability of annual rainfall, usually from November to April (summer). Temperatures in Namibia vary greatly from well over 50° C and under 0° C being recorded; daily fluctuations are greatest in the zones with lesser vegetative cover, and, on the contrary, vary little along the coast and in the northeast. Namibia has the second driest climate in Africa only to the Sahara.

Biological resources (habitats, species and biodiversity): Even though Namibia is one of the world's driest countries, it is a nation of impressive, often unique habitats and species. The dense and rich forests of the north give way to open and low formations in the centre, while they are rare, fragile and scattered in the south. There are 5,500 species and sub-species of flora, 20 of which are endemic, 240 rare and 103 very rare. Fauna includes 75 species of reptiles, batrachians and fish, 45 of which are endangered (26 mammals, 10 reptiles and 9 amphibians). The freshwater ecosystems have a high ecological, economic and social value. The ocean and coastal environments are among the worlds' most productive because of the Bengali Current system. These ecosystems face threats from habitat alteration through agriculture, human settlement, over-fishing, over-grazing, pollution from offshore oil exploration, industrial development and diamond mining.

Land resources: Although rainfall varies from below 50 mm in the south-west (coastal desert) to 700 mm in the North and north-eastern (semi-humid regions), Namibia produces a considerable amount of woody biomass from its three main vegetation types: deserts, savannas and woodlands that occupy 16 percent, 64 percent and 20 percent of the land, respectively. Most of the woody biomass is found in the savannas areas. Land use is: agriculture 52 percent; open communal land 32 percent; State protected nature areas 12 percent; restricted for mining 3 percent; and tourism 1 percent. Agricultural production has been mainly practised on the communal areas with very little irrigation along the northern rivers. Little investments, has been done to promote arid land agriculture in parts of Namibia. The main

constraints for this lack of investment can be attributed to the scarcity of fresh water, lack of secure land tenure and the prohibitive costs associated with the exploitation of saline fossil ground water sources. The current land bill that promotes the use of communal title deeds as collateral for joint credit loan could enable the development of agricultural projects in horticulture, and livestock production in Northern Namibia.

Water resources: The availability of water in Namibia dictates the patterns of human settlement and migration and also of occurrence of fauna and flora throughout the country for it is undoubtedly the country's most limited and, ultimately, limiting natural resource. There are very few perennial rivers variably flowing in the northern (Kunene, Zambezi) and southern (Orange) borders. During the rainy season, there is much ephemeral surface water that is briefly available in some areas of the country where ground water tables have dropped, specifically in the central and western regions. Fossil ground water is widely exploited and, in general, groundwater sources are limited in quantity as well as quality (high salinity and thus unusable for irrigation and human consumption).

Population, demography and employment: Namibia has a present population of 1.8 million. About 60% of the population lives in the northern part of the country, where rainfall exceeds 400 mm/year and the majority live in 30 percent of the country land area. Twenty-eight percent of the population are urban. The Namibian population is young with more than 42 % under age 15, with a yearly growth rate of 2.6 percent between 1991 and 2001, and a mean fertility of 6.1 children per woman. The agriculture sector provides 37 percent of total employment, and the wholesale and retail trade sector provides only 8 percent. An average annual employment increase of 22 percent is estimated over the period 1999-2006, at the same rate as population growth.

Economic situation and consumption patterns: Agriculture (accounting for about 40 percent of GDP in the early 1990s) and mining (about 11-25 percent) are the most important sectors in Namibia, which also has important commercial marine fisheries, subsistence inland fisheries and tourism activities. The national economy depends on both imported goods (food, manufactured products, and technology), and exports (minerals, beef and fish). The subsistence agricultural sector contributes only 1.5 percent of GDP, but is essential to the livelihood of about 70 percent of the population.

Gender equality: In 1998 the Namibian Government developed its National Gender Policy to achieve effective partnership towards gender equity in the country. This legal framework was followed by the development of a National Gender Plan of Action that seeks to promote gender equality through empowering woman in information, law and policy reform, and equal participation in the political, economic, social and cultural development of the nation.

Food security: There is widespread under-nutrition among children under five years. Over 66 percent of the population suffer from disorders caused by moderate to severe iodine deficiencies. The Government is addressing these issues through the Food Security and Nutrition Development Programme.

Energy: Liquid fuels, electricity and coal account for 82 percent of energy consumption, of which petroleum fuels account for 70 percent. Traditional wood, charcoal and dung account for only 18 percent, even though they are the main energy source for 60 percent of the population. Mining and fishing are energy intensive industries that account for the high energy-consumption ratios. Subsistence consumption of fuelwood is estimated at 520,000 tons/year and

commercial consumption at 153,000 tons/year. For rural people, fuelwood will remain the principal source of energy. Because of the high rate of population growth the demand for fuelwood is anticipated to increase.

CURRENT STATUS AND MANAGEMENT OF FORESTS

National forest inventory and information systems

Information on forests and other woody biomass vegetation types is very limited. However, the recently formed Directorate of Forestry (DoF) works in cooperation with the Namibia-Finland Forestry Programme to manage and perform scientific research for necessary data and information on forestry management activities. Namibia's vegetative cover includes: deserts 16 percent; savannas 64 percent; and woodlands 20 percent. Only woodlands areas in the northern and north-eastern parts of the country are considered as forest areas.

Deforestation

In 1995, forests covered 12.4 million ha and during the period 1990-1995, the estimated annual loss of forest cover was 42,000 ha giving an annual rate of deforestation of 0.3 % (FAO, 1997), comparable to the information from the Ohangwena region in Northern Namibia where, using satellite images and aerial photography, forest cover change has been estimated to be around 0.5% between 1981 and 1992.

Characteristics of the Namibian national forest

Natural forests: The natural vegetation consists of semi-closed woodlands and several variants of acacia-dominated savannas. The highest forests are found along the rivers in the north-eastern parts of Namibia and mopane woodlands in wetter Eastern Caprivi.

The four northern regions where forest inventory work has been completed are:

- *Caprivi region:* This region covers 2,009,527 ha in the north, most eastern part of the country and is classified as "Tree Savanna and Woodland" vegetative zone. Soils are sandy and landforms consist of dunes, dune valleys. Forests cover 1,632,743 ha and savanna 15,216 ha, but about 5 percent of the forest category and 18 percent of the savannah are extensively cultivated. The whole area has an average of 87 trees per hectare (total number of trees is 142,798,780) and a mean volume of 21 m³ /ha. The two main commercial saw timber species are *Pterocarpus angolensis* and *Baikiaea plurijuga*, the former of which has been overexploited;
- Oshikoto Region: This region covers 2,656,523 ha divided into commercial farms (957,049 ha) and communal lands (1,699,474 ha, of which 53,073 ha are grasslands and oshanas. Mean number of trees per hectare is 129, with mean volume of 12 m³/ha. There is no forest industry in the region and the wooded areas provide fuelwood, poles and non-forest products including fodder;
- Oshana Region: This region, situated in the north central part of the country, covers about 510,000 ha but has the highest population density in Namibia with 25 inhabitants /km². With a flat topography, and predominant sandy soils, the Oshana region has a relatively poor drainage system. Average rainfall varies from 180 mm in the southern part of the region to 710 mm in its more populated northern part. Eighty percent of the area investigated has little or no woody vegetation. The reasons for this lack of forests

or woodlands in this region include deforestation due to over-harvesting and poor soil conditions that prevent the woody vegetation from developing into tree size; and

• *Omusati Region:* Situated to the west of the Oshana region covers 1.39 million hectares and has an annual rainfall ranging from 350 mm to 500 mm. The topography of the region consists of an extremely flat plain, except in its western most part. For the whole region, there is an average 33 trees/ha, total tree volume amounts to 4,449,500 m³ and mean volume per unit area is 3 m³/ha.

Planted forests: There has been very limited development of planted forests (300 ha) due to a lack of available land, harsh climatic conditions and poor soil properties. The former colonial rulers favoured ranching in these conditions. Plantations of Eucalyptus in Kavango region have demonstrated poor growth and yield. However, the *Development of Forestry Policy for Namibia* and the *Forests Act, 2001* advocate tree planting, primarily through agroforestry systems in meeting rural peoples' needs and to support their livelihoods. A lack of research, training and demonstration has hampered development. A target of 10,000 ha of plantations and woodlots for construction poles, fencing materials and indigenous fruits is proposed by 2020.

Trees outside forests: The importance of trees outside forests is highlighted in the *Forests Act, 2001* and the *Nature Conservation Ordinance Amendment Act, 1997*. Both forbid wilful destruction of trees and other woody vegetation on agricultural lands. *Customary laws* also forbid destruction of fruit trees and penalties are imposed in traditional courts if breached. Trees outside forests mainly occur on agricultural fields within human settlements and trees present in scattered formations in savannas and arid zones. Most Namibians live in the north where they have traditionally converted woodlands, savanna, and strips of riverine lands into cultivation fields and pastures. A wide range of species are grown, each with specific values such as those producing fruits, oil nuts, medicinal products, or the ones conserving or enhancing soil fertility, and shade trees are often left in agricultural fields as sources of raw material for crafting or medicinal products. There are also trees planted in community forestry activities. The main "systems" of trees outside forests in Namibia are:

- *Homestead plantings*, which consist mainly of shade and fruit trees, which have high value to warrant their intensive care, especially in the years of establishment when scarce water has to be spared for their tending;
- *Farm woodlots*, which the Department of Forests is currently promoting among individual farmers and community groups;
- *Live fencing*, which exists traditionally but is not as widespread compared to the use of wooden pickets, palisades and thorn bush types of fences to protect crop fields; and
- *Urban forestry*, which includes trees in parks, public gardens, and along roadsides, and are the responsibility of the Municipal Affairs.

Environmental values of forests: Forest areas and woodlands of Namibia contribute to the fight against desertification by preventing soil losses due to wind and water erosion. These forested areas play a very important role in maintaining water quality and in protection of watercourses. By also providing habitats for many plant and animal species, these natural ecosystems contribute to the conservation of the country's rich biological diversity. In some areas, woodlands are sanctuaries for traditional worshippers and also participate in enhancing scenic beauty of rural landscapes, in mitigating climate or in regulating air pollution in urban centres.

Preservation of biodiversity: The Department of Forests is a key member of the National Biological Diversity Task Force along with all the Directorates in charge of Parks, Wildlife, Environmental Affairs, and the National Botanical Research Institute. Each of these institutions has a biological plan of action in its national programme. The Department of Forestry contributes to the conservation of biological diversity by establishing community-based forest reserves and by creating key forest types that are not currently in the nationally recognized protected area network. The targeted goal is to increase the combined size of protected areas that is now 8% to about 10% of the total land area.

Initiatives toward Sustainable Forest Management

The Department of Forests has adopted several tools from the sustainable forest management toolbox, including:

Criteria and indicators for sustainable forest management: In October 1999, the Department of Forests with the Namibia-Finland Forestry Programme developed a set for Criteria and Indicators for monitoring and evaluating progress towards sustainable forest management. The framework used was an adaptation of that used for countries of the Southern Africa Development Community (SADEC). These were classified according to criteria and indicators for forest resources, environmental values and socio-economic benefits. The framework has been defined, but the challenge is now to ensure that forest and woodland managers apply these in the field.

Strategic planning: Forestry activities are planned and implemented by the Ministry of Environment and Tourism (MET) and Department of Forestry (DoF). The Department of Forestry derived the first *Forestry Strategic Plan for Namibia*, 1996 as the long term planning framework for the forestry sector. The MET also handles wildlife, environment and tourism, which complement the operational activities of the forestry sector with a wider mandate for sustainable natural resource management.

Management plans: Management plans are necessary to detail medium-term plans for defined geographic areas, to be managed for specific purposes. Management plans should detail the forest resource, institution (public or private), socio-economic aspects of the rural communities and environmental contexts, and plan operations and sustainable developments tailored to suit these covenants.

Participatory approaches: The DoF has recognized the importance of adopting participatory planning approaches to understand the needs and aspirations of rural populations who equally have a desire to live in harmony with their natural and planted forest resources. Finland, Germany and Denmark have provided external assistance to support the Government to strengthen capacity and capability in this process.

Codes of forest management and harvesting practice: These are regulated by the Namibian Forestry Strategic Plan of 1996 and the Forest Act of 2001. Harvesting of woody forest products is controlled through a permits system from the DoF. To date there is no legislation on harvesting of non-wood forest products (NWFPs).

Certification: Charcoal, marula oil (from kernels of *Sclerocarya birrea*) and ground roots of devil's claw (*Harpagophytum procumbens*) for medicinal purposes have been certified through the Forestry Stewardship Council for export to Europe and the USA.

Forest production

In 1996, the DoF estimated total economic value of forest resources as N \$1,058.2 million.

Wood products: Consumption of industrial wood (fibreboard, plywood, sawn wood, veneer sheets and pulp) has increased between 1995 and 1998. This is due to construction booms after independence. However, the Government seeks ways to reduce its high import bill from the SADC region.

Fuelwood and charcoal: Most fuelwood and charcoal production comes from savanna and woodland supply. Despite a permit system to harvest, transport and market wood, an estimated 50 percent is still harvested illegally. The total (including charcoal production) commercial consumption of fuelwood is about 152,864 tons per year; subsistence consumption in rural and urban areas is about 519,467 per year. Namibians do not use much charcoal (supplied by the Acacia) compared to other Africans. Yearly production of charcoal is around 12,000 tons, which are mainly exported to Germany, United Kingdom, South Africa.

Non-wood forest products (NWFPs): In Namibia, NWFPs traded in informal and formal markets include fruits and their by-products (wines, liqueurs, nuts and oil), Mopane worms, grass, NWFPs (such as marula oils for food and cosmetic and devil's claw for medicine) have gained access in the international market arena. Further, NWFPs of plant origin can be classified into three major groups: food products, medicinal plants and leaves for weaving and decorating. Ecotourism is is a rapidly expanding market. Over 500,000 tourists visited in 1998, with a growth rate estimated at 20%/year.

FOREST SECTOR

The institutional framework

Ministry of Environment and Tourism (MET) The MET is the umbrella Ministry responsible for forestry in Namibia and includes four Directorates: Forestry; Environmental Affairs; Parks and Wildlife Management; and Tourism.

Directorate of Forestry (DoF): The main duties of DoF are:

- Develop and implement appropriate policies, legislation and strategies for the forestry sector to achieve sustainable management of all types of forests and woodlands;
- Monitor and assess resources, conduct research, and control over utilisation, processing and trade; and
- Conservation for national and global benefits.

Notable achievements of DoF have been:

- National Forestry Strategic Plan in 1996, the main instrument of policy implementation and the basis for donor support to the sector;
- Adoption of an operational planning system, which develops mid-term strategic objectives, defines, on an annual basis, major result areas and sets targets that are used

to manage the performance of individual staff, starting from the Director to District Forest Officers; and

• Development of a Management Information System consisting of six priority systems dealing with forest permits (3), management reporting, forest inventory, and human resource development.

Until 1987, all forest activities planned and organized by the forestry frameworks were implemented by the State. Since then, the tendency has been to encourage private companies to invest in forest developments. Forest management studies are carried out primarily by national and international educational institutes. The General Director of Forestry and the forestry districts supervise inventories, study and approve management plans, carry out tree marking operations prior to forest exploitation, and implement management plans.

Other institutions: Other institutions responsible indirectly for different aspects of forestry include:

- The National Botanical Research Institute (herbarium);
- Directorate of Environmental Affairs (Environmental Impact Assessments);
- The Ministry of Trade and Industry (forest products import and exports); and
- Various NGOs such as CRIAA, DRFN, DAPP.

Cross-sectoral links: The following cross-sectoral linkages exist:

- *Ministry of Finance* determines the amount of financial resources allocated to the Directorate of Forestry for implementation of public forestry programmes;
- *National Planning Commission* is responsible for the preparation of development budgets and co-ordination of the international community support towards national development efforts;
- *Ministry of Agriculture, Water and Rural Development* executes specific programmes that have agroforestry components, and has a training extension service; and
- *Ministry of Lands, Resettlements and Rehabilitation* is responsible for the implementation of the proposed Land Use and Environment Board, Land Boards and Land Tenure.

Forestry research

The DoF is the institution responsible for forestry research and is seconded in the achievement of its mission by the National Botanical Research Institute, the Desert Research Foundation of Namibia, and the Department of Agriculture of Polytechnic of Namibia.

The Research Division within the Directorate of Forestry has an insufficient number of trained and experienced staff and limited information on past research activities carried out during the German occupancy and during the South African Mandate Period. Its activities include:

- Creating and commissioning a national research and tree seed centre in 1997 at Okahandja, with offices also created in Otjiwarongo, Gobabis, Keetmanshoop and Opuwo;
- Current work on projects on mopane woodland management and marula provenance trials; and

• Planned research activities on the selection and genetic improvement of chosen indigenous fruits trees, and on long-term monitoring of forests using permanent sample plots – pending funding support.

Forestry training

The DoF has made noticeable efforts in human resource development by funding training for its staff members either to the MSc or to the BSc level, in addition to the diploma or technician level training. Six staff members have successfully completed their MSc programme and are currently working at the DoF which envisions that, by the year 2005, 70% of all professional posts and 100% of all technical posts will be filled by appropriately trained Namibians.

Forest industries sector

There are 88 forest-based industries in trade and utilization of forest products in sawmilling, furniture and fixtures, and pulp and paper. However, the forest resources of Namibia are insufficient to support large scaled industries, so the larger scaled sawmilling and pulp and paper depend upon imported raw materials. Smaller scaled mobile sawmilling units and cottage-based industries are more suited to the conditions prevailing. More focus is needed in training artisans and marketing access to assist the smaller units. The Government wish to promote a formal wood industry based upon wood and non-wood forest products that will contribute more significantly to the economy.

Legislative framework

Forest Act, 2001: The legal framework is encapsulated in the *Forest Act, 2001* which deals with management issues, the need to plant trees where necessary in Namibia in order to conserve, protect soil and water, and to enhance the natural environment.

Other legal and regulatory instruments: In 1994, Namibia's Government initiated a National Programme to Combat Desertification (NAPCD), and three years later, ratified the Convention to Combat Desertification in 1997. NAPCD aims to combat the process of desertification by promoting the sustainable and equitable development of natural resources. The main objectives of this programme are to:

- Establish mechanisms to collect and analyse information regarding desertification issues;
- Identify key players and improve their capacity;
- Develop integrated planning strategies at all levels on the basis of clearly defined policies;
- Implement appropriate interdisciplinary research programmes;
- Provide appropriate training and education according to needs at all levels; and
- Empower natural resource users and managers to plan and implement sustainable management practices.

Planning framework for forestry

Centralized planning: The DoF is the administration solely responsible for planning and policy decisions, development planning pertaining to the forestry sector. However, the

Government has developed the following three major policy changes aimed to correct this centralist model of natural resource administration:

- *New communal land bill* that has provisions for regional land boards and regional land use plans, and that also recognizes the right of rural associations to seek investment credit by using a communal title as collateral;
- *Forest and Wildlife Laws* that allow local institutions to manage community forest reserves and wildlife conservancies, with resource tenure or usufruct rights on the basis of agreed arrangements with central or a regional or local government; and
- *Policy of decentralization*, under implementation by the Ministry of Regional, Local Government and Housing. Regional and Local Governments will be in control of the planning, management and revenues of forest resources in their localities. The Central Government will remain responsible for policy and supervision of its implementation, for law enforcement, and for co-ordinating forestry development planning at the national level.

Forestry Strategic Plan of 1996: This was the first comprehensive post-independence strategic document elaborated in Namibia and is the major instrument to date used in implementing policy and is also the basis of donor support to the sector. The strategic plan has four programme areas namely, Institutional Capacity Building, Community Level Management of Natural Forests, Farm Forestry and Environmental Forestry.

Namibia's Forest policy puts an emphasis on poverty alleviation measures designed to relieve pressure on the environment. The goals of this strategy include:

- Intensifying agricultural production (crop and livestock) through innovative land-use strategies that hold the possibilities of increasing farm productivity and incomes;
- Developing small and medium manufacturing enterprises based on wood and non-wood forest raw materials;
- Conserving the wildlife habitat as the base service for development of tourism industry; and
- Developing a sustainable rural economy that the country is capable of supporting indefinitely.

The four basic aims of the forest policy flowing directly from the poverty reduction strategy are to:

- Reconcile rural development with biodiversity conservation by empowering farmers and local communities to manage forest resources on a sustainable basis;
- Increase the yield of benefits of the national woodlands growing stock through research and development, application of silvicultural practices, and protection and promotion of requisite economic support projects;
- Create favourable conditions to attract investment in small and medium industry based on wood and non-wood forest raw materials; and
- Implement innovative land use strategies, including multiple use conservation areas, protected areas, agroforestry and a variety of other approaches designed to yield forestry global benefits.

International conventions

With regard to International Environmental Treaties, Namibia, which joined the United Nations as an independent state only in 1990, is already a signatory to, or ratified major environmental treaties or conventions including:

- Conventions on Climate Change and on Biodiversity at the Rio Earth Summit;
- Subscription to the principles of UNICODE and proposed actions of the IPF and IFF processes;
- Control of the Trade in Endangered Species (CITES);
- Convention for the Protection of the Ozone Layer in 1993;
- Wetlands Convention in 1995; and
- Convention to Combat Desertification in 1997.

External assistance and cooperation

External assistance and cooperation in the forestry sector include:

- Finland in the Namibia Forestry Programme which ensures institutional development, participatory integrated forest management and information and planning;
- Germany which provides assistance through the NGO German Development Service– GDS/DED and SADC/GTZ, to two Community Forestry Projects in the preservation and sustainable use of the natural forests by empowering them to secure their forests against illegal exploitation and to derive benefits directly;
- Denmark initiatives to address unsustainable land management practices and focus on interaction among people, livestock and the natural environment; and
- FAO, USAID, SIDA, INCD Secretariat and the World Bank, at the international level, provide financial assistance and technical support to Namibia's National Programme to Combat Desertification.

CAUSES AND EFFECTS OF DEFORESTATION AND DEGRADATION

Indirect causes

Land tenure and user rights: There are about 6,500 freehold commercial farming units averaging 5,800 ha per holding that occupy around 45 percent of the land in the Central Plateau Region. The majority of the remaining Namibian population (60 to 70 percent) lives on 25 percent of the country land area, in communal lands situated in the North. This large concentration of people in a rather small portion of the country land areas has put a huge pressure on natural resources. This is more so in forested areas where lands have been cleared for homestead and farm establishment, wood harvesting for rural domestic purposes (cooking, construction, heating, lighting) and for urban demand (building, fuel, carvings), frequent bush fires, and to a lesser extent, overstocking.

Land redistribution in Namibia is an important issue with a strong racial dimension and there is an urgent need to promote some form of land redistribution in order to make agricultural development more equitable. This will need a new land use legislation to end the ongoing principle of "willing seller-willing buyer", and to equitably apportion "property" rights.
Water tenure and use rights: The dry climate in Namibia leads to severe water shortages in many parts of the country for often long periods of the year. There is no documented information linking scarcity of water in Namibia to deforestation and land degradation.

Poverty: The issues of poverty and food security are the driving forces of many activities leading to deforestation and land degradation. The Namibian Government is engaged in promoting enabling policy environments that reach out to the people in rural areas and has taken steps towards solving this crucial human aspect of the environment. Important aspects of poverty include:

- Unchecked population growth and limited environmental resources leading to acute shortages of fuelwood and building materials;
- Rural predominance of subsistence living and heavy dependence on the forest and woodland resources for survival, particularly during economic hardship; and
- Legal and customary and regulatory instruments have been introduced to address poverty issues including the National Programme to Combat Desertification.

Direct causes

Direct causes of deforestation and forest degradation in Namibia include natural causes and the ones related to human activities.

Natural causes: It is very difficult to identify natural causes of deforestation and land degradation in Namibia, characterized by an arid climate exacerbated by low and erratic rainfall. The inter-annual variations in rainfall may lead, in the case of prolonged drought periods, to the decline of some vegetative cover in the most vulnerable environments.

Causes linked to human activity: Misuse of natural resources: The major factors involved in the mismanagement of natural resources in Namibia include:

- Rapidly growing human population; and
- Socio-economic factors, especially poverty.

The concentration, for too long, of many people and livestock has led to overgrazing, deforestation and land degradation, mainly in the northern parts of Namibia. In most of these rural areas, woodland resources are exploited well above their regenerative capabilities. Likewise, rangelands are used without any consideration of their carrying capacity.

Man-made causes

The main man-made causes include:

- Forest/veld fires destroy large areas every year. In 2001, 5 million ha were burned in the country with 66 percent of this area situated in the Caprivi, Kavango, Otjozondjupa and Omaheke regions;
- Cross border fires with Angola, Zambia and Botswana are also a major concern;
- Land abandonment in Namibia is not common, however, inadequate agricultural practices can lead to extreme depletion of land fertility, and the subsequent temporary abandonment of cropping areas can lead to loss of woody vegetative cover through its conversion to agricultural fields; and

• Infrastructure construction, including dams to generate hydroelectric power, unregulated creation of artificial water, new residential developments, particularly around urban areas.

Effects of deforestation and forest degradation

The main effects of deforestation and forest degradation are the yearly loss of productive land, the loss of NWFPs along with income they used to generate. These losses accentuate or create poverty, which promotes further desertification. This seemingly cyclical aspect of desertification has raised awareness among natural resources managers that deeply consider the poverty alleviation issue and to the implication of all stakeholders, especially local grassroots populations in the combat against deforestation.

It is very difficult to quantify the effects of deforestation in Namibia since it lacks of a national figure about the rate of deforestation; the only available estimate provides a 5 % annual decrease in forest cover change.

STATUS OF KNOWLEDGE

Lessons learned

Namibia can look back on a decade of new interventions and testing of various approaches to community-based natural resource management, rural development, small and medium enterprises (SME) promotion, conservation and sustainable use of biodiversity, all ultimately adding up to the struggle against deforestation and desertification. The major lesson learned is that all these issues relate ultimately to livelihood security and poverty alleviation.

Other key lessons learned in the sector include:

- Forest and management techniques developed, demonstrated and documented;
- Need for quality education and training of personnel to impart knowledge and technology;
- Need for sound and consistent policy, legislation and planning promoting partnerships, participatory and integrated approaches and to encompass wider land-use management issues; and
- Any form of rural development must consider making the best use of the existing traditional knowledge and know-how.

Initiatives recognized as being valuable in sustainable management of forests and woodlands include:

- Development and refinement of people centred approaches and methodologies;
- Development of well-targeted training and information materials;
- Creation of true opportunities at the grass-roots level;
- Facilitation of communication, information exchange;
- Strengthening of the collaboration and support amongst all stakeholders; and
- Elaboration of enabling policy environments that reach out to the people in rural areas.

Gaps in knowledge

The pending issues inadequately understood, but recognized as important in sustainable forest management, include:

- Extent and consequences of desertification not only on forest and woodlands but on people, communities, livelihoods and economic and environmental development;
- Need to combine traditional knowledge and experience with scientific knowledge, technical and formal managerial skills;
- Elaboration of new approaches for initiating full participation/partnership in rural community and smallholder development;
- Establishment of networks of decentralized statistical planning databases; and
- Development of communication supports for awareness-raising about environmental degradation and desertification.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The conclusions of the mission are summarized as follows:

Development choices: Namibian forestry is strongly focused on conservation of existing forest resources and other woody vegetation through sustainable management practices. There is also a strong policy for development of agroforestry and urban forestry.

Institutional, policy and legal frame: The conclusions are:

- Namibia has supportive policies and legislation in forestry and wildlife, in view of current global policies and conventions but would gain from more efficient, partly decentralized administration;
- The adoption of global policies in the forest sector will mean that the sector will be sensitive and also contribute to the conservation of biological diversity, mitigation of climate change and will be regularly assessed using the concept of criteria and indicators for sustainable forest management;
- Even though the area under forests will decrease, better land use planning at the regional and local levels will produce a legally recognized forest state that will be more immune to unplanned conversions to non-forest uses, as is the case today. In other words, forest reserves of various classes will be part of the protected area network in Namibia; and
- The government is pursuing a policy of attracting private sector investment in product processing and convincing donors to be actively involved in value-added industries.

Natural resources use and management: The conclusions are:

• In the absence of a strong traditional forest industry, Namibia should adopt new technologies for processing of its wood and non-wood products. It should develop the area of reconstituted wood products, the use of lesser-known tree species, new products from non-wood raw materials and its cottage industries based on limited local resources;

- Non-wood forest products need systematic development for sustainable use locally. Furthermore, some products like Marula and Devils Claw have international markets and therefore need proper management to benefit the local people;
- At the moment the dry environment limits the development of large-scale forest plantations. Low precipitation and unsuited soils hinder the establishment of fast-growing indigenous species. At present there are few woodlots of exotic species in the country, which indicate that there is some potential for further development in this area. Some exotic species, such as *Prosopis*, grow very well in some parts of Namibia where there are no trees at all and as a result provide shade, fodder and firewood; and
- There are many opportunities for the Namibian forest sector to develop creative investments in processing and taking advantage of new niche-market specialized products and the growing tourism industry as a market for value-added products.

Recommended actions

Non-wood forest products: In Namibia, there is a great need for data on NWFPs used by local communities but not well accounted for in the national economy. There is an urgent need to promote such NWFPs that have been neglected so far. Recommendations include:

- Determine the nutrition content of many veld foods and health related issues with regard to local beverages from NWPFs;
- Document more information on the NWFP, especially the traditional knowledge of rural people; and
- Continue the on-going efforts on research activities pertaining to the determination of appropriate harvest methods for sustainable management of medicinal plants.

Trees outside forests: There is a need to develop simple but analytically valid methods for the collection of information on TOF, such as on-farm trees in communal areas, woody vegetation and on commercial areas. There is also a need to provide extension and support services to reflect local priority needs and aspirations.

Afforestation and reforestation: The Forestry Development Policy, and Forest Act, 2001 advocate planted forests and trees outside forests. However, on the ground afforestation and reforestation programmes are in their infancy. Despite the harsh and dry environment, which hampers tree-planting activities in Namibia, there is nevertheless a high potential. Recommendations include:

- Establish plantations to meet local peoples' needs for fuelwood, fodder and construction poles;
- Conduct trials in plantation development, especially tree planting techniques on sand dune stabilization, and planting activities including community-based tree nurseries;
- Collaborate and exchange information with other countries having similar dry environment to share lessons learned;
- Promote conservation of indigenous species;
- Set aside land on resettlement farms acquired by government for tree planting purposes; and
- Develop cooperation between the MET and the municipalities to promote urban tree planting.

Forest management planning

Recommendations include:

- Develop management plans for all forms of forest land-use and ownership;
- Establish participatory mechanisms to enable people to benefit from conservation and management of all types of woody vegetation and
- Enhance and control, monitoring and reporting on the conservation, and utilization of forest and woody resources.

Training

Continue capacity building in forest management through both short- and long-term training programmes, and development of more human resource capacity, especially forest extension workers.

Forest research

Initiate research to provide scientific data for decision making for forest management and for more efficient charcoal making.

Urban forestry

Develop cooperation between the MET and the municipalities to promote urban tree planting.

Ecosystems

Promote conservation of strategic/important forest areas.

Charcoal production

Recommendations include:

- Prepare guidelines on Wood utilization in the other land use area, such as charcoal production taking into account the protection of the woody resources;
- Assist communal farmers to participate in charcoal production through the Forest Stewardship Council (FSC) to control "bush thickening"; and
- Conduct research into efficient charcoal making methods from bush encroachment species. For example, development of efficient retorts currently underway.

Forestry sector contribution to national economy

Recommendations include:

- Assess the value of revenues raised by the forestry sector to determine the financial contribution of the forestry sector in the national economy; and
- Account for, and analyze revenues from wildlife sector since forests and other woody vegetation provide important habitat to game.

Food Security

Recommendations include:

- Support current policies to improve food security and diversify rural incomes through careful assessment of natural resource availability and the issues of their sustainable use; and
- Promote indigenous foods and products for value-added production, to stimulate interest in use and assessment of indigenous fruit-tree resources.

Appendix 2

Regional Workshop Summaries

- Tehran, October 2002
- Nairobi, December 2002
- Bamako, January 2004

Near East Regional Workshop, Tehran, 28-31 October 2002 The Role of Planted Forests, Trees Outside Forests and Urban, Peri-urban Forests in Sustainable Forest Management in Low Forest Cover Countries

SUMMARY

Introduction

The purpose of the workshop, based upon the Tehran Process recommendations, through the presentation of LFCC country case studies, was to share lessons learned and translate recommendations into achievable strategies and actions. These strategies and actions, are intended for incorporation into national forest programmes, and to be used in the preparation of proposals to donors including follow-on support through the FAO-Netherlands Partnership Programme (FNPP).

Participants included policy, planning and technical officers, responsible for decision making with respect to sustainable natural resources management from Governments and international and regional agencies.

The countries represented at the Near East Regional Workshop included North Africa, the Gulf and temperate zones representing a range of cultural, social, economic, environmental, governance and institutional characteristics.

At the workshop, the following were covered:

- Participants were reminded of the Tehran Process initiatives for low forest cover countries;
- Country case studies for Tunisia, Oman and Iran were presented and discussed, as examples of status and trends in forestry and livelihoods in different conditions prevailing in different low forest cover conditions (environmental, social, economic, cultural, institutional); and
- Participating countries were able to contribute their inputs, thus enabling participants to share experiences and ways forward in initiatives relating to planted forests, trees outside forests and urban and peri-urban forestry with respect to sustainable forest management and livelihoods in low forest cover countries.

Three working groups were formed, based upon the topics: i) planted forests; ii) trees outside forests; and iii) urban/peri-urban forests. The purpose of the working group sessions was to discuss issues, constraints, opportunities, conclusions and recommended actions for the way forward on selected topics.

This summary brings together the outputs of the working groups into a Main Findings and Recommended Actions as a formal output of the Workshop.

Concepts and definitions

A consensus was agreed on the concepts of planted forests, trees outside forests and urban, peri-urban forests and green spaces. It was recognized that with the diversity of forest types from participating countries their definitions of forests and wooded lands would differ, so for working purposes, it was agreed to adopt the concepts and definitions as reflected in FAO documents, particularly FRA 2000. These reflected a consensus from member countries, international agencies and organizations as agreed in expert consultative group meetings.

Objective

Through working group discussions, bring together recommendations that enhance the role of afforestation and reforestation as an accelerator and a correct means to achieve sustainable forest management which is the backbone of sustainable livelihoods.

Constraints

Common factors

Physical

- Severe climate and fragility of ecosystems;
- Severe scarcity of water, particularly in selected areas; and
- Sub-optimal management of water.

Legal/policy/planning framework

- Under-valuation of the benefits (environmental, social) as they do not always contribute highly to Government revenues;
- Lack of political will;
- Because of poor financial viability and the long term nature of rehabilitation, it can be difficult to attract necessary financial resources and incentives compared with other sectors;
- Inadequate and inconsistent laws, policies and development plans related to natural resource management between sectors;
- Inadequate account of traditional laws in formal laws;
- Lack of multi-disciplinary, integrated approaches, coordinated planning programmes and collaboration between sectors; and
- Unclear land ownership or land-use rights mean that an exploitative economic environment prevails.

Institutional framework

- Socio-political pressure and interventions;
- Weakness of institutional capacity in some countries;
- Insufficient networking both on a national and regional basis;
- Unclear management roles between governments, communities, smallholders, NGOs, municipalities and the private sector;

- Imbalance between the number of professionals and lack of field managers and technicians; and
- Limited educational curriculum development to maintain pace with modern and traditional knowledge and technology.

Technical/management

- Lack of research information on a variety of issues including: seed sources, arid/saline, site, species/provenance matching, invasive species, alternative mechanisms of growing, indigenous and exotic silviculture;
- Lack of genetic and wider tree improvement programmes (seed orchards and centres, nursery, silviculture);
- Lack of monitoring of past afforestation and reforestation in terms of advocacy in water and environmental protection;
- Lack of reliable and updated forest resources, growth and yield data;
- Lack of consideration of traditional knowledge to consider alongside scientific knowledge; and
- Poor forest and tree protection against fire, pests, diseases and destructive interventions by man.

Social/environmental

- Insufficient respect for ownership rights, community rights, traditional rights;
- Lack of baseline and subsequent socio-economic and environmental impact assessments prior to and after afforestation and reforestation;
- Insufficient public awareness as well as awareness of the potential role of NGOs;
- Protected area management by the public sector too often disregard the livelihoods of local communities and smallholders whose lives depend upon these areas; and
- Lack of participatory planning and management.

Planted forests

- Because of the poor financial viability, it is difficult to attract investment in the husbandry of forest and tree-based systems compared with other land uses (e.g. annual crops);
- Lack of sound field management data and operational maps;
- Lack of silvicultural and protection management of planted forests;
- No requirements for, or guidelines on, preparation of management plans for planted forests;
- Lack of appropriate technology e.g. manpower vs machinery or manpower vs chemicals;
- Lack of commitment and understanding in taking into consideration the vital needs and aspirations of the rural family; and
- Heavy focus on exotic forest species, without full consideration of the environmental and social implications, compared with indigenous species.

Trees outside forests

- Lack of general awareness among managers, policy and decision makers about the role and potential of TOF in supplying social and economic products; and
- High cost of TOF resource evaluation, with regard to the types of resources and systems.

Urban, peri-urban forests and green spaces

- Lack of interest, involvement and commitment from foresters and other stakeholders;
- Lack of knowledge of adapted species for urban conditions including pollution, pests, diseases and fires;
- Lack of water sources and efficiency of water utilization;
- High price of land;
- Limited involvement of civil society in greening urban areas;
- Absence of linkages between social, economic and environmental factors in the urban development process;
- Lack of global vision (long-term planning and management); and
- Lack of means and capacities of municipalities and partners.

Opportunities

Opportunities in no order of priority:

- Afforestation/reforestation as a means to enhance soil and water protection, land stabilization, carbon sequestration and urban development, is increasingly recognized nationally and internationally;
- Implementation of agreed criteria and indicators for sustainable forest management can address the key resources, social, environmental, cultural and economic dimensions;
- Afforestation/reforestation for diversification of the landscape for production, protection, conservation, aesthetics and recreation is increasingly recognized;
- International processes and donors are more receptive to support and provision of financial and other resources to invest in afforestation and reforestation;
- Rehabilitation of denuded and degraded lands enhance biodiversity and this needs to be promoted strongly;
- Opportunity to decrease excessive runoff and help to ameliorate flood hazard;
- Preferential, low interest loan availability for afforestation, reforestation and trees outside forests;
- Improvements in water management efficiency and new technology available;
- Rehabilitation of unique forests for not only biodiversity conservation but controlled eco-tourism emerging;
- Inter-sectoral collaboration and integrated land-use planning shows potential;
- Potential to engage other stakeholders outside the public sector (NGOs, CBOs, civil society, State Enterprises, private sector and possibly the army) to reduce central Government costs for maintenance and exploitation. This could allow more effective control over forest resources; environmental benefits and local conflict resolution,

natural resources for local development; effective management through partnerships and sustainable livelihoods for the community;

- Adoption of participatory planning approaches are helping to mobilize and engage communities and families in a positive way;
- Awareness raising with Government decision makers, schools and with the general public remains relatively untapped;
- Integration of scientific and traditional knowledge is a relatively new concept with potential; and
- Safe use of waste and sewage treated waters is potentially available for forest and tree planting.

Planted forests and trees outside forests

• Planted forests and TOFs can provide wood and non-wood forest products to substitute for forest product imports. This can increase revenue and improve livelihoods of local communities.

Urban, peri-urban forests and green spaces

- Integration of nature, wildlife and forest realities in urban environments;
- Possibility for LFCCs endowed with substantial experience and expertise to assist other LFCCs;
- Development of silvicultural treatments adapted to new forms of use in urban conditions;
- Urban communities can benefit from in-country forestry capacity in forest management;
- Dynamism of city development provides possibilities to integrate UPUFG into urban expansion and changes;
- Availability of large urban and peri-urban forests established in the past; and
- Committed technical personnel are available in municipalities.

What lessons have been learned?

- Multi-purpose species are well protected by local people;
- Indigenous species preference for establishment, adaptation to sites, pest and disease resistance, contribution to conservation of biodiversity, resistance to fire and valuable source of wood and non-wood forest products;
- Metrological data is critical in planning successful planted forestry species (e.g. early warning systems for predicting drought);
- Decentralization has given more incentive to local authorities for better management and expansion of planted forestry species;
- Regular reforms in forest policy and law, to harmonize and recognize local peoples rights and roles for participation in decision making, serve as a sound basis for forest and planting development and conservation management;
- Consistency in policy, laws, regulations and plans is necessary to complement sustainable natural resource management and sustainable forest management;
- Water harvesting technologies (both indigenous and modern), for ground waters and planting techniques, are recognized as vital to successful afforestation and reforestation.

Planted forests

- Recognition that exotic species have a place in forest plantation development in commercial and industrial purposes and in acting as a nurse species in sand-dune reclamation;
- Positive financial benefit which meets the needs of rural communities from investment in planted forests can result in excellent forest management, protection and harvesting to diversify rural community income;
- Introduction of exotic species without due research and development can lead to negative results (e.g. invasiveness);
- Integrated scientific and indigenous knowledge is necessary for success;
- Planted forest harvesting can help to reduce exploitation of natural forests for wood and fuelwood products;
- Participation of communities in planning and plantation forest management has had successful results; and
- Combating desertification can involve cross border initiatives. These require international cooperation between countries and international agencies.

Trees outside forests

- Indigenous knowledge of tree species selection and domestication;
- Extension of technologies and knowledge, including their use for common benefits;
- Inclusion of traditional knowledge in the academic curricula; and
- Undertake further research of traditional knowledge for better understanding and valuation.

Urban, peri-urban forests and green spaces

- The public demand for "green" services has been steadily growing and as such has constituted the major driving forces for UPUFG expansion and improvement;
- There is a lack of criteria and indicators definition, particularly in regard to the optimal balance between forestry and urban development;
- Foresters have to give more priority to UPUFG and provide it with more significance within their policy and legislative frameworks;
- Awareness campaigns (tree days, media) have been used extensively to promote UPUFG and seem to have reasonable impact;
- Although not always adequate, the combined government and civil society commitment are on the rise and their synergies have definite impact on UPUFG;
- There is a high potential for UPUFG development and a more important role for the foresters to play in this development;
- Foresters have to be better equipped and trained to meet the challenge; and
- The positive role played by the private sector and NGOs in the process of UPUFG development needs to be better acknowledged and enhanced.

Gaps in knowledge

Common factors

- Technical assistance for development and update of forest assessment and information systems;
- Water harvesting with the need to develop appropriate irrigation and watering techniques;
- How to communicate and link locally, nationally, regionally and internationally into appropriate networks, for information on production and information on potential marketing, with a focal role for the LFCCs Secretariat;
- Scientific studies to determine characteristics and distribution of the ecological zones (mountains, climate and soils).
- Research of a wider range of mechanisms, species (including indigenous), silviculture, nursery management, particularly dry zones;
- Review of professional and management training to update curricula;
- Access to alternative international financing including CDMs, for afforestation and reforestation;
- Studies on the impacts of afforestation and reforestation on carbon sequestration and enhancement of biological diversity and complementing protected area management in indigenous forests in LFCCs; and
- How to incorporate socio-economic, environmental and cross-sectoral issues such as gender balance, including meeting the needs of ethnic minorities, through participatory planning, evaluation and monitoring.

Planted forests

- Monitoring of international markets for wood and non-wood forest products;
- Development of growth and financial simulation models for the main afforestation and reforestation methods; and
- Guidelines for collaborative partnerships and management planning for forest plantation development.

Trees outside forests

- We need to look inward for our own traditional knowledge as a basis for development; and
- Concept and definition of TOFs needs more elaboration.

Urban, peri-urban forests and green spaces

- Lack of awareness among policy makers, particularly in regard UPUFG;
- Lack of "Scheme Director" and no priority given to UPUFG;
- Lack of information on urban development;
- Lack of continuity in programme implementation and monitoring;
- Lack of participation of the neighbourhood in planning; and
- Lack of adapted modern techniques for monitoring dynamics and evolution of cities and UPUFG.

The practical way forward – recommended actions

Common factors

- Existing forest resources and TOFs of the Near East Region should be identified and mapped;
- Adopt an eco-regional and ecosystem approach;
- Include the enhanced role of planted forests and TOFs into national forest programmes in LFCCs;
- Exchange of knowledge and capacity building through workshops, training courses, technical expertise and education opportunities;
- The specific conditions prevailing within each country must be considered, in determining the use of afforestation, reforestation or TOFs in planting developments;
- Two publications of newsletter for LFCC issues, research, new technologies, success stories, linkages with NGOs, international processes and other agencies;
- Update and expand LFCCs website regularly;
- Invite NGOs to contribute to the Near East Forestry Commission for exchange of knowledge and experiences;
- An award for excellence be instigated for contribution to LFCC forestry in the Near East region;
- Document and enumerate the traditional knowledge regarding TOF according to standardized format in each country through involvement of all stakeholders, with CBD, CCD, IUCN, LFCC, and NGOs focal points;
- In recognition of the critical potential role of the LFCC Secretariat, the necessary resources (financial, personnel and other) be allocated to carry out their functions more effectively; and
- FAO assist Near East region LFCCs to submit a project idea for a major regional integrated, multi-dimensional project to promote afforestation, reforestation and TOFs to conserve biodiversity, sequester carbon, protect soil and water values, enhance social services, provide wood and non-wood forest products in selected priority areas of need. Potential donors to whom projects could be submitted include: Islamic Development Bank, Asian Development Bank, African Development Bank, World Bank, GM, CDMs and GEF facilities.

Planted forests

- Translate criteria and indicators for sustainable forest management into actions in LFCCs with regard to planted forests;
- Encourage afforestation and reforestation on private and collective lands by providing adequate loans and incentives according to context;
- Establish alternative demonstrations of mechanisms of planted forest and tree resources development in countries with demonstrated need and commitment; and
- Document success stories in planted forest and tree resources development in the region.

Trees outside forests

- Give academic status to traditional knowledge;
- Outcomes of studies on traditional knowledge be presented and discussed in a regional workshop, jointly organized by FAO, ICRAF, ICRISAT, and other relevant partners;

- Establish a network of institutions and experts on TOF, under management of LFCC Secretariat;
- Consider and enhance the important role of TOF as part of farming systems;
- Value (processing, value-adding), TOF resources through establishment of market system analyses; and
- Encourage South-South cooperation in promotion of TOF.

Urban, peri-urban forests and green spaces

- Access information centres for better information such as definition of information collection mechanisms and promoting regional networks on UPUFG;
- Document success stories in UPUFG design, implementation and management;
- Conduct studies comparing activities, experiments, models, results and impacts;
- Organize workshops or expert meetings on indicators and criteria for a proper balance between UPUFG and urban spaces, appropriate functions for UPUFG, and design and programming;
- Programme a regional awareness campaign by the LFCCs Secretariat, based on information provided between countries and municipalities;
- Twinning between South-South and North-South municipalities for exchange of experience and expertise for mutual support in enhancing UPUFG development; and
- The Parks and Green Spaces Organization, Tehran (as a centre of excellence) in collaboration with FAO and the LFCCs Secretariat, jointly host a workshop on UPUFG for LFCCs in the Near East region.

How can LFCCs, LFCC Secretariat, donors, international agencies and other stakeholders mobilize their resources so that the outputs of workshops become tangible outcomes in the field?

LFCCs

- Urge member countries make special budget allocation for afforestation, reforestation and TOF development;
- Urge member countries to provide funds to be loaned by agricultural banks or similar agencies on long-term low interest rate basis;
- Appoint a focal point for liaison on all matters relating to LFCCs;
- Wealthy LFCCs allocate funds for initiatives in afforestation, reforestation and TOFs in developing LFCCs; and
- LFCCs Government share in a partnership with the LFCC Secretariat and the Islamic Republic of Iran in providing personnel and other resources.

LFCC Secretariat

- Enable LFCC Secretariat to present member countries cause to regional, bilateral and multi-lateral financial agencies and donors with FAO and UNEP support;
- LFCC Secretariat approach the regional and bilateral financial agencies through the Government of Iran, to support afforestation, reforestation and TOFs as vehicles for rural development and poverty alleviation;

- Implement the recommendations of the FAO (McConnell and Abdel Nour) consultancy report on the LFCC Secretariat with respect to support for afforestation, reforestation and TOFs;
- Establish a steering committee for the LFCCs Secretariat including host country Iran, selected LFCC members, FAO and UNEP to facilitate support systems to achieve actions in afforestation, reforestation and TOFs;
- Language for communication with the LFCC Secretariat to be in Arabic, French and English;
- LFCC Secretariat to have a role in implementation of the recommendations of the six LFCC country case studies supported by FAO-FNPP; and
- LFCC Secretariat to take the cause of LFCCs to international processes, international conventions and other international meetings as a permanent and viable office.

International processes and meetings

- Participation in UNCCD, UNCBD, UNFF, UNFCCC, CPF as possible; and
- Presentations at key international meetings (e.g. World Forestry Congress).

List of Participants Near East LFCCs Regional Workshop, Tehran, Iran, 28-31 October 2002

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Final Agenda Near East Regional Workshop, Tehran, 28-31 October 2002 How to Achieve Sustainable Forest Management in Low Forest Cover Countries

Date/	Name	Торіс
Time	Organization	
28 October		
0800-0900		Registration and reimbursements
0900-0920	His Excellency Mr. M. Samadi, Deputy Minister	Welcome and background relating
	and Head of Forest & Range Organization,	to the Tehran Process
	Ministry of Jihad-E-Agriculture	
0920-0940	Mr B. Ziyaran, Director General for	Welcome and background to
	International Economic and Specialized	Tehran Process and international
	Organizations, Ministry of Foreign Affairs	follow up
0940-1000	Mr Abdur Rashid, FAO Representative, Tehran	Welcome and background to
		Project and Workshop
1000-1015	Group Photo and Morning Break	
1015-1020	Election of Dr Shamekhi as Chairperson, Jim	Purpose and structure of the
	Carle as Co-chairperson and Secretary	Workshop
1020-1030	Introduction by each Participant	Introduction of participant,
		organization and role in sustainable
		forest management in the region
1030-1100	Mr. Naser Moghaddasi, Director General	Background to the Secretariat and
	Engineering, FRWO and Director, LFCC	its Role in supporting LFCC issues
	Secretariat	and actions
1100-1115	Mr. Syaka Sadio, Forest Resources Division,	FAO Initiatives in LFCCs
	Forestry Department, FAO, Rome	
1115-1130	Mr. Jim Carle, Forest Resources Division, FAO,	FAO-Netherlands Project
	Rome	
1130-1150	Mr. Jean-Louis Blanchez, Policy and Planning	Introduction to the Near East
1150 1000	Division, FAO, Rome	Outlook Study
1150-1200	Nominee for Benno Boer, UNESCO	Statement
1200-1330	Lunch Break	a
1330-1500	Mr. Jafari, I. R. Iran representative to FAO,	Statements
	Country Representatives, IUCN, ICARDA,	
1500 1515	NGO Coalition	
1500-1515	Afternoon Break	
1515-1545	Salah Rouchiche, FAO Consultant, The	Oman Case Study
1545 1615	Netherlands	
1545-1615	Mr Ahmed Ridha Fekih Salem, Director	Tunisia Case Study
	General, Forestry Department, Ministry of	
1615 1645	Agriculture, EnvironmentHydrology,, Tunisia	Lucy Cours Starla
1615-1645	Mr Mirsadeghi, FAO Consultant, Tehran	Iran Case Study
1645-1700	NIT. JIM Carle, Forest Resources Division, FAO	Case Study Summary/Guidelines
1		for working sessions

Date/	Name	Торіс
111110		
29 October		
0800-0830	Guidelines and composition of working groups	Composition and topic of working
		groups
0830-1000	Working Group Sessions	According to guidelines
1000-1015	Morning Break	
1015-1200	Working Group Sessions	According to guidelines
1200-1330	Lunch Working Croups Papart to full workshop	Penert according to guidelines
1500-1530	Afternoon Break	Report according to guidennes
1530-1800	Anternoon break	Field Visit to FRWO Protection
1000 1000		Plantation Agros Mountain, Tehran
30 October		
0800-0830	Guidelines and composition of working groups	Composition and topic of working
		groups
08030-1000	Working Group Sessions	According to guidelines
1000-1015	Morning Break	
1015-1200	Working Group Sessions	According to guidelines
1200-1330	Lunch Warking group Sagaiang	A spending to suidalines
1500-1500	Afternoon Break	According to guidennes
1530-1700	Working Groups Report to full workshop	Report according to guidelines
1930-2200	Mr Abdur Rashid, FAO Representative	FAO Reception. Sonati Restaurant.
		Homu Hotel, Tehran
31 October		
0830-1000	Mr. Jim Carle, Forest Resources Division, FAO,	Presentation of Summary of
	Rome, translation by Hassan Abdel Nour and	Working Session Main Findings
	Salah Rouchiche with inputs from the Plenary	and Recommendations, Discussion
		and approval of outputs of
1000 1015	Morning Break	workshop
1015-1230	Mr. Jim Carle, Forest Resources Division FAO	Continued discussion and approval
1012 1250	Rome with inputs from the Plenary	of Main Findings and
	r in the second second	Recommendations
1230-1400	Lunch	
1400-1500	Mr. Jim Carle, Forest Resources Division, FAO,	Continued discussion and approval
	Rome with inputs from the Plenary	of Main Findings and
		Recommendations
1500-1520	Mr. Hassan Abdul Nour, Senior Forestry	The way forward – outputs of this
	Officer, Near East Regional Office, FAO, Cairo,	workshop for inputs to other
1520-1540	Egypt Forest & Range Organization/Ministry of Jihad-	Concluding remarks as host of
1520-1540	F-Agriculture	LECC Secretariat and Workshop
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		initiatives
1540-1600	Dr. Shamekhi Chairperson; Mr. Jim Carle, Co-	Closing Remarks, close Workshop
	chairperson, Mr. SidÁhmed Lehbib, Mauritania	

Africa Regional Workshop, Nairobi, Kenya, 10-13 December 2002 The Role of Planted Forests, Trees Outside Forests and Urban, Peri-urban Forests in Sustainable Forest Management in Low Forest Cover Countries

SUMMARY

Introduction

The purpose of the workshop, based upon the Tehran Process recommendations, through the LFCC country case studies was to share lessons learned and translate recommendations into achievable strategies and actions and for incorporation into national forest programmes and preparation of proposals to donors including follow-on support through the FAO-Netherlands Partnership Programme (FNPP).

Participants included policy, planning and technical officers responsible for decision making with respect to sustainable natural resources management from Governments and international and regional agencies.

The major ecological regions represented included arid Northern Africa, East and West Sahelian Africa; Southern Africa, Small Island Developing States and a Central African State which represented a range of cultural, social, economic, environmental and institutional characteristics.

The workshop recapped on the Tehran Process initiatives for low forest cover countries, presented and discussed the Mali, Ethiopia and Namibian country case studies and inputs from participating countries as examples of status and trends in forestry and livelihoods in different conditions prevailing in different low forest cover conditions (environmental, social, economic, cultural, institutional). This material allowed participants to share experiences and ways forward in initiatives relating to planted forests, trees outside forests and urban and periurban forestry with respect to sustainable forest management and livelihoods in low forest cover countries.

Two working groups were formed, based upon two topics: i) planted forests; and ii) trees outside forests and urban/peri-urban forests. The purpose of the working group sessions was to discuss issues, constraints, opportunities, conclusions and recommended actions for the way forward on selected topics.

This summary melds the outputs of the working groups into a Main Findings and Recommended Actions as a formal output of the Workshop.

Concepts and definitions

A consensus was agreed on the concepts of planted forests, trees outside forests and urban, peri-urban forests and green spaces. It was recognized that the diversity of forest types from participating countries that their definitions of forests, wooded lands, etc., differed, so it was agreed to adopt, for working purposes, the concepts and definitions as reflected in FAO

documents, particularly FRA 2000. These reflected a consensus from member countries, international agencies and organizations as agreed in expert consultative group meetings.

Objectives

Development Objective

Enhance the role of planted forests and trees to support natural forest and agriculture management in a landscape approaches to achieve sustainable forest management, the backbone for sustainable livelihoods.

Immediate objectives

- Rehabilitation of degraded lands, enhancing biodiversity conservation, protecting against soil erosion, safeguarding water supplies, improving agricultural production through maintenance of soil fertility and diversifying the landscape;
- Improving and diversifying revenues in the fight against poverty and food insecurity through the exploitation of wood and non-wood forest products;
- Provision of sustainable supply of wood and non-wood forest products for subsistence and industrial uses; and
- Improving quality of life through shade, beautification and absorbing pollutants and sequestering carbon.

Major issues

Common factors

- New decentralization, participatory, inter-sectoral and multi-disciplinary approaches require different institutional frameworks, training and skills by forest planners and management;
- Institutional reforms defining new roles of State, private sector (corporate and smallholder), communities, NGOs result in an unclear state of transition;
- Inter-sectoral planning and monitoring committees and working groups exist, but in many countries, are not able to achieve the desired sustainable land-use outcomes in practice; and
- Addressing SFM in an environment of poverty, food insecurity, high population growth, intense pressure for fuelwood, wood and NWFPs are issues beyond the forestry sector alone.

Planted forests

• Debates continue regarding the quality and sustainability of planted forests by State versus those by private (corporate or smallholder).

Constraints

The main constraints noted, in no order of priority, included:

Common factors

Physical

• Extreme conditions of land allocated as forest land (rainfall/drought, fragile soils), combined by extreme social and economic pressures to subsistence and trade.

Legal/policy/planning framework

- Inconsistent Government policies, legal, planning and regulatory framework;
- Competition and conflicts for suitable land due to lack of Land-use Development plans, particularly with the agriculture sectors; and
- Security of land and crop tenure can severely limit confidence and hinder development of planted trees and forests which require long term investment.

Institutional framework

- Narrow perception of the roles and values of planted forests and tree resources by key Government decision makers which can result in limited allocation of resources and poor performance of planted forests (limited funds for tending, silviculture, protection after planting);
- Decentralization and autonomy is not always done with full institutional reforms (retraining, allocation of appropriate resources);
- Many institutions are involved in natural resources management and land-use issues, resulting in incoherent land-use and confusing and conflicting initiatives;
- Frequent institutional changes create organizational instabilities and sub-optimal performance in the management of trees and forests;
- Past lack of political commitment and allocation of resources to State planted trees and forest development; and
- Poor access to markets for wood and non-wood forest products.

Technical/management

- Lack of forest and tree resources data and information which translates into a lack of information on performance of planted trees and forest mechanisms, site/species matching, etc;
- Limited technology to increase productivity of planted trees and forests and agricultural crops (water harvesting, genetic and tree improvement, silviculture, harvesting, utilization); and
- Lack of compliance of stakeholders with policies, laws, regulations and codes of practice (this can involve private sector, NGOs, donors and State).

Social/environmental

- Insufficient access of women and youth to land, particularly in participatory approaches to planted trees and forest development; and
- Unsolved cultural constraints specifically related to sacred forests where sustainable forest management principles and practices are not applied.

Opportunities

Opportunities, in no order of priority, included:

Common factors

- Application of the newly developed national level principles, criteria and indicators for sustainable forest management provides the foundation on which to plan, manage and monitor planted trees and forests;
- The ongoing review of legal, policy and planning frameworks allows incorporation of innovative, new concepts and approaches;
- Free market dynamics (particularly prices) gives opportunity to diversify and to adopt more flexible approaches in pursuit of optimal financial benefits;
- Decentralization and adoption of participatory approaches allows local Government and individual investor decision making previously centrally controlled;
- Application of new technology (eg more effective use of water, genetic resources, tree improvement practices, research results, etc.) into planted trees and forest development;
- Integration of planted trees and forests in an ecosystem approach that incorporates agriculture and forest resources;
- Availability and access to new technology and collaboration between countries through networking, including via the internet, publications, regional/national and sub-national meetings and study tours;
- Engage political decision makers to translate their awareness and commitment to international processes (desertification, biodiversity, climate change) into commitment of resources for planted forest development;
- Articulate and integrate planted trees and forest issues into nfps to reflect commitment to international processes and national priorities in order to maximize the opportunities of increasing availability of funding and technical support from international donors; and
- Engage in, and adopt, a new framework with the LFCC Secretariat moving from an interim body to a strong, global Secretariat to be more pro-active on key issues on behalf of LFCCs.

Lessons learned

- Participation of rural communities is essential in achieving sustainable forest management, including melding scientific and traditional knowledge in approaches and mechanisms giving full access to information, education and communication;
- Forestry makes a significant contribution to address poverty alleviation and food security;
- Giving secure tenurial rights to land and tree resources is essential as a foundation on which to build an investment programme on tree planting towards sustainable forest management and ensure supply of wood and non-wood forest products;
- Decentralization and participatory approaches must be supported by appropriate legal, policy, regulatory and planning frameworks which must be reflected in institutional reforms with clear mandates of the main stakeholders;

- An enabling environment is necessary to enhance the opportunities and role of the private sector (corporate and smallholder) into forestry development;
- Integration of forestry with other forms of land-use can have negative effects if the site/species, growing mechanisms and management are not properly addressed (*Acacia*, *Prosopis*);
- Equitable benefit sharing between stakeholders is necessary for conservation and development of forest resources;
- The introduction of environmental programmes into the school system and capacity building of stakeholders are necessary to achieve successful planted trees and forest management; and
- Marginal groups, specifically women, must be involved at the outset of formulation of plans and implementation of natural resource management activities.

Planted forests

• Sound planning, management and monitoring is dependent on quality forest resource data (planted forest type, purpose, ownership, species, areas, growth rates, rotations, harvest yields, etc.), information on social (dependence levels, incomes, forest use, etc.), environmental (soil and water quality, contribution to biodiversity).

Trees outside forests, urban and peri-urban forests

- The specific mechanisms for TOFs or UPUFs and the ownership, whether individual or community, will be determined by the purpose intended;
- TOFs and UPUFs have a legally recognized status in many countries however, their true value in wood, NWFPs production and other services have not been fully reflected so they do not get the priority that they deserve in terms of investment; and
- Communication and collaboration between decision makers and researchers and different stakeholders involved in management of TOFs and UPUFs is necessary in order to create synergies for economic growth and conservation of forested areas in the struggle against poverty.

Gaps in knowledge

Gaps in knowledge noted, in no order of priority, included:

- Lack of research on the knowledge and technology on indigenous species, silviculture and more flexible people approaches to planted trees and forest development;
- Limited formal national and international market intelligence on supply, demand, price, specifications of forest products (wood and non-wood forest products);
- Means to access new initiatives supporting planted forest development, e.g. CDM, WEHAB, Carbon Funds, GEF and other international funds, etc.;
- Curricula of professional education, technical and community training (including women and youth) do not reflect the major reforms in planted trees and forest development;

- Foresters and communities may understand the principles and to some degree, the practices in sustainable forest management, but subsistence living requires meeting immediate food and simple livelihood needs;
- Lack of knowledge and technologies of more efficient use of woodfuel or alternative methods of providing financially competitive energy sources (e.g. solar, biogas) to reduce dependence on woodfuel; and
- Recognition of the importance of traditional knowledge and the value of incorporating this into forest management.

Planted forests

- Comparative land-use analysis to evaluate financial and economic performance of planted forests with other land-uses; and
- Lack of technical management tools, such as codes of planted forest practice, guidelines for participatory planning, growth and yield models, yield tables for increasing productivity and efficiency in management.

Trees outside forests, urban and peri-urban forests

• Methods of assessing resources, sustainable harvesting, distribution and marketing of TOFs and UPUFs and the wood and non-wood forest products derived from them.

Recommended actions

Recommended actions agreed, in no order of priority, included:

- Integrate land-use and sustainable development policies, strategies, legislation and regulations to include forestry and poverty reduction and food security strategies in National Development Plans;
- Establish inter-sectoral planning to integrate land-use policies and implementation mechanisms to ensure these are achieved in practice, with forestry representation to be more pro-active in integrating forestry issues into the rural landscape;
- Change the mindset of foresters from owning the forests to providing the enabling conditions (policy, laws, regulations, strategic planning, monitoring) and support services (extension services, success stories, demonstrations, training, etc.) to private owners (corporate and smallholder), combining technical, scientific and traditional knowledge in decentralized and participatory approaches to meet people's livelihood needs and respond to market demands;
- The transition from centralized to decentralized and participatory approaches incurs costs in providing technical support services, which must either be borne by appropriate allocation of resources from national treasuries or charged on a user-pays basis;
- Water is a critical input in planted trees and forest development; however, nurseries (large scale central and village based) and planted forests need to demonstrate efficient water management and justify their role in moderating quantity and quality of water to gain preferential treatment from Governments wishing to introduce water taxes on users;
- Prioritize preparedness to drought and other mitigating factors, particularly in combating desertification, famine and environmental calamities (wildland fires) in sustainable

forest management, to assist in minimizing impacts and preparation towards securing national and international assistance;

- Apply sound technical forestry knowledge in unison with appropriate policy/legal/regulatory/institutional frameworks to deliver effective field performance;
- Prepare justifications for national forest assessments, including planted forests, TOFs and UPUFs;
- Network appropriate knowledge and technologies in low forest cover countries through electronic and other mass media distribution systems using the LFCC Secretariat with support from FAO and UNEP;
- Gear interventions in planted forests and tree resources to the specific needs of people in particular ecological zones;
- Mobilize the necessary human and financial resources and capacity building to enhance the role of planted trees and forest contribution to sustainable forest management; and
- Ensure planted forests, TOFs and UPUFs have improved seeds and other tree improvement technology available.

Planted forests

- Prepare better justifications and proposals to national Governments and international donors and funding agencies reflecting the full benefits (environmental, social, economic) of planted forests;
- Change the homogeneous (engineering) approaches to planted forest development (primarily exotic species in monocultures) to respond to the more diverse, flexible, heterogeneous (multiple species) approaches to planted forests (including agroforestry, multi-tiered), including multiple species (indigenous and exotic) as appropriate; and
- Conduct successive surveys (baseline and follow up) on the true impacts and contribution of planted forests to social, environmental and economic benefits to the national economy and internalize the true costs where possible.

Trees outside forests, urban and peri-urban forests

- Satisfy demand for wood, fuelwood and NWFPs by planting and management through establishment of village woodlots, integration of trees into the rural and urban landscape in all ecological zones; and
- Support agricultural production and productivity through enhancing soil fertility, agrosilvipastoral, protection of soil and water, fruit tree production, watershed management according to methods to meet specific needs of the different eco-regions.

Roles of countries, donors, international agencies

Recommendations on the immediate roles of major stakeholders, in no order of priority, included:

Low Forest Cover Countries

• With support from FAO/UNEP (and others as appropriate), formally register and nominate a focal point for country membership to the LFCC Secretariat and commit to share appropriate information to network with other LFCCs;

- Request FAO/UNEP to allocate resources from their governing bodies to assist in supporting the development of the LFCC to a full global Secretariat;
- Commit follow up to the Recommended Actions of this workshop by directing to appropriate national authorities; and
- Raise awareness and prepare proposals to national Governments to access funding and technical support from international donors for priority LFCC issues, including access to CDM, WEHAB and other new initiatives.

Low Forest Cover Country Secretariat

- Proactive role of the LFCC Secretariat in being the global focal point on low forest cover country issues, data, lessons learned and sharing of technical information;
- Maintain lobbying for LFCC issues at international processes and meetings; and
- Enhance collaboration and sharing between LFCCs.

International Agencies (FAO, UNEP and regional agencies)

- FAO and UNEP to assist in providing background and justification to LFCC Governments for benefits of membership to the LFCC Secretariat;
- Research and advise LFCC countries on procedures to access funding under the CDM, WEHAB and other new initiatives;
- Provide policy and technical assistance in forest resources assessment, nfp formulation, and provision of management tools and technical support to development of planted forests and tree resources within their capacity; and
- Assist LFCCs to prepare proposals to international donor agencies on projects and programmes related to planted forest, TOFs and UPUFs, including climate change, combating desertification, rehabilitating degraded lands, forestry and poverty alleviation.

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Agenda

Africa Workshop, Nairobi, Kenya, 10-13 December 2002 The role of Planted forest, Trees outside Forests and Urban and Peri-urban Forestry to Sustainable Forest Management in Low Forest Cover Countries

Date/	Name	Торіс
Time	Organization	
10 December		
0800-0900		Registration and DSA payments
0900-0910	Mr Syaka Sadio, Agroforestry and Land Use	Welcome and Introduction of
	Officer, FAO, Rome, Italy	Guest Speakers
0910-0920	Mr. Mike Doeff, FAO Representative, Kenya	Welcome and background to
	Mr.	Project and Workshop
0920-0940	Mr. Halifa Drammeh, Deputy Director,	Welcome and background as lead
	Division of Policy Development and Law,	agency Tehran Process/Low
	UNEP, Nairobi	Forest Cover Countries
0940-1000	Mr. Gideon Gathaara, Chief Conservator,	Opening Address
	Ministry of Environment and Natural	
	Resources, Government of Kenya	
1000-1020	Group Photo and Morning Break	
1020-1040	Election of Chairperson, Co-chairperson and	Purpose and structure of the
	Secretary	Workshop
1040-1100	Brief Introduction of Each Workshop	Introduction of participant,
	Participant	organization and role in
1100 1100		sustainable forest management
1100-1120	Mr. Jim Carle, Forest Resources Division,	Background to Tehran Process;
	FAO, Rome	Mandate and Services of the
		LFCCs Secretariat; FAO-FNPP
1100 1140		Project
1120-1140	Mr. Syaka Sadio, Forest Resources Division,	FAO initiatives in LFCCs
1140 1200	Mr. Dei Mass Teel, Head, Interagency and	LINED initiatives in LECCs
1140-1200	Intergovernmental Ligison Unit DPDL UNEP	UNEF initiatives in LICCS
	Nairobi	
1200-1330	Lunch Break	
1200-1350	Mr. Peter Lowe Forestry Planning Officer	Initiatives in LECCs in Sub-
1550-1550	FAO Africa Regional Office Accra Ghana	Saharan Africa
1350-1410	Mr. Jim Carle on behalf of Hassan Abdel Nour	Initiatives in LECCs in Near
1550 1410	RNE Cairo Egypt	East/Nth Africa
1410-1500	Country and regional representatives	Brief country or regional
1110 1200	country and regional representatives	organization statements relating to
		planted forests. TOFs and UPF
		issues in SFM
1500-1515	Afternoon Break	
1515-1545	Continuation of country and regional	Brief country or organization
	representatives	statements relating to planted
		forests, TOFs and UPF issues in
		SFM
1545-1730	Mr. Ibrahima Thomas, FAO Consultant,	Synthesis of Case Studies - role of
	Senegal	planted forests and TOFs in
		Sustainable forest management
		and discussions
	Evening Free	

Date/	Name	Торіс
Time	Organization	
11 December		
0830-0900	Mr. Jim Carle, Forest Resources Division, FAO HQ	Guidelines, Topics and Composition of working groups
0900-1000	Working Group Sessions	According to guidelines
1000-1015	Morning Break	
1015-1200	Working Group Sessions	According to guidelines
1200-1330	Lunch	
1330-1500	Working Group Sessions	According to guidelines
1500-1530	Afternoon Break	
1500-1800	Working Group Chairs and Participants	Working Group Reports to plenary and discussions
1800-1930	Cocktail hosted by FAO-UNEP	
12 December		
0830-0900	Working Group Chairs and Participants	Discussion on Working Group Reports
0900-1000	Working Group Sessions	According to guidelines
1000-1015	Morning Break	
1015-1400	Working Group Sessions	According to guidelines
1400-1530	Working Group Chairs and Participants	Working Group Reports to plenary
		and discussions
	Evening Free for Participants, Preparation of	
	Workshop Summary by Secretariat	
13 December		
0000 0010	Mr. Kamil Lachani, Algaria	Outline I ECC Initiatives in Algeria
0900-0910	Mr. Jim Carle, Forest Resources Division	Presentation of Workshop Main
0910-1000	FAO Rome and Ibrahima Thomas FAO	Findings and Recommendations
	Consultant with inputs from the Plenary	and Discussion/Approval
1000-1015	Morning Break	
1015-1115	Mr. Jim Carle, Forest Resources Division.	Continue Discussion/Approval of
	FAO, Rome and Ibrahima Thomas, FAO	the Main Findings and
	Consultant, with inputs from the Plenary	Recommendations,
1115-1145	Mr. Peter Lowe, Forestry Planning Officer,	The way forward – outputs of this
	FAO, Africa Regional Office, Accra, Ghana	workshop for inputs to other
	with assistance of Ibrahima Thomas, FAO	initiatives in Africa
	Consultant	
1145-1200	Mr. Halifa Drammeh, Deputy Director,	Concluding remarks as co-host of
	Division of Policy Development and Law,	Workshop on behalf of UNEP
	UNEP, Nairobi, Kenya	
1200-1220	Syaka Sadio, FORC, FAO HQ, Rome, Italy	Concluding remarks as co-host of
		Workshop on behalf of FAO
1220-1230	Mr. Anthony Maina, Vice Chairman/Senior	Closing Remarks, close Workshop
	Conservator of Forests, Nairobi, Kenya	
1230+	Lunch and Departure of Participants	

Regional Workshop for African and the Near East Low Forest Cover Countries Bamako, Mali, 14-16 January 2004 "Strengthening the Tehran Process and support to countries"

SUMMARY

Introduction

In the context of the Tehran Process, a technical workshop was jointly organized by FAO, UNEP and the TP/Secretariat of Low Forest Cover Countries in Bamako, Mali, from 14 to 16 January 2004, hosted by the Government of Mali.

This workshop follows the three workshops organized successively in Tehran in October 2002, in Nairobi in December 2002 and in Tehran again in July 2003. The objectives, on the basis of the findings and recommendations of these previous workshops, were:

To determine the legislative and institutional setting of the organization and to propose a priority action programme to the backing of the Tehran Process, the Secretariat and national forestry programmes of the countries, keeping at the forefront plans to combat desertification.

The following took part in this workshop: the representatives of LFCCs of the Near East (Egypt, Iran, Lebanon, Morocco, Tunisia, Oman, Yemen, Saudi Arabia and Sudan) and Sub-Saharan Africa (Burkina Faso, Chad, Ethiopia, Lesotho, Mali, Mauritania, Niger, Senegal), the Sub-regional West African Economic and Monetary Union (UEMOA), scientific and research institutions (ICRAF-Sahel, Mali; CSE-Senegal), NGOs (CENESTA-Iran) and representatives from UNEP and FAO.

The opening ceremony of the workshop was chaired by the Minister of Environment of Mali. Presentations were made by the Secretary of the Tehran Process, the Director of the Policies and Laws and Environment of UNEP, the Director of Forest Resources Division of the Forestry Department of FAO, and the Minister of Environment of the host country, Mali.

The bureau of the workshop under the leadership of Iran as the interim chair, is composed as follows:

Chair:	Salif Kanoute, Mali	
Vice-Chair:	Abdelhai M. Sharief, Sudan	
Reporters :	Akl Ghatas, Lebanon	
	Assize Toure, Senegal	
Secretary:	Ibrahim A. Fawzan, Saudi Arabia	

The workshop included plenary sessions and Working groups, as follows (Annex 1):

14-15 January - Plenary sessions where various key and voluntary papers were presented by the representatives of institutions and individuals and by the country representatives, followed by discussions.

16 January - the participants split in two working groups by sub-region: one for the Near East and one for the Sub-Saharan Africa. The participants debated ways and means to strengthen the Tehran Process and the Secretariat as well as support to national forestry programmes and national action plans to combat desertification, including issues related to the UN Conventions on Biodiversity and on Climate Change.

Findings and recommendations

Governments, FAO, UNEP and Donors

- Reaffirm their adherence to the Process and positively endorsed the findings and the recommendations presented in the background documents discussed at the time of the workshop;
- Implement the Tehran Process through concrete actions at the political, institutional level, as well at political level;
- Request FAO, UNEP and UNFF, including countries and donors involved, to continue to support and reinforce financially and technically the Tehran Process and the Secretariat;
- Request the Government of Iran to continue its support to the Tehran Process and to the Secretariat and invite other Low Forest Cover Countries, as well as the donors, to join the process;
- Request the Secretariat to elaborate, with the assistance of UNEP and FAO, appropriate related legal texts and propose the institutional setting to be adopted by a ministerial conference to be held at a later date. Documents should be made available to the countries for observations at least three months before the conference;
- Request the Secretariat, with assistance of UNEP and FAO, to amend the texts on the basis of comments and suggestions made by the countries, at least one month before the conference;
- Request the Secretariat, with assistance of UNEP and FAO, to compile the conclusions and recommendation and the resolution of the Bamako workshop and send it to all LFCCs, and potential members of Tehran Process;
- Request the Government of Iran, with assistance of Secretariat and FAO, to approach LFCC governments to discuss the opportunity to organize a ministerial conference in early 2005, at which conference the LFCCs will adopt the legal and institutional frameworks proposed by the Secretariat and FAO and officially endorse the Tehran Process and create the organization;
- Request the Ministers of the Low Forest Cover Countries to seize all opportunities of any international meeting to debate the adoption and the state of the Tehran Process;
- On the basis of the propositions submitted to the participants, it has been agreed to set up the institution on the basis of a simple resolution adopted by a ministerial Council of which modalities, the date and the venue of the first meeting will be defined later on;
- The council, chaired by a Minister of one of the member countries, will be advised by a Scientific and Technical Committee, composed of high-level scientists and experts;
- To develop a synergy between the Tehran Process and related international conventions endorsed by Rio and Johannesburg Conferences on Sustainable Development, e.g. UNCCD (Combating Desertification), UNFCCC (Climate Change), UNCBD (Biological Diversity);

- A strong support is awaited from the member countries and partners currently involved in the Tehran Process and in Low Forest Cover Countries;
- Reaffirm the independency of the Secretariat in order to assist in all neutrality the countries to design and implement their programmes; and
- Request FAO to continue its technical assistance to Low Forest Cover Countries and finalize the formulation of the strategic framework of "Forest resource assessment and institutional and technical capacity building" in support of the Secretariat and countries, as discussed at the workshop, and to be submitted to the country for comments and endorsement before their implementation, with particular focus on natural resource use, sustainable forest and tree management, planted forest and trees outside forests.

The Tehran Process Secretariat

- Invite the Secretariat to work on the definitions of Low Forest Cover Countries (forest cover percentage, areas, types), based on clear and consensual criteria to be discussed in a workshop; and
- Request the Secretariat, in the interim period, to continue liaising with the country interim focal points, coordinate activities related to the formulation of the legal and institutional framework, formulation of mandate of the council and the Secretariat and the establishment of the networks.

Regional Workshop for African and the Near East Low Forest Cover Countries Bamako, Mali, 14-16 January 2004

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Regional Workshop for African and the Near East Low Forest Cover Countries Bamako, Mali, 14-16 January 2004

"Strengthening the Tehran Process and support to countries"

Agenda

Date/Time	Organization/Activities	Торіс		
12-13 Jan.04	FAOR/ICRAF-Mali	Arrival of Participants		
14 January 2004				
0800-0900	FAOR/ICRAF-Mali	Registration and reimbursements		
0900-0950	TP/LFCC, UNEP, FAO, Government	Opening		
	of Mali			
0950-1015	All participants	Group Photo and Coffee Break		
1015-1020	Interim Chairperson	Election of Chairperson, Co-		
		chairperson and Secretary		
1020-1040	Introduction by each Participant	Introduction of participants		
1040-1050	LFCC Secretariat	Background to Tehran Process and		
		LFCC Secretariat Role		
1050-1100	UNEP, Nairobi	Background to LFCCs issues and		
		UNEP support		
1100-1110	FAO, Rome	FAO support to TP/LFCCs and Purpose		
		of the Workshop		
1110-1120	Chairperson	Questions and Discussions		
Session 1: Fore	est resource management and poverty a	alleviation, including Biodiversity and		
	Desertification issues in	LFCCs		
1120-1140	FAO	Keynote paper (findings of case studies		
		and conclusions of previous workshops)		
1140-1200	UNEP	Keynote paper on Poverty and		
		Environment and relevance to LFCC		
1200-1220	All Participants	Questions and Discussions		
1210-1230	Chairperson	Concluding remarks		
1230-1400	All participants	Lunch Break		
1400-1420	ICRAF	Agroforestry		
1420-1440	UNEP/ICRAF	Forest & Climate change		
1440-1500	FAO/SDRE	Communication strategy and approach		
		in support to forestry programme in		
		LFCCs		
1500-1520	CSE	Forest and tree resource assessment and		
		Remote sensing issues		
1520-1540	All Participants	Questions & Discussions		
1540-1550	Chairperson	Concluding remarks		
1550-1610	All participants	Coffee break		
Session 2: REGIONAL ISSUES: Sub-Saharan Africa				

Date/Time	Organization/Activities	Topics		
15 January 2004				
Session 2: REGIONAL ISSUES: Sub-Saharan Africa (continued)				
0830-0930	Country representatives from Sub-	Forestry issues and national forestry		
	Saharan Africa	programmes & NAPS		
0930-0950	All participants	Questions & Discussions		
0950-1000	Chairperson	Concluding remarks		
	Session 3: REGIONAL ISSU	ES: Near East and North Africa		
1000-1030	Country Representatives from Near	Forestry issues and national forestry		
	East & North Africa	programmes & NAPs		
1030-1050	All participants	Coffee break		
1050-1210	Country Representatives from Near	Forestry issues and national forestry		
	East & North Africa	programmes & NAPs		
1210-1230	All participants	Questions and discussions		
1230-1235	Chairperson	Concluding remarks		
1235-1400	All participants	Lunch break		
	Session 4: Way forward: regional a	and country programme		
1400-1420	Ma, FAO/FOPE	What future of forestry in the LFCCs:		
		The outlook for the next two decades".		
1420-1440	FAO/FOR	Presentation of the draft programme		
		framework		
1440-1500	All participants	Questions and discussions		
1500-1510	Chairperson	Concluding remarks		
1510-1520	FAO/LFCC Secretariat	Strengthening the TP/LFCC Secretariat		
1520-1530	FAO/LFCC Secretariat	Presentation of the guideline of the		
		Working Groups		
1530-1545	All participants	Coffee break		
1545-1800	All participants	Group 1: Policy and Legislation		
		Group 2: Environmental, Ecological		
		and Socio-economic issues		
		Group 3: Forests and Trees resource		
		management		
16 Jonuary 2004				
0900-0930	All participants	Plenary: presentation of Summary of		
0900-0930	An participants	Working Sessions (1, 2, & 3)		
		Questions and Discussions		
0930-1030	All participants	Strategic framework and priority		
0,50 1050		actions: WG 4:Sub-Saharan Africa &		
		WG 5:North Africa and Near East		
1030-1050	All participants	Coffee break		
1150-1230	All participants	Working groups 4 & 5 (continued)		
1230-1300	All participants	Presentation of summary of Working		
1200 1000	· ···· participanto	Creares A 0- E		