

The FAO Programme on Forest Harvesting, Engineering and Environment

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INTRODUCTION

Forest Harvesting

Although in recent years considerable progress has been made to introduce environmentally sound forest operations to support sustainable forest management and development in various parts of the world, nevertheless still a lot needs to be done.

There is a need for a continuous refinement of forest harvesting and engineering methods and systems to make them fully compatible with the objectives of sustainable forest management and thus contribute in a substantial way to the economic and social development, not only for those closely linked with forestry and forest products, but for the society at large. The concept and terms for forest practices have changed over time. While in the past the term **logging** has been widely used for operations related to felling of trees and the extraction of their stems, or other usable parts, and transport from the forests for subsequent processing into industrial products, nowadays the preferred terms are **wood harvesting** in the strict sense or **forest harvesting** in the broader sense.

Forest harvesting no longer refers only to the process of extracting selected trees from the forest to the roadside but also takes into account the importance of forests as a source of non-wood forest products and environmental services, as well as for the conservation of biological diversity and cultural values. This increased complexity makes the planning and execution of harvesting operations more difficult, since they must be designed and implemented in such a way as to accommodate and, if possible, enhance the multifunctional character of forests.

Forest Engineering

Forest engineering structures such as forest roads play an important role in forest management operations and forest development. They are complex engineering works which provide access to and within the forests. They are not only essential for the extraction of wood and non-wood forest products but they provide overall access for forest management and monitoring purposes, and could also contribute to the overall rural infrastructure development or become part of the public road network. However if they are poorly planned and designed, constructed or maintained, forest roads can contribute significantly to environmental degradation. In fact, often inadequately engineered forest roads significantly contribute to increased water flows, sedimentation, soil erosion and, in the worst cases, land slips. Therefore it is important that forest roads are designed and laid out by competent engineers who understand the need to minimise construction and maintenance costs, as well as soil disturbance.

Environment

It is evident that any harvesting and engineering system and technique, even the most advanced, will have an impact on the environment. Therefore, it is important to assess the environmental impacts on the forest stand and site of forest harvesting and forest infrastructure development. This includes the planning of forest roads, pre-harvest planning and monitoring of

all phases of operations. To determine the degree to which forest operations have followed the plans and met their stated objectives, while complying with established standards of practice, systematic checks should be undertaken while the operation is still underway (in-process assessment) or after its completion (post harvest assessment). It is very important to develop in the future practical guidelines for criteria and indicators in assessing the impacts of forest harvesting and engineering operations.

FAO FOREST HARVESTING PROGRAMME COMPONENT

The objective of the Forest Harvesting Programme Component is to promote environmentally sound, economically feasible and socially acceptable forest operations to significantly contribute towards sustainable forestry development by the year 2010. The scope of the programme is global but with emphasis on natural forests in the tropics, mountain forest ecosystems and plantation forests. The basic strategy of the programme is to collect information, to share information and experience, increase countries' manpower capacities to properly plan, carry out and control improved harvesting practices, increasing the value of harvested forest products and services, while reducing waste in the forest and the environmental impact on forest trees and stands.

ACTIVITIES

- **The FAO Forest Harvesting Bulletin**

For the last eleven years FAO has been producing annually the FAO Harvesting Bulletin in order to promote environmentally sound forest harvesting practice. It is presently distributed to nearly 5,000 institutions such as forest services, private enterprises and forest owners, universities, research stations, extension and training institutes, non-governmental organizations, international organizations and individuals. The bulletin forms part of FAO's networking and technological transfer activities in the field of forest harvesting, engineering and environment, and is available in hard copy and on the Internet.

- **RIL-Afrique-L**

RIL-Afrique-L is an electronic bulletin (in French) on Reduced Impact Logging Practices in Africa which is a network for communication, discussion and information, sharing expertise among different stakeholders in the forestry sector, particularly in Francophone Africa. This Bulletin is supported by the EC/FAO Partnership Programme in

Sustainable Forest Management in African ACP Countries. To join the list, the e-mail address is: RIL-Afrique-L@mailserv.fao.org. This electronic bulletin will complement other existing information networks, such as the RILNET, operated by the FAO Regional Office for Asia and the Pacific. The e-mail address for RILNET is: mailserv@mailserv.fao.org.

- **Development of Codes of Harvesting Practices**

In 1996 and 1997 FAO developed and published the FAO Model Code of Forest Harvesting Practice in English, French and Spanish. In the year 2000 the Model Code was published also in Chinese. Since then a strong interest has been recognised in the development of regional and national codes of practice. In 1999 a regional code of practice for forest harvesting has been developed for the Asia Pacific Region. Presently a code is under preparation for Central

and West Africa. In addition, efforts are being made to develop a regional code for Latin America. Based on the FAO Model Code, a number of countries have started initiatives to develop national codes and guidelines. The most recent example is cooperation between the International Labour Organization and FAO in developing a national code for China.

- **Case Studies on Environmentally Sound Forest Operations**

FAO collaborates with government agencies, private companies and institutions, including universities and research organizations, to carry out field studies which test the principles of environmentally sound operations and demonstrate that forest operations are compatible with sustainable forest management practices. The aim is to compare conventional and improved technologies and systems, measuring the benefits and costs of such operations and to foster the transfer of environmentally sound technology to developing countries. An important part of such studies is, besides the assessment of the environmental impact, an assessment of costs and productivity and the social benefits of improved forest operations. Reports of recent case studies focus on:

- ❑ Forest Harvesting in Natural Forest of the Congo, 1997
- ❑ Environmentally Sound Forest Harvesting, 1997: Testing the Applicability of the FAO Model Code in the Amazon in Brazil
- ❑ Labour-intensive Harvesting of Tree Plantations in the Southern Philippines, 1997
- ❑ Reduced Impact Timber Harvesting in the Tropical Natural Forest in Indonesia, 1998
- ❑ Environmentally Sound Forest Infrastructure Development and Harvesting in Bhutan, 1999

In the near future, the following Case Studies will be published:

- ❑ Forest Harvesting Practices in Concessions in Suriname
- ❑ Financial and Economic Assessment of Timber Harvesting Operations in Sarawak, Malaysia
- ❑ Forest Harvesting Operations in Timber Permits in Papua New Guinea

- **Database on Forestry Equipment**

FAO is maintaining a worldwide database on companies which manufacture forest hand-tools, harvesting transport and road construction equipment. It is planned to fully computerize the database and make the information available to a broad audience by CD-ROM.

- **Cooperation within the Framework of the FAO/ECE/ILO Committee on Forest Technology, Management and Training**

The FAO/EC/ILO Joint Committee is an international body which has been serving forestry in the countries of Europe and North America since 1954. It acts as an interface between practitioners, researchers and policy makers. Participants in the joint committee activities are forest specialists who come from forest services, private forests, the forest industry, research institutes and universities, training centres, trade unions and others. However, anyone with an interest in forestry, from any part of the world, is most welcome to participate in the Committee. The Committee works through holding international seminars, focussing on important topics of general interest, with wide participation. It also works through workshops, which focus on a more specific forestry subject, and through teams of specialists whose aim is to solve specific

problems and address particular issues in forestry and forest utilization, as well as forestry advisory missions.

The exchange of information and cooperation within the Committee focuses on forest management and silviculture, forest technology and operations, training and safety, and health in forest work.

Recent important meetings in the field of forest technology have been held. These are: Seminar on the Harvesting of Wood and Non-wood Forest Products in the Mediterranean Region (Menemen-Izmir, Turkey, October 2000 – Proceedings published and distributed); and the Workshop on New Trends in Wood Harvesting with Cable Systems (Ossiach, Austria, June 2001 – Proceedings presently being prepared). Future meetings being planned are: Seminar on Multi-functional Forestry in Protected and Vulnerable Forest Areas (Sochi, Russian Federation, 21-26 October 2002); and Seminar on Mobilization of Additional Wood Supply, Mainly from Private Forests (venue to-be-decided, proposed for 2004).

More information on the Committee can be obtained by e-mail: Joint.Committee@unece.org.

- **Cooperation between FAO and International Union of Forest Research Organizations (IUFRO)**

In the field of Forest Operations in the Tropics, and Forest Operations under Mountainous Conditions, close cooperation between the International Union of Forest Research Organizations (IUFRO) and the FAO Forest Harvesting, Trade and Marketing (FOPH) Branch has existed for many years. In particular, a joint meeting on Reduced Impact Harvesting and the development of a Regional Code on Best Forest Harvesting Practices for Latin America is being planned for Brazil in October 2002.

An international meeting is planned to be held on the Role of Farm Forests and Wood Utilization for Rural Development in Slovenia in 2003. The objective of the meeting will be to exchange experiences and information, in particular in the European countries with special consideration for countries in transition.

- **Cooperation between FAO and the International Labour Organization (ILO)**

FAO has a long-standing cooperation with ILO in the field of Forest Operations, Safety and Health, and Forestry work and ergonomics. One major programme product of this cooperation has been a manual on chainsaw operations in the Tropics. Presently, we are working on a National Code of Practice for Forest Harvesting in China. The main outputs of this programme will be publication of the Code in Chinese (20,000 copies), and in English (500 copies). Furthermore, training models will be developed for target groups related to the Code implementation. It is expected that a good number of trainers will be made familiar with all the technical aspects of the Code, and these trainers will serve to train more than 700 forestry field staff.

FAO FOREST ENGINEERING PROGRAMME COMPONENT

The objective of the Forest Engineering Programme is to assist in the adoption and implementation of environmentally friendly forest road construction methods and to reduce the negative impacts on the environment, while minimizing road construction and maintenance costs. The scope of the programme is global; it emphasizes forest road infrastructure

development in mountainous and difficult terrain. The basic strategy of the programme is to strengthen the capacity of decision makers and forest road practitioners to better plan, design and construct forest roads and mitigate the destructive elements during construction works and their aftermath.

ACTIVITIES

- **Manual for the Planning, Design and Construction of Forest Roads in Mountainous Terrain**

Presently, guidelines on Forest Roads are being developed, which will include the preparation of the above-mentioned Manual. An Expert Meeting is planned to be held in Vancouver, British Columbia, Canada in Spring 2002, to discuss and review the first draft.

- **Case Studies on Environmentally-Friendly Forest Road Construction**

The following Case Studies have been prepared and are available:

- Environmentally Sound Road Construction in Mountainous Terrain Applying Advanced Operating Methods and Tools in Austria, 1998
- Environmentally Sound Forest Infrastructure Development and Harvesting in Bhutan, 1999

The following Case Studies are under preparation:

- Rural Road Infrastructure as Introduced in Nepal: The Green Road Concept
 - Forest Road Construction in Plantation Forests in Hilly Terrain in South Africa
- **Cooperation within the Framework of the FAO/ECE/ILO Committee on Forest Technology, Management and Training**

The Joint Committee, supported by IUFRO, organized a meeting on Environmentally Sound Forest Roads and Wood Transport in 1996 in Sinaia, Romania, which brought together more than one-hundred participants from 22 countries. The Proceedings were published in 1998 and subsequently distributed.

A follow-up meeting is planned on the same subject in 2004, which is foreseen to be held in Hungary.

- **Cooperation between International Technical Tropical Timber Association (ATIBT) and FAO**

Through the above-mentioned cooperation, a joint publication has been developed and published on road infrastructures in tropical forests: "Road to Development or Road to Destruction?". The objective of the publication was to draw attention on the road of forests and forest roads, and the importance they play in the social and economic development of tropical forest countries and to the danger which forest roads could present for the environmentally sound management of forest ecosystems.

FAO FOREST RESOURCE UTILIZATION AND ENVIRONMENT PROGRAMME COMPONENT

The objective of the Forest Resource Utilization and Environment Programme Component is to promote the efficient utilization of forest resources by reducing wood-waste and other losses in all phases of the utilization process, in order to contribute to the overall goal of sustaining all types of forests and their products for present and future generations. The scope of the programme is global, but the particular focus on tropical forest resources is the present main issue of concern.

The basic strategy of the programme is to provide information for decision-makers in the public and private forest sector organizations and enterprises to encourage them to apply environmentally sound utilization practices.

PROJECTS

- **Project on Environmental Impact Assessment related to Forest Utilization**

This FAO Project is being implemented with the support of the Government of Austria. Information on harvesting in tropical natural forests has been surveyed in 43 selected countries in Africa, South America, Asia and Oceania, having at least 5% of the total land area or 1 million ha of forest. The information gathered was used to quantify existing levels of harvesting impact and to enhance sustainable forest management in tropical countries, through the improvement in forest practices. The final report will be available in the near future.

- **EC/FAO Project on Sustainable Forest Management in African, Caribbean and Pacific (ACP) Countries**

The overall objective of this project is to assist national forestry administrations in ACP Countries to reform and focus policies and institutions in support of the achievement of sustainable forest management. The following activities will be carried out within this Project:

- ❑ Development of a Regional Code and subsequently testing the applicability of it
- ❑ Case Studies in Republic of Congo, Central African Republic, Ghana, and Gabon to explore methodologies to overcome some of the problems identified in harvesting of tropical forests
- ❑ Training workshops to introduce the Code and Reduced Impact Harvesting Practices

- **Conference on Reduced Impact Logging**

An international conference on Reduced Impact Logging, held in Kuching, Malaysia in February-March 2001 was jointly organized by: APFC, CIRAD-Forêt, FAO/RAP, FDS, ITTO, MoF-Indonesia, STA, TFF, USDA/FS, and USAID, and was attended by 260 participants. This conference provided a good overview on recent developments and investigations in Reduced Impact Harvesting and Engineering Practices. In this connection, a draft report was prepared on Reduced Impact Logging in Tropical Forests which provides a literature synthesis, analysis and prototype statistical framework. It contains a review of 266 articles on harvesting intensities, cycles and wastes, and residual stand and site damages. A final version of this report is foreseen to be published next year.

- **Technical Support to Field Projects**

- Technical assistance to the Forestry Project in Albania (GCP/ALB/004/ITA)

Among other activities of that project, FAO is supporting activities aimed at sustainable forest management. In particular, forest road rehabilitation will be undertaken in accordance with the new Environmental Impact Assessment Guidelines, which were developed with FAO Technical Assistance and Headquarters' backstopping. Further FAO backstopping has been requested for the monitoring of the work during the actual reconstruction.

- **Protection of Spruce Stands in the Slovak Republic, Kysuce Region**

FAO is assisting in developing and demonstrating to forest owners, environmentally sound, socially acceptable and environmentally favourable forest harvesting technologies for infested forest stands (bark beetle) on sensitive soil.

- **Case Studies on Environment and Forest Utilization**

- Development of Guidelines for Case Studies

Guidelines are being prepared for the collection of data on the Environmental Impact Assessment related to Forest Utilization.

- The following Case Studies are in preparation:
 - Logging Impacts on the Training and Model Forest of the National University of Lao PDR
 - Impact Assessment Related to Harvesting in Natural Forests in Brazil