



USDA FOREST SERVICE

International Programs

Addressing the Four Threats in an International Context

Land Use Conversion

Introduction

The loss of open space through conversion of forestlands to developed lands is one of the four threats that the Chief of the Forest Service has identified as the main challenges to the management of national forests and grasslands in the United States.

Increases in population and demand for resources have led to conversion of forest to agriculture or urban lands that can affect not only our nation’s public and private forests but can also cross international boundaries.

Through International Programs, Research and Development, and other government and nonprofit partners, the Forest Service is working to define and address land conversion issues in an international context. Our work focuses on sharing domestic experiences with international partners and learning from the experiences of countries that are addressing similar issues.

This paper describes the international scope of the land conversion threat, the actions currently being taken by the Forest Service and others internationally to address the problem, and options for future action that can be taken both globally and domestically.

Scope of the Land Use Conversion Problem

Global extent of land use conversion

In the 1990s, the world lost 14.6 million hectares (ha) (35 million acres) of forest per year when forestlands were converted to agricultural or urban uses. However, 5.2 million ha (12.8 million acres) per year were gained in plantations, reforestation, and natural forest expansion, for a net loss of 9.6 million ha (23.7 million acres) of forest per year (FAO 2001). Some specialists estimate that up to 20% of the world’s remaining large blocks of forest could be converted to agriculture (Bryant et al. 1997), with the highest conversion rates in the world occurring in the tropics (Echavarria 1996).



Countries and forests with high rates of net forest area change 1990-2000. FAO 2001.

Primary reasons why forests are converted to other uses

In most parts of the world, agriculture is the primary driver of land use change. Much of the pressure to convert forests to agricultural uses comes from increasing population growth and development demands. More land may be needed to provide food and commodities or to enable division of property into smaller parcels for new families. New communities and populations also require the development of new or improved transportation infrastructure. In many parts of the world, particularly in the United States, forests also are converted to urban land uses, although not to the extent that forests are converted to agricultural land.

Conversion of forests to other uses also occurs because local forest owners and users may perceive or actually receive a greater value and return on investment for uses other than forest. Public benefits such as clean water and wildlife may not benefit the forest owner economically. Insecure tenure systems and poverty also create disincentives to manage for long-term resource values, because they create the need for immediate economic returns from forest land.

Effects of forest conversion on environments and societies

As forest land is changed to agriculture or urban use, the products and services provided by that forest (such as timber, water, wildlife, carbon storage, aesthetic beauty, etc.) are lost. The liquidation of forest assets has a profound impact on communities that rely on the forest for food and economic development.

Land use conversion affects both the amount and spatial pattern of forest habitat, which in turn can affect the ecological function and future development of remaining forest lands. For example, habitat fragmentation and transportation corridors can create migration barriers or inhospitable habitats for wildlife and interfere with other ecological processes. Small ownership parcels also complicate management and cooperation at landscape and watershed scales.

In addition to its ecological and management effects, tenure changes resulting from land conversion can lead to social conflict. For example, indigenous populations may have traditionally used specific natural forest lands, but forest frontier settlers may end up with tenure rights after these lands are converted. In other cases, reallocation of timber rights may enable industrial concessionaires to pre-empt local forest users. Unclear or conflicting tenure status may add even more confusion to already complex management authority and overlapping jurisdictions for management or government oversight.

Habitat fragmentation — the “disruption of continuity” in pattern or process (Meffe and Carroll 1994).

While sustainable timber harvests provide much needed economic benefits, timber roads from legal and illegal commercial timber harvest can fragment remaining forests and allow new transportation access into previously inaccessible forest areas. Expanded access may be used by poachers for the hunting and trade of endangered bush meat trade, or by agricultural migrants looking for new areas to cultivate; it may also be used to further legal or illegal timber harvest operations. Newly opened areas may further provide routes for invasive species to spread.

Lack of reliable information about land use conversion

Despite the escalating worldwide threat to ecosystems and communities from increased conversion of forestland to agriculture and urban development, we lack accurate and timely information about the global extent and location of land use conversion. Global statistics are often patched together from disparate national and regional methods and statistics, giving no definitive data on where forest change is occurring. At local

scales, data on land use change may not be available in a timely fashion, making it difficult for forest managers to interdict illegal forest clearing (because the criminals often have left the area by the time forest managers are aware of the problem). Furthermore, there is no universally accepted way to measure fragmentation and assess the complex effects of landscape pattern on ecosystems.

Links and Lessons: Policy Forums and Projects Addressing Land Conversion

International Programs facilitates Forest Service participation in numerous efforts to address the land conversion issue, such as bilateral programs and activities and multilateral policy forums. We link Forest Service managers to international networks, tools, and resources that can help them address management issues at home through lessons learned abroad.

Bilateral Programs and Activities

In cooperation with the U.S. Agency for International Development (USAID) and other partners, International Programs participates in a number of targeted projects that address land use change:

- The Forest Service is working with Madagascar natural resource agencies and nonprofits to create a transparent permit system for timber harvest in order to control increasing agriculture conversion and deforestation in Madagascar.
- In the Eastern Arc Mountains of Tanzania and Kenya, the Forest Service shared its expertise in remote sensing to develop a system for local resource managers to monitor forest health threats and forest cover change.
- In Albania and Georgia, International Programs is providing technical assistance and advice on land use plans and watershed assessments.
- In the Congo Basin, landscape planning and training in “reduced impact logging” is being done to reduce deforestation and eliminate road access used by illegal loggers and bush meat traders.
- International Programs is in the proposal stage of a remote sensing project in Brazil to map land use conversion.



Fire used for land clearing. Photo by USDA Forest Service.

Multilateral institutions and activities

Internationally, almost all multilateral institutions and agreements dealing with forests identify loss of forest cover as a major problem. International Programs helps facilitate travel and participation of Forest Service staffs in these activities, such as the following:

- International efforts to track forest condition change can provide information that policy makers can use to prioritize and target areas under the most threat of land conversion or fragmentation. Such efforts include criteria and indicator initiatives (such as the Montreal Process); the current plan to establish an internationally integrated Earth Observation System; the global Forest Resource Assessments by the UN Food and Agriculture Organization (FAO); and non-governmental efforts to collect forest trend data, such as the work of the World Resources Institute (WRI) and Forest Trends.
- The UN Forum on Forests has a number of proposals for action (PFAs) that address loss of forest cover, and the U.S. has hosted a workshop on methods to better share experiences on effective implementation of the PFAs. The International Tropical Timber Organization, Convention on Biological Diversity, and Convention Combating Desertification also all have major programs that promote the protection and restoration of forest cover.
- A critical aspect of land use conversion is the limitation of illegal timber harvest, because such operations often open access to intact forest systems and use harvest methods that fail to maintain forest cover. Under the President's Initiative Against Illegal Logging (U.S. Department of State 2003), many U.S. Government agencies are cooperating with partners around the world to interdict illegal timber trade and to address related governance issues. This U.S. initiative complements the international Forest Law Enforcement and Governance processes (FLEGs) that are occurring in different regions.



Kenya agroforestry. Photo by Robert Anderson, forestryimages.com.

Key Policy Issues, Opportunities, and Steps Forward

Because numerous causes and factors affect forest loss globally, different techniques are necessary to solve individual incidents of forest loss and fragmentation, depending on the issue being addressed.

Using remote sensing

Efforts are underway to link remote sensing data with ground measurements and local officials to enhance understanding of forest inventory, road tracking, fragmentation effects, and land use. These efforts will be most effective if the data collection management systems provide timely and accurate information to local resource managers so they can respond effectively to various threats. The goal is to enable managers to intervene in cases of illegal forest conversion rather than to simply document the damage after the fact (Auer et al. 2003).

Improving research on forest fragmentation

In countries that are still facing rapid deforestation, direct forest loss is probably a more important topic than spatial pattern of remaining forest fragments. However, in countries where the amount of forest is more or less constant, fragmentation and spatial pattern are more important because the total forest amount by itself may create a misleading picture of changes in forest cover. Opportunities exist for future research that could improve the understanding of the relationship between forest cover (extent) and habitat fragmentation (pattern). With this understanding, more knowledgeable decisions could be made to mitigate the effects of land use conversion and habitat fragmentation, while continuing to satisfy demands for agricultural and urban land uses.

Applying reduced impact logging practices

International Programs and partners in the Tropical Forest Foundation (TFF) are working to develop and implement reduced impact logging techniques in the Amazon and Southeast Asia. These techniques allow development of tropical forest products while maintaining canopy cover. With the support of the U.S. and the International Tropical Timber Organization, TFF is currently in the process of establishing a regional training center in Brazil to expand its ability to teach reduced impact techniques to Amazonian forest workers. By making these techniques more broadly available, legal and sustainable forest development can occur without losing the benefits of forest cover.

Capturing non-timber values of forests

New tools that promote the value of forest property can become important incentives for the maintenance of forest cover. Alternative financing mechanisms such as conservation easements and environmental credits (carbon, water, etc.) can create economic incentives to maintain forest cover, reducing the economic incentive to convert forest land to uses such as agriculture or urban development. At the 2003 World Forestry Congress in Quebec City, Canada, the U.S. forestry community shared information about a number of these mechanisms through the U.S. exhibit and an accompanying event. Other forest uses, such as non-timber forest products (e.g., fruit, wildlife game, florals) and economic returns from recreation activities, can also provide value to help maintain forests.

Establishing secure land tenure and empowering forest users

Community forestry initiatives around the world may help empower local populations to maintain and protect their forest resources. These initiatives can create more secure land tenure situations and provide local incentives for communities to maintain and sustainably use their forest resources.

Opportunities for stemming the loss of open space

Among the programs that are most likely to succeed are those that enhance the value of maintaining forests, such as:

- Securing tenure for local communities;
- Developing agroforestry technologies;
- Preventing illegal logging;
- Certifying sustainable forest management for access to high-value timber markets;
- Marketing non-timber forest products (NTFPs); and
- Establishing carbon/water/ environmental credit trading.
- Potential certification systems for green ecotourism and other recreation alternatives to protect natural and cultural resources.

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For More Information

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Websites:

- Conservation Finance Alliance, <<http://www.conservationfinance.org/>>
- Forest Trends, <<http://www.forest-trends.org>>
- Yale Forest Fragmentation Conference 2000, <<http://research.yale.edu/gisf/ppf/fragmentation.html>>