

## BACKGROUND

There are 1,700 million hectares of tropical forests, accounting for half of the world forest area. The many different types of tropical forests range from the rain forests of the Amazon to the dry woodlands of Southern Africa, from the coastal mangroves of Southeast Asia to the alpine forests in the Andean highlands of South America. They are all characteristically rich in both plant and animal species. Some 500 million people live in or at the edge of the tropical forests. They are, for the most part, some of the least privileged groups in our global society. They depend on the forests for many important products: food, building materials, medicines, fibres, and resins. Tropical forests are the source of approximately 15 percent of the world's industrial forest products, such as lumber, panels, pulp, and paper. The forests provide important environmental services, such as regulating streamflows, moderating local and global climates, and conserving soil.

**This FORESTRY ISSUES paper examines the major environmental problems facing tropical forests and looks at practical approaches to address them.**

The environmental problems facing the developing world are staggering in their magnitude and their complexity. They are fuelled by the vicious cycle of population growth and persistent poverty. Most countries face serious problems in the urban environment: lack of potable water, inadequate sewage disposal, increasing air pollution, and the inappropriate disposal of toxic wastes. In rural areas, the deterioration of natural resources not only destroys the environment but also undermines the very foundation on which economic growth and development depend. The catastrophic impact is seen in accelerating soil erosion, which results in permanent loss in agricultural productivity; in advancing desertification accompanied by drought and famine; in declining coastal and inland fisheries; in the misuse of agrochemicals that poison both farmers and the environment; in the alarming sedimentation of fragile coral reefs; and in the destruction of biodiversity-rich wetlands. None of these natural resource problems is more threatening, none more in need of immediate action, than those related to the tropical forests.

## ENVIRONMENTAL CHALLENGES FACING TROPICAL FORESTS

### Uncontrolled Deforestation

Deforestation is the clearing of the forest for other land uses: agriculture, grazing, new settlements, infrastructure, and dam reservoirs. It has received much attention in recent years with vivid images of burning trees in the Amazon seen by people around the world. Its effect on biodiversity and climate change has been the subject of many newspaper articles and television documentaries.



How much forest is being destroyed? We are now losing almost 16 million hectares every year. What is causing it? More than 60 percent of all deforestation occurs when small farmers; driven by poverty, landlessness, and the lack of economic alternatives; are forced to cut down the forests for subsistence cropping. The other major cause of deforestation is the clearing of the forest for new range and pasture for livestock grazing. The tragedy lies in the fact that these lands are not suited to long-term farming or grazing and quickly degrade after the forest has been cut. In fact, throughout the developing world, very few forested lands are left that have any potential for sustainable agriculture. Firewood collection and timber harvesting are secondary causes of deforestation.

## Advancing Desertification

Desertification is land degradation in dry climates. It affects about 3,000 to 3,500 million hectares, about one-quarter of the world's land area, and threatens the livelihoods of 900 million people in 100 countries of the developing world. Desertification is the consequence of extremes in climatic variation and unsustainable land use practices. Growing populations are making ever-increasing demands on the land to produce more and more. This has led to an intensification of use beyond the carrying capacity of the land. The main agents of desertification are over-cultivation, over-grazing, over-cutting of trees and shrubs, and poor water management on irrigated lands.

## Climate Change

The currently accepted models of climate change predict a 3o Celsius increase in global temperatures over the next half-century. The principal cause of global warming is the excessive discharges in industrialized countries of greenhouse gases, mostly compounds of carbon, which come from burning fossil fuels. However, about 20 percent of the global carbon dioxide emissions come from deforestation and forest fires, with tropical America being the chief contributor. Deforestation on a regional scale is known to disrupt rainfall patterns, creating hotter and drier weather patterns.

### CIDA HIGHLIGHT - SENEGAL

The Coastal Soil Conservation Project works with communities in Senegal to stop desertification through reforestation and agroforestry tree planting.

## Loss of Biodiversity

Tropical forests have a special role in the conservation of biodiversity. They shelter the greatest diversity of plants and animals in the world. Of the estimated 30 million species thought to exist, 40 percent are found in tropical forests. At present, our knowledge about them is very imprecise. Many provide important products: forest fruits, medicines, resins, and fibres. Genetic diversity, the diversity within a given species, is very important for plant-improvement breeding. A species of wild maize, *Zea diploperennis*, has been found in Mexican woodlands. It is resistant to five of the world's seven most important corn viruses and is now an important genetic resource for corn-improvement programs. Deforestation is eroding this precious resource.

## Excessive Firewood Cutting and Use

Firewood accounts for 50 percent of all the wood cut in the world and satisfies most of the developing world's energy needs. Even with fuel substitution, it is not expected that this dependence will change significantly before the end of the next century. Worldwide, nearly 3,000 million people use firewood as their principal source of energy, particularly in rural areas and among the least privileged groups in society. Firewood is collected mostly from unregulated commons and, as a consequence, is very sensitive to overexploitation as the population increases.

## Exploitive Logging Practices

Forests are the quintessential renewable natural resource if they are properly managed for long-term benefits, employing technologies sensitive to the environment. Unfortunately, very few natural forests in the tropics are managed adequately. In most tropical countries, logging is characterized by a "cut-and-get-out" philosophy with no long-term regulation of the harvest, poor natural regeneration, high felling damage and residual waste, inadequate protection, and low rates of reforestation. Logging roads damage watercourses and cause severe soil erosion. They also open up the forests to spontaneous colonization. The intrusion of men and machinery for timber harvesting, with the resulting changes in the forest ecosystem, displaces many forms of animal life, particularly birds and larger mammals. Environmentally appropriate silviculture systems have failed in the tropics not for ecological reasons but because they lack the appropriate policy framework in which to operate.

## **Destruction of Watersheds**

When watersheds have balanced land use, their forests absorb excessive rainfall that is gradually released later. Once denuded, the same watersheds lose their capacity to regulate streamflows and experience rapid fluctuations in stream and river levels, often resulting in disastrous downstream flooding. Water shortage is a major health risk in terms of inadequate sewage disposal, poor personal hygiene, and insufficient potable water. Food security is threatened as irrigation water becomes scarcer. Without the protection of the tree cover, soils are exposed to the rigors of severe tropical climates and are rapidly eroded. Freshwater and coastal fisheries are devastated by the high sedimentation loads carried by the rivers, as are wildlife-rich wetlands. Sedimentation from degraded watersheds is also one of the principal causes for the decline of coastal coral reefs. The economic and environmental costs are staggering.

## **TAKING STEPS TOWARD MORE SUSTAINABLE MANAGEMENT OF FORESTS**

What can be done to reverse the deterioration of tropical forests? What are some practical steps that can be taken by developing countries? How can donor agencies help? Forestry and conservation offer some practical steps toward more sustainable forest management.

### **CIDA HIGHLIGHT - HONDURAS**

The Forestry Support Unit assisted Honduras in developing new legislation that provides incentives for reforestation and the management of natural forests.

## **Support Policy Reform**

Reforms to natural resource policies and other policies affecting forestlands should be given the highest priority. Before project-level or community-level interventions can have a meaningful effect, national policies must encourage sustainable management of forests. Forest policies should reflect the environmental importance of the forests as well as their economic value and the appropriate roles of the public and private sectors in implementing the policies. National planning for the development of natural resources should be based on land-use planning that takes into account not only the short-term economics of alternative land uses but also the long-term capability of the environment to sustain the proposed use. National economic accounts must be reformed to reflect the depletion of natural resource stocks when calculating gross domestic product. Currently, exploitive industries that deforest are erroneously credited with contributing more to national development than they actually do because there is no measure for their consumption of the forest resources. Subsidies, which distort the true market value of competing land uses, should be eliminated. Traditionally, forests have been undervalued. By not collecting forest-user taxes that reflect the true value of the resource and the cost of managing it, governments have discouraged sustainable management and the long-term investments needed to make forests more productive. Stumpage, user fees, and other forms of revenue should, at a minimum, provide the state with sufficient revenues to manage the forests and, if possible, generate surplus revenues for the public treasury. Resource tenure must be secure and long enough to be conducive to long-term investment. Finally, government policies should give priority to establishing the scientific infrastructure and human resource capacity to conduct forest-related research.

## **Support Integrated Resource Management**

Forest sector development must take into account the other sectors that share, and at times compete for, forest resources. The need for this type of cooperation is particularly true of the agriculture, forestry and conservation, energy, and water sectors. Win-win situations are possible when agroforestry is used as a tool for soil conservation, when the health sector uses the management of micro-catchments for potable water supplies, when watershed management is used to improve water flows to irrigation systems and when improved firewood supply satisfies energy needs. Natural resources must be managed more holistically, recognizing the interdependence of all sectors.

## Conduct Resource Assessments

Despite numerous efforts during the past four decades to inventory forest resources and to map land use, knowledge of the extent and nature of tropical forests is still woefully inadequate. Comprehensive resource inventories are needed, not only of the timber but of the trees and other plant forms, fauna, soils, and water resources.

### **CIDA HIGHLIGHT - CAMEROON**

Canada assisted Cameroon in conducting an inventory of 100,000 km<sup>2</sup> of forest, preparing management plans, and drafting a new national forest policy.

## Establish Protected Forest Areas

The United Nations Conference on the Environment and Development (UNCED) endorsed the goal that nations protect 12 percent of their area to conserve the natural flora and fauna. Although agreed to in principle, this good intention falls far short of being a reality. Greater support is needed to establish and maintain a network of protected areas and biological corridors, strategically chosen as representative of the world's ecosystems and their biodiversity. In order for the protected areas to have a chance at survival, human activities surrounding protected areas must be more sustainable. Environmentally sensitive development activities, such as sustainable agriculture, appropriate forest management, or ecotourism, should be encouraged in the buffer zones. Greater support is needed for the international conventions related to protected areas and their biodiversity. In particular, support should be given to the RAMSAR and CITES conventions for wetlands and endangered species, the biodiversity and climate change conventions signed at UNCED.

## Practice Sustainable Forest Harvesting

For forests to continue to perform their vital environmental functions and to realize their enormous economic potential, they must be managed. Those forest management technologies that have been successful should be used more widely as the first steps in moving from exploitive logging to wise forest use. Tropical silviculture systems should be adopted to secure adequate restocking by natural regeneration or enrichment planting. Practical measures such as appropriate design and construction of road and skid trails to minimize damage to soil and water resources are well known. Adequate and socially-appropriate protection measures must be taken to curb deforestation, including the creation of permanent forest estates. Land-use policy reforms are needed to secure long-term commitments to sustainable forest management. Adequate resource tenure systems must be adopted that provide security of supply for producers while protecting long-term public interests and a stable environment. Industrial plantations of fast-growing trees can satisfy much of the demand for forest products and, at the same time, reduce the pressure to exploit the timber of the natural forest. The successes of countries like Brazil and Zimbabwe show how industrial plantations can be managed in an environmentally sustainable manner and profitably grow the raw material for a thriving forest products industry. More support is needed for national and international research on forest management practices, including the strategic and applied research being undertaken by the Centre for International Forest Research (CIFOR).



## Enhance Forest-Derived Benefits

The long-term future of the tropical forests and their environmental health depends largely on how the forests are perceived by people. If they are considered worthless, mere impediments to the economic growth of other sectors, tropical forests most certainly will be lost in a matter of a few generations. If the forests are to survive, they must be of value to the people who might otherwise destroy them, and their benefits must be distributed fairly. Forest-derived benefits can be enhanced by adopting tenure systems that recognize co-management of the resource by the government and local communities; by practicing

more intensive silviculture; by making more efficient use of the resource (more species and greater recovery per species); by using and more effectively marketing non-wood forest products; by capitalizing on the ecotourism potential of the tropical forests; by adopting policies that provide society a fair return from the exploitation of its natural resources; and by ensuring long-term management of the forests.

**CIDA HIGHLIGHT - SOUTHERN AFRICA**

The Southern Africa Agroforestry Research Network is developing agroforestry systems for more productive, more sustainable small farmer agriculture.

**Reforest Watersheds**

One of the most viable alternatives for long-term rehabilitation of watersheds is reforestation. Thirty-one million hectares of tropical and sub-tropical plantations have been established for the protection of the environment, firewood, and industrial wood products. Tree planting and protection initiatives can green-up deforested hillsides and put watersheds on the road to environmental recovery, renewing their ability to regulate groundwaters and arrest soil erosion. Reforestation with multiple-use species can have both environmental and economic benefits.

**Expand Agroforestry**

Agroforestry is growing trees with agricultural crops or livestock on the same piece of land. Well-known examples of agroforestry are windbreaks, hedgerows, and mixed home gardens where trees form an integral part of the farm. It has proven itself to be an effective tool for improving land use and increasing agricultural productivity. It is particularly appropriate for resource-poor farmers who cannot afford the escalating cost of fertilizers, pesticides, improved seeds, and other modern farm inputs. Many agroforestry extension projects have successfully increased crop production by 25 to 100 percent by using multipurpose trees to arrest soil erosion, enhance soil fertility, and provide a favourable micro-climate for crops and livestock. Extension projects have found their greatest success when implemented by non-governmental organizations (NGOs) as part of more general development programs. Agroforestry is also one of the most appropriate ways to address firewood shortages.

**CIDA HIGHLIGHT - CHINA**

The Integrated Intensive Forest Management Project is developing environmentally sensitive approaches to forest harvesting and wise management in China's northeast region.

**Raise Awareness of Environmental Issues**

More support must be given to environmental awareness campaigns. Awareness-building must reach people living in the cities and in the country, adults and children, rich and poor. Decision makers in developing countries must understand the causes and consequences of mismanagement of the tropical forests, the potential benefits of sustainable use, and the appropriate, alternative actions they can take. Campaigns must move beyond the "beauty-of-nature" focus or the "for-the-good-of-your-grandchildren" appeal. Sound, quantifiable arguments must be made about the economic and social benefits of wise use of the forest resources. It is only through an informed public and informed leadership that the political will can be found to make the tough policy decisions required.

**Participate in National Forestry Action Plans (NFAP)**

To achieve the goal of environmental sustainability, new approaches to development cooperation must be found. Greater coordination of actions between the various sectors at the national level is needed as well as greater cooperation among donors. NFAP is an internationally coordinated effort by national governments, NGOs, and donor agencies for forest sector development. An NFAP brings together the various stakeholders in a country's forest sector to work together on a national development plan that truly

reflects society's constraints and opportunities. To date, most forested countries in the developing world and 15 donor agencies are involved in the NFAP process.

### **Join the International Model Forest Network**

In 1991, Canada embarked on a program designed to establish a network of working models of sustainable forest development. The program was expanded internationally in the following year as part of our commitment to UNCED. There are now more than 30 Model Forests in existence or under development around the world. Model forests strive to bring resource users together to develop new forest resource management solutions. The network fosters international cooperation and information exchanges. Model forests support involving all stakeholders in resource management decisions and applying appropriate forest science and social science technologies.

#### **CIDA HIGHLIGHT - MULTILATERAL**

CIDA strongly supports the National Forestry Action Program as a coordinated, multisectoral approach to sustainable forestry.

### **ACTION NEEDED NOW!**

Environmental sustainability, economic development, and social advancement are interdependent. It is impossible to think of long-term conservation of tropical forest ecosystems without thinking of the needs of the societies that are dependent on them. Our current knowledge and technologies, as imperfect as they are, can conserve much more of the remaining tropical forests and do much more to meet the basic needs of people than is being done now. The survival clock is ticking. In the time it took you to read this paper, 3,000 people were born and 550 hectares of forest were lost in developing countries. More, a lot more, can be done. Now is the time to do it.

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