

Chapter 8

Wood, Fuelwood, and Non-wood Forest Products

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Main Messages

Strategies to address the impacts of forest product use on ecosystem health and human well-being are strongly affected by actions outside the forest sector. Some responses to problems related to forest products are achieving far more impact than others. Outcomes tend to be shaped as much or more by policies and institutions related to trade, macroeconomics, agriculture, infrastructure, energy, mining, and a range of other “sectors” than by processes and instruments within the forest sector itself. The objectives of some sectoral responses might be better achieved by non-forest measures; for example, land reform might benefit poor communities more than collaborative forest management. When considering responses, it is important to understand the degree to which each may be undermined or overridden by driving forces beyond the forest sector and the degree to which each can engage with and influence such forces.

Forest product trade tends to concentrate decision-making power over (and benefits from) forest management in the hands of powerful interest groups, rather than spreading it to include poorer and less powerful players. It “magnifies” the effect of governance, making good forest governance better and making bad forest governance worse. This threatens prospects for long-term sustainability. Both increased trade and trade restrictions can make impacts worse if underlying policy and institutional failures are not tackled. Trade liberalization can stimulate a “virtuous cycle” if the regulatory framework is robust and externalities are addressed.

International forest policy processes have made some gains within the forest sector. Attention now needs to turn to integration of agreed forest management practices in financial institutions, trade rules, global environment programs, and global security decision-making. The last decade saw many intergovernmental and civil society ‘soft’ policy responses to define sustainable forest management and to produce guidelines that could be interpreted locally. These responses included the United Nations Conference on Environment and Development, the International Tropical Timber Organization, and the Convention on Biological Diversity; they have both enabled much local progress and linked forest debates between local and global levels. Much critical intergovernmental policy work within the sector has been done. National policy and the interpretation and implementation of international policy at the national level are increasingly influenced by extra-sectoral policy and planning frameworks. Forest sector frameworks will have to adjust to more directly serve these wider goals or their influence will diminish.

Forest governance initiatives and country-led national forest programs are showing promise for integrating ecosystem health and human well-being where they are negotiated by stakeholders and strategically focused. Multilateral and bilateral accords to combat illegal logging, its associated trade, and the governance frameworks that might prevent it are becoming important venues for developing action plans and agreements. National forest programs are now being strongly promoted on the understanding that they follow a country-led approach. To be most effective, these programs should have multistakeholder involvement in forest decision making; be a means for cooperation, coordination, and partnership; promote secure forest resource access and use rights; involve research and traditional knowledge; and be built upon the study and policies on underlying causes of deforestation and degradation. In addition, they should include codes of conduct for business. They should have built in monitoring, evaluation, and reporting on their progress and effectiveness. To date, the new breed of national forest programs, although quite widespread, shows more promise than tangible results.

Local responses to problems of access and use of forest products have proliferated in recent years. They are collectively more significant than

efforts led by governments or international processes but require their support to spread. A wide range of local responses have emerged “spontaneously” over the last decade, each with locally appropriate organizational forms and proven or potential impact in improving the contribution of ecosystems to human well-being and poverty alleviation. They often have a strong emphasis on gender equity. These include *campesino* forestry organizations in Central America, forest user groups in Nepal, the National Council of Rubber Tappers in Brazil, people’s natural resource management organizations in the Philippines, and the Landcare movement in Australia. Policy frameworks could better assist such groups to build on what they are already doing and to enable new partnerships. Multistakeholder poverty-forests learning processes could be fostered with codes of conduct for supporting local initiatives. These could be integrated into national forest programs and poverty reduction strategies.

Government-community collaborative forest management can be highly beneficial but has had mixed results. Most collaborative management has promoted arrangements that maintain and even extend central government control. Local people generally have better legal access to forests and some have higher incomes but many have lost access and benefits. As a result the “co-management” response is shifting. Management increasingly involves not just a local group and the government but a range of stakeholders, and acknowledges overlapping systems of management and diverse interests. Local people are able to win more benefits for themselves where they have strong local organizational capacity and political capital to mobilize resources and negotiate for better benefits. NGOs, donors, federations, and other external actors also have a key role in supporting local interests. Where local groups manage their own forests without state intervention, however, they are not necessarily better off. Without government support, they often have difficulty implementing or enforcing their decisions. Improved formal access to forests has helped in many cases to protect a vital role of forests as safety nets for rural people to meet their basic subsistence needs. The benefits to be gained beyond the subsistence-level, however, are limited.

There is a widespread need for support to enable people in forest areas to secure their rights and strengthen their powers to negotiate fair division of control, responsibility, and benefits with other actors. Many governments have realized that they cannot secure a balance of public and private benefits from forests. Some have transferred control to private entities under lease agreements requiring public benefits to be guaranteed. Others have recognized, returned, or created rights for local communities to own forests, manage them, benefit from them, and bear certain costs and risks. Such communities often lack adequate recognition, powers, organization, capacity, and information to make use of these rights. Ways to cover the transaction costs of collective action are still sought. Checks and balances need to be in place to ensure that no group, including the local elite, controls benefits and decision-making. Processes are needed that acknowledge plural interests among the different groups and give special attention to livelihood needs of the poor. Culturally appropriate and technically sound cooperation between indigenous and non-indigenous organizations to reinforce natural resource management on indigenous lands is rare. This is much needed given the rapid growth in areas over which indigenous peoples have control.

Where information, tenure, and capacity are strong, small private owners of forests may deliver more local economic benefits and better forest management than larger corporate owners. Individuals and families have proven their potential to practice good forestry over the long term. However, many conditions are required for this to be effective. These include good knowledge, capacity to manage, market information, organization among smallholders to ensure economies of scale, long-term tenure, and transfer rights. Private ownership (or “family forestry”) is common in Western Europe and in the southern United States, and is increasingly common in Latin

America and Asia. It may lead owners to assume a greater sense of responsibility and foster long-term thinking, prompting them to pursue sustainability, partly for risk reduction. Experience in Nordic countries and in many continental European countries shows the positive effects generated by information flow, education, and training and that it can be in the self-interest of owners to “do right.”

Company–community partnerships can be better than solely corporate forestry, or solely community or small-scale farm forestry, in delivering benefits to the partners and the public at large. Companies may seek to improve long-term survival and competitiveness. Communities may prioritize gains such as secured land tenure or improved local infrastructure. Effects on equity and rural development are mixed. Financial returns often have proven insufficient to lift community partners out of poverty. Making the most of partnerships requires iterative approaches to developing equitable, efficient, and accountable governance frameworks (at the contract level and more broadly), raising the bargaining power of communities, particularly through association at appropriate scales, fostering the roles of brokers and other third parties (especially independent community development organizations), sharing the benefits of wood processing as well as production, and working toward standards that give equal opportunities to small-scale enterprises.

Public and consumer action has resulted in some important forest and trade policy initiatives and improved practices in some large forest corporations. Public and consumer action has been key in the development of forest and trade policy initiatives in “timber consuming countries” and in international institutions. The operating standards of some large corporations and institutions, as well as of those whose non-forest activities have an impact on forests, have been improved. Consumer campaigns have provided the underpinning for forest certification and served as a useful mechanism for bringing public attention to, and engagement with, issues that are often geographically remote. Such campaigns can potentially continue to play an important role both in maintaining public awareness of forestry issues and in encouraging improved forest management.

Forest certification has become widespread; however, most certified forests are in the “North,” managed by large companies and exporting to Northern retailers. The early drivers of certification hoped it would be an effective response to tropical deforestation. There has been a proliferation of certification programs to meet different stakeholders’ needs with the result that no single program has emerged as the only credible or dominant approach internationally. Many certification programs have developed group certification of small growers, or certification of regions with a single management regime. Stepwise approaches to certification, starting with legality verification, are now emerging and hold promise for wider applicability and adoption in tropical regions and Russia. National certification programs in Brazil, Malaysia, Indonesia, and elsewhere have increased adoption of this response in the “South.”

Commercialization of non-wood forest products has achieved modest successes for local livelihoods but has not always created incentives for conservation. There has been significant growth in some NWFP markets. This has followed extension of the market system to more remote areas; increased interest in natural products such as herbal medicines, wild foods, handcrafted utensils, and decorative items; and development projects focused on production, processing, and trade of NWFPs. Few NWFPs have large and reliable markets. Those that do have tend to be supplied by specialized producers using more intensive production systems. Many other NWFPs are vital to the livelihoods of the poor but have little scope for commercialization. Such commercialization has achieved modest impacts for livelihoods through combinations of technical and capacity-building interventions to improve raw material production, processing, trade, and marketing, and through development of co-

operatives, improved policy, and institutional frameworks. There are often problems, however, with stronger groups gaining control at the expense of weaker groups and with overexploitation of resources. Increased value does not automatically translate into effective incentives for conservation and can have the opposite effect.

Sustainable natural forest management in the tropics should be focused on a range of forest goods and services, not just timber, to be more economically attractive. Low-cost new technology has made a difference to some forest management functions. Diverse cultures can be expected to arrive at local solutions to securing both wood supplies and forest environmental services. While the “best practices” of global corporations are worthy of scrutiny, there is also much to be gained by exploring “what works” in traditional forest management and the work of local (small) enterprises. Since the early 1990s, considerable interest has developed in the application of reduced impact logging, especially in tropical forests, which lowers environmental impacts and can also be more efficient and cost-effective.

Development of farm woodlots and large-scale plantations is an increasingly widespread response to growing wood demand and as natural forest areas decline. Without adequate planning and management, the wrong growers, for the wrong reasons, may grow forest plantations in the wrong sites, with the wrong species and provenances. In areas where land degradation has occurred, afforestation may play an important role in delivering economic, environmental, and social benefits to communities and help in reducing poverty and enhancing food security. In these instances, forests and trees must be planted in ways that will support livelihoods, agriculture, landscape restoration, and local development. There is increasing recognition that semi-natural and mixed-species, mixed-age plantings can provide a larger range of products, provide “insurance” against unfavorable market conditions, reduce the effects and economic consequences of insect and disease attacks, harbor greater diversity of flora and fauna, contain the spread of wildfires, and provide greater variety and aesthetic value.

Fuelwood remains one of the larger outputs of the forest sector in the South. If technology development continues, then industrial-scale forest product fuels could become a major contributor to sustainable energy sources. Consumption of fuelwood has recently been shown to be growing less rapidly than earlier thought. This follows increasing urbanization and rising incomes as users switch to more efficient and convenient sources of energy. In some regions, including much of developing Asia, total fuelwood consumption is declining. Efforts to encourage adoption of improved wood burning stoves have had some impact in urban areas of some countries but little success in rural areas due to cultural and economic obstacles to their adoption. Recent attention to improved stoves has shifted from increasing efficiency of fuelwood use to reducing damage to health from airborne particulates and noxious fumes associated with the burning of wood and charcoal. In Northern regions, as renewable options gather more momentum and the technology becomes more fine tuned, it can be expected that dendro power options, using wood to fuel electricity generation, will become more competitive and investor friendly.

8.1 Introduction

This chapter assesses the impact on ecosystem health and human well-being of actions taken to influence the production and use of wood, fuelwood, and non-wood forest products (also known as non-timber forest products). These actions are responses to the ecosystem and human well-being conditions and trends associated with forest products that are assessed in *MA Current State and*

Trends (Chapters 9 and 21). The effectiveness of these responses is also assessed in relation to the possible scenarios in *MA Scenarios*.

The chapter discusses (1) driving forces of change in ecosystems that produce wood, fuelwood, and non-wood forest products, and the problems and opportunities they create; (2) interventions and actions to tackle the problems; (3) an assessment of selected responses; and (4) lessons learned. Other chapters in this and other MA volumes assess ecosystems and services closely linked to the provision of wood, fuelwood and non-wood forest products. Gaining a full picture of the state of forests and woodlands, the provisioning services of wood and NWFPs, and the human actions taken to address problems linked to wood and NWFPs requires looking at them as well. (See Chapters 5, 7, 15, 16, in this volume; *MA Current State and Trends*, Chapters 10, 13, 14, 17, and 24; and *MA Scenarios*, Chapter 10.)

8.1.1 Driving Forces of Change in the Ecosystems that Provide Forest Products

There is a range of strong proximate (or direct) drivers of change in the ecosystems that produce wood, fuelwood, and non-wood forest products. Some of these drivers are natural phenomena. Almost all interact in complex and unpredictable ways with human activities to influence the ability of wildlands, forests, plantations, and agricultural systems to produce wood, fuelwood and non-wood forest products.

Fire is the most immediate and dramatic agent of ecosystem change, and is an important process in many forest systems. Fire-affected forests have developed under characteristic fire regimes, ranging from frequent, non-lethal ground fires to infrequent, lethal, stand-replacing events (Pyne et al. 1996). Traditional societies used fire extensively to encourage the growth of food plants, to encourage new growth and attract animals for easier hunting, to control insects and disease, and to develop defensible space around villages (Pyne et al. 1996). Traditional forest management techniques stemming from Europe, combined with the fear of fire damage to wooden houses, fences, and settlements, and the desire to prevent the loss of valuable trees, led to increasingly effective fire prevention efforts in many forested areas, including North America, Europe, and Australia. These efforts, which often had the effect of removing fire as an ecosystem process, created significant ecological changes in many fire-adapted forests (Covington and Moore 1994). One result has been increasing concerns with forest health and the changing nature of wildfire, with greatly increased incidence of uncharacteristically large, intense, and severe fire events. These events, which may consume 5–20 times as much fuel as historical fires in these systems, can permanently damage soils (Giovannini 1994), alter ecosystem recovery rates (Cromack et al. 2000), create significant air pollution and human health impacts (Neuenschwander and Sampson 2000), and threaten significant population centers (NCWD 1994).

Both native and introduced *diseases, fungal infections, and insects* are important disturbance agents in forest ecosystems as well, and often these vectors interact with fire (Harvey 1994). While epidemics can occur in healthy forest ecosystems, most often in connection with periods of climate stress, they occur more frequently in forests where the vegetation is stressed and unhealthy due to overcrowding, lack of moisture or nutrients, or the invasion of ill-adapted species (NCWD 1994; Pyne et al. 1996). Large areas of uniform, mature forests in the boreal zone are similarly susceptible. Where trees have been killed by insect or disease epidemics, they are much more susceptible to large, uncharacteristic wildfires. Conversely, large areas of fire-killed timber are open invitations to insect epidemics that can then advance into adjoining

unburned forests (Harvey 1994). These interrelated forest health problems are made worse in areas where forest management (or the lack of it) has created large, unbroken tracts of forest that lack age, structural, or species diversity (Sampson and Adams 1994).

Extreme weather, such as strong winds and floods can also be dramatic. Anthropogenic climate change is likely to exacerbate such weather events and to bring about more widespread shifts in the ecosystems that provide forest products (see *MA Current State and Trends*, Chapter 14). Unnatural changes such as simplification of ecosystems, dam building, and heavy pesticide use can exacerbate the natural forces described above.

Movements and migration of people, rising consumption of natural resources and land, changing human values, urbanization, and many other shifts in *human behavior* are having a huge impact on forests, farming, and use of wood. In many parts of the world, such as Southeast Asia and Africa, demographic change puts increasing pressure on land where wood is available or being produced. In wealthy countries, such as the United States and Japan, per capita demand for wood products continues to grow and already is many times greater than in poor countries.

Land and resource management practices are shifting as wood and related products are derived more intensively, such as through large-scale plantations of genetically cloned trees that grow faster than their natural ancestors. Ownership is shifting as large forestry enterprises continue to consolidate globally to achieve greater competitiveness through economies of scale, and as governments recognize traditional forest managers such as native peoples in South America. Protest is common from farmers groups, environmentalists, communities, and others over who owns and controls forest resources. Where violent conflict between political or ethnic groups occurs in rural areas, it often plays out in remote forests and woodlands. In several countries, governments and insurgent forces have used revenue from timber to finance military activities.

All of these proximate drivers of change are influenced by a range of underlying, interconnected processes; some of these and their possible impacts are examined here.

Globalization has impacts through trade liberalization, which changes the key centers of demand and production and enhances competition. This tends to concentrate wood and fiber production on intensive, controllable, and accessible land (though ownership of the land may be disputed by local communities) where costs of production are lower. Fewer, larger companies increasingly control a larger portion of wood and fiber production, processing, and trade. Products are increasingly standardized in form and quality. Meanwhile there is globalization of knowledge and advocacy about what is “good” or “responsible” production and awareness of issues associated with wood.

Governments still own much forest land, but *privatization* of forest resource ownership, fiber production, and forest management services, such as third-party certification, are dominant trends. This may improve the efficiency of production and the quality of products, but it also can result in declining access to resources for some of the world’s poorest people.

Decentralization of authority and responsibility to local government, communities, and the private sector is common in many parts of the world, including in large forest-rich countries such as Indonesia and Brazil. This shifts power closer to the people most affected by local resource use and might improve management where local institutions are adequate and accountable.

Changing patterns of wood consumption are emerging along with new technologies, fashions, and substitutes. Engineered and more highly designed wood products are replacing simple solid wood, resulting in lower resource intensity for some uses such as home

construction. Nonetheless, fuelwood continues to be the major source of energy for many poorer and rural families. The geography of consumption is also shifting as huge new import markets emerge in China and India, set to rival Europe and the United States as sources of growing demand.

Technology is changing the way wood is produced, processed, and used. Biotechnology is given increasing emphasis in commercial plantations with cloned trees to standardize production and quality and to increase growth rates. Much experimentation is done to develop new generations of “super trees” using genetic modification. These modified trees are being criticized by interest groups concerned about possible environmental impacts. Wood engineering is allowing the use of more species and smaller pieces of wood in processing. Wood-fiber-gasifying energy generators are also being developed and could one day produce large amounts of renewable electricity using trees harvested from fast-growing plantations.

Food production and processing have a large impact on forests and wood production. The dynamics that affect food production in turn affect the forest–farm interface geographically, economically, and socially.

Stakeholder values and opinions are changing. Environmental and social responsibility is increasingly mainstream and calls for pro-people and pro-environment approaches are ever stronger. There is also pressure for greater transparency of how forest and forestland are administered and managed. Increasingly there are expectations of multistakeholder approaches to decision-making by governments and increased partnership with civil society by business.

Yet governance systems that can manage forest stakeholder values effectively and equitably are often weak where their need is great. Where there is limited provision of social services, weak justice systems, and slow economic growth, the interests of the few come to dominate the many and there is little incentive for the local population to be loyal to national government. In some such contexts, violent conflicts have emerged.

8.1.2 Problems and Opportunities Created by the Driving Forces of Change

Ecosystems and human well-being face a range of problems as a result of the driving forces described above. The area of provisioning ecosystems is declining due to deforestation, desertification, and forest degradation. There is also declining quality of ecosystems (productivity, diversity, standing stock quality, and health support services), and increasing vulnerability of ecosystems (increase in fires, climate change, and pathogens). Resource extraction and management technologies for wood, fuelwood and non-wood forest products can have impacts on biodiversity, water quality, carbon storage, and cultural values.

Stakeholder equity problems are widespread. There is often inequitable access to wood, fuelwood and non-wood forest products; poor sharing of costs and risks of production; and conflicts and mistrust between stakeholders. Conservation efforts in some places creates burdens for others; for example, China is currently protecting its own natural forest and importing much wood from Russia and Indonesia, which, given forest governance weaknesses in those countries, leads to excessive and illegal harvesting.

Since many of the driving forces of change originate in processes beyond the forest sector (extra-sectoral), many of the problems in the use of forest products stem as much or more from extra-sectoral policies and institutions—trade, structural adjustment, poverty reduction, debt, agriculture, infrastructure, energy, mining—than from processes and institutions within the forest

sector itself. Such extra-sectoral policies and institutions often override or undermine priorities negotiated by forest stakeholders.

Further problems with the current policies and institutions that constitute forest governance are abundant (WCFSD 1999; IPF 1996). These include the following:

- Forest rights are often insufficiently well negotiated, established, and legally and institutionally backed-up for effective and equitable forest management.
- Policies and investment conditions sometimes create perverse effects and make it impossible to tackle problems and realize opportunities associated with changing driving forces. Elsewhere policy “inflation” has occurred—with an excess of international precepts and lack of real capacity and mechanisms to deliver local benefits.
- Decentralization is often incomplete and coordination of institutional roles insufficient to support effective and equitable forest management.
- Smaller forest enterprises, fuelwood-dependent stakeholders, and users and managers of non-wood forest products, many very poor, are often “invisible” to policy processes (their values and forest management practices are ignored or misunderstood).
- Information about specific wood-producing ecosystems—including their location, extent, capability, and vulnerability—is inadequate, and forest research capabilities are weak.
- Corruption and weak regulation or enforcement lead to poor forest management in some places.

In addition, there are problems linked with the markets. Many pro-sustainability approaches are unviable financially. Viable approaches are not always socially and environmentally responsible and market prices often do not reflect social and environmental values, a situation worsened by competition between producers.

Despite these potential problems, there are also opportunities arising from anthropogenic driving forces. Technology allowing concentration of fiber and fuel production on small areas of land has the potential to release other areas for environmental and livelihood purposes, though this depends heavily on other factors. There is potential for cash-poor producers to access high-value markets as market information improves. There is greater transparency to forest resource information and strengthening of government-led reporting such as through the various criteria and indicators processes. Knowledge of sustainable practices is now being shared more easily among groups and nations. Decentralization offers opportunities to match wood production with local livelihood needs and constraints.

8.2 Overview and Selection of Responses

In the past, governments made the majority of responses to the issues summarized above through laws and regulations covering the ownership, management, and use of forests; the harvesting, transport, and trade of forest products; and the extraction and use of income from public lands. These responses were designed to shift the balance between public and private benefits toward the public end of the spectrum (for example, environmental services for public benefits, rather than wood production for private ends).

In the last three decades, a richer range of responses has emerged that spans a spectrum from “pure” public regulation to “pure” private, voluntary approaches. Across this spectrum, market-based approaches have emerged to allocate costs and benefits. Some nongovernmental responses, such as voluntary forest certification, are proving to be just as effective as state regulations.

Some approaches described here as “responses” are explicit policy instruments and intervention programs; others can be better seen as “spontaneous” local reactions and social movements.

Not all responses to change in the ecosystems that produce wood, fuelwood, and non-wood forest products are assessed here. Rather, fifteen responses have been selected for investigation on the basis of the following criteria: whether the response attempts to address a major problem or opportunity; whether it evokes political interest or contention; whether a major investment has been made in it; and whether there are strong indications of positive impact. The response options fall into the following four main types:

- *Multistakeholder and extra-sectoral policy processes.* These include international forest policy processes and development assistance; trade liberalization; and national forest governance initiatives and national forest programs.
- *Rights to land and resource management.* These include direct management of forests by indigenous peoples; collaborative forest management and local movements for access and use of forest products; small-scale private and public-private ownership and management of forests; and company–community forestry partnerships.
- *Demand-side, market-driven, and/or technological responses.* These include public and consumer action; third-party voluntary forest certification; wood technology; and commercialization of non-wood forest products.
- *Land management institutions, investment, and incentives.* These include natural forest management in the tropics; forest plantation management; fuelwood management; and carbon management.

The following sections assess the various response options in terms of their impact on ecosystem health and human well-being; the final section summarizes lessons learned.

Truly extra-sectoral responses, which have clearly improved impacts of forest product use on ecosystem health and human well-being in mind, are rare. Trade is one arena in which such responses are visible and these are discussed below, with some additional examples given in Chapter 15. Most of the responses discussed have an extra-sectoral dimension—relying on engagement with driving forces beyond the forest sector—and should be judged in part by their effectiveness in this.

A number of other important options are not addressed here. For example, *importing* wood is an option for an individual country that cannot produce wood cost-effectively. This shifts any ecosystem problems to another country, but is positive if comparative advantage can be realized. *Producing substitutes* for wood products (such as metals, plastics, concrete, and non-wood fibers) results in a different set of ecosystem issues (often agricultural, as in the case of non-wood fiber); the major drawback is that many substitutes may neither invest in renewable resources (the bulk of plastics manufacture is petroleum-dependent) nor exhibit the same degree of concern for ecosystem services that the various wood-producing sectors are increasingly doing. These alternatives are also often more energy and water intensive than wood (Hair et al. 1996; Koch 1991; Meil 1994).

Some key responses are omitted here because they are covered in other chapters (for example, protected areas, which are covered in Chapters 5 and 15). Some new “paradigms” gaining significant currency, such as ecosystem approaches and landscape restoration, are not included because their impacts have yet to become clear. Single powerful institutional frameworks, such as the World Bank’s forest strategy and policy, are not covered directly but are treated indirectly where their influence is strong. Other key arenas of problem and opportunity in forest product impacts on

ecosystem health and human well-being seem to lack major responses. For example, concerted initiatives to address these links from the standpoint of forestry labor are difficult to identify.

Implementation of the full set of responses assessed here is not the norm in the forest sector. Indeed some places demonstrate hardly any of these responses. Nevertheless, each of the selected responses has substantial and generally growing significance globally for the way wood, fuelwood, and non-wood forest products are developed and used.

8.3 Multistakeholder and Extra-sectoral Policy Processes

8.3.1 International Forest Policy Processes and Development Assistance

A host of international processes and initiatives engage with forest issues. Many are intergovernmental, some are civil society approaches, and others are driven by the private sector. They can be clustered in four groups: forest, environment, trade, and development policy.

8.3.1.1 Forest Processes

The core international policy process on forests includes the debate, negotiations, and decisions stretching from the 1992 Rio Earth Summit to the current United Nations Forum on Forests. UNFF’s objective is to promote the management, conservation, and sustainable development of all types of forests and to strengthen the long-term political commitment to this end. It has been catalytic in developing a number of distinct forestry response options, which are considered elsewhere in this chapter. It has achieved the following (Bass 2003; Sizer 1994):

- kept forests on the international agenda, especially in the context of sustainable development;
- provided opportunities for collaboration and lesson learning at inter-sessional meetings on a wide range of technical and some cross-cutting issues;
- promoted consensus around a set of U.N. Forest Principles and identified 20 main voluntary “Proposals for Action” (incorporating a total of 270 detailed proposals that some countries find hard to interpret and thus implement);
- helped define and give legitimacy to country-led national forest programs as the main means to implement the Proposals for Action;
- developed sets of criteria and indicators for sustainable forest management that have provided a common language that has brought stakeholders closer together, but allowed national and local differences in interpretation. These have influenced the development of voluntary forest certification;
- sought to improve collaboration and coordination with other policy processes and international organizations under the Collaborative Partnership on Forests; and
- promoted NGO involvement in U.N. processes. However, UNFF also has weaknesses. To date, it has:
 - failed to reach agreement on the voluntary monitoring of implementation in ways that could provide evidence of direct impact;
 - remained very sectoral, and has struggled to make any significant progress on key cross-cutting issues (finance, trade and environment, technology transfer).
 - failed to achieve a consensus on the nature and justification for a legally binding instrument but will continue to absorb time and energy in an attempt to do so; and

- remained excessively dominated by governments, despite pioneering NGO involvement within U.N. processes establishing a multistakeholder dialogue and the Collaborative Partnership on Forests.

8.3.1.2 *Environment Process*

Of the key environment processes and initiatives, the Convention on Biological Diversity, the United Nations Framework Convention on Climate Change, and the Global Environment Facility have been most influential to date. The United Nations Convention to Combat Desertification is starting to have an impact through national action programs. The main impact of the CBD has been the development of national biodiversity strategies and action plans; its revised work program on forest biodiversity has potential, but its ambition far exceeds the resources available for its implementation. CBD's benefit sharing objective has been of great interest to many developing countries, but it has generated difficult debates about intellectual property rights and trade that go well beyond biodiversity. UNFCCC introduces the subject of markets for environmental services. The wide array of experiments to test market approaches for provision of watershed services, biodiversity, and carbon are creating a body of understanding that is reaching an ever-wider audience.

8.3.1.3 *Trade*

The International Tropical Timber Organization is a unique commodity agreement that balances concern for improving trade with conserving the resource base on which trade depends. It has been effective in its purpose of facilitating discussion and international cooperation on the international trade and utilization of tropical timber and the sustainable management of tropical forests (Poore 2003). ITTO has achieved the following:

- It was influential in the 1980s and early 1990s when it was effectively the only intergovernmental forum on forest issues.
- It captured public and political attention with its assessment of the sustainability of tropical forest management.
- It made a significant contribution to the concept of criteria and indicators.
- It developed a series of guidelines on management practices that has been well used.
- It has the potential to contribute to the development of trade in marketable environmental services of tropical forests.

Concern with forest law enforcement, governance and trade gathered pace in the late 1990s, when the scale and impacts of illegal logging, and the power of some forest industries to run amok, became better understood. The Group of 8 and other international forums took up the issue. The forest law enforcement, governance, and trade initiatives now under way address the governance, policy, and market failures that cause and sustain illegal logging and associated trade. The FLEGT processes took advantage of the political space created by an East Asia Ministerial Conference and the African ministerial process (where exporting countries spoke with a frankness not heard before, and importing countries acknowledged their role in sustaining demand for illegally logged timber). In addition to East Asia, FLEGT processes are also under way to varying degrees in Europe and Africa.

New multistakeholder regional initiatives are also emerging that hold promise to better address governance and enforcement issues. These include the Asia Forests Partnership (Sizer 2004). It is too early to assess the utility of these approaches.

As these processes evolve, they are more likely to need to grapple with more aspects of governance (Colchester et al, 2004). National forest programs are potentially the ideal integrating

framework at national level. Internationally, interventions are likely to be needed from agencies previously little linked to forest issues—for example, the United Nations Security Council being called upon to take action on conflict timber.

8.3.1.4 *Development*

International development assistance for forestry has passed through four different phases, with considerable overlap, over the last 40 years: industrial forestry, social forestry, environmental forestry, and sustainable management of natural resources. Recently forestry assistance entered a fifth phase, framed by the new poverty agenda that emerged from ideas about how to reduce poverty based on providing opportunity (growth), empowerment, and security. Forestry assistance now links the United Nations Millennium Development Goals, with poverty reduction foremost among these, with a set of mechanisms and instruments for delivering aid that includes poverty reduction strategy papers, medium-term expenditure frameworks, sector-wide approaches, and direct budgetary support. The development community is still adjusting to these new changes. There has been a distinct move away from discrete sectoral projects and a sharp decline in related funding from the peaks reached during the early 1990s.

This decline has been particularly marked in rural development and within forestry. Poverty reduction strategies involve political choices. Where a national consensus is hard to reach and where urban biases exist, the voices of the rural poor are heard less distinctly. SWAPs favor social sectors where it is public expenditure that largely determines outcomes and where institutional relationships are manageable. Productive sectors and crosscutting themes like forestry do not sit comfortably with the SWAP model. Direct budgetary support places responsibility for choice of development strategy and sectoral allocation of resources in the hands of developing countries themselves.

Response options within the new poverty agenda must demonstrate that they contribute to growth (including reduced vulnerability), empowerment, and security. This will take many forms, including:

- helping to understand and express how forest-related interventions can be supportive of wider policy objectives;
- supporting institutional change in public sector organizations in ways that contribute to wider social and economic goals;
- scaling up community forestry as part of wider livelihood strategies, in ways that stress political and legal change as much as local forest management arrangements;
- helping community–company partnerships respond to market opportunities; and
- working with a range of partners to tackle illegal logging and associated trade.

8.3.1.5 *Policy Challenges*

Much critical intergovernmental policy work within the sector has been done. Short-term priorities are reaching agreement on how countries should monitor, assess, and report on forests and reaching a conclusion on a legally binding instrument. More attention should now be focused on policy implementation at the regional, eco-regional, and national levels. It is easier for countries to identify issues of common interest at the regional and eco-regional levels; in many cases, institutions or processes are available that can be used.

More attention is needed in the integration of agreed forest management principles and practices in multilateral financial institutions, trade rules, and the Global Environment Facility. The U.N. Security Council should play its part in curbing trade in

conflict timber. National policy (and the interpretation and implementation of international policy at the national level) will be increasingly influenced by these and other extra-sectoral policy and planning frameworks. Forest sector frameworks will have to adjust, to more directly serve these wider goals, or their influence will diminish.

8.3.2 Trade Liberalization

Trade in forest products is growing rapidly, involves every country in the world, and is worth about US\$330 billion annually. Conventional trade theory predicts economic benefits to both trading partners, which is broadly observed in forest product trade (Sedjo and Simpson 1999; USTR 1999). Three problems complicate matters: unanticipated levels of benefits and costs due to market imperfections; inequitable distribution of those benefits and costs; and disputed values ascribed to different types of benefits and costs, especially between market and non-market values (World Bank 2002; IIED 2003). Different interest groups perceive the relative importance of these problems differently, and consequently promote different initiatives to solve them.

8.3.2.1 Initiatives to Influence Forest Products Trade

Trade liberalization is the dominant economic paradigm; however, when non-tariff measures and effects of subsidies are taken into account, the net trend internationally is probably slightly toward increased protection rather than liberalization (Rice et al. 2000; Bourke 2003). In addition to forest products trade policy, and macroeconomic policies affecting interest rates, stability, and risk, significant effects are created by other policies. Logging bans displace logging problems to other locations and countries rather than solving problems (Brown et al. 2002). Forest tenure is affected by privatization, and decentralization measures are creating new trade players (White and Martin 2002). Sectors competing for inputs or land dictate whether there are any forest products to trade. Policies that support large-scale agriculture have had particularly significant effects (Hyde forthcoming).

There are more than a hundred regional agreements that affect forest trade in some way (IIED 2003). Regional trade agreements are the most prominent of these, including Asia-Pacific Economic Cooperation, the North American Free Trade Agreement, and the European Union. Regional mechanisms to control illegality in forest trade have also begun to receive support and provide platforms upon which to develop new ideas (see earlier discussion). Internationally, influence over trade is dominated by the World Trade Organization negotiations, which have not installed pro-forest principles and clarified forest trade uncertainties. Other international agreements influencing forest trade include those on forestry, climate change, trade in endangered species, biodiversity conservation, core labor standards, guidelines for multinational enterprises, and combating bribery.

Voluntary initiatives (demand-side processes such as certification and labeling, supply chain management and product campaigns; and supply-side initiatives such as environmental management systems, investment guidelines, and corporate citizenship) have made significant headway in recent years but their influence on trade is still relatively small.

8.3.2.2 Impacts

Trade liberalization and initiatives to influence its course in the forest sector have produced several strong trends:

- increasing consumption and production, and increasing trade as a percentage of production. These trends are particularly

pronounced in developed countries and for highly processed products;

- a continuing strong segregation of trade into regional trade flows (Wardle and Michie 2001; Rytkonen 2003); and
- a transition of tropical countries from net exporters to net importers of wood (IIED 2003).

In terms of the maturity of markets, trade with regions in the early stages of market development increases unsustainable harvesting from open access and mature natural forests. It is only at the mature stage of market development that good forestry practice becomes economically attractive in comparison with agricultural land values and the cost of protecting property rights (Hyde forthcoming).

For most developing markets, existing regulatory capacity is too weak to control external demands on the resource, and trade liberalization is likely to result in an increase in unregulated logging (Sizer et al 1999). Where windfall resource rents occur, public sector corruption is often rife (Ross 2001; Wunder 2003). However, there is strong evidence that, where there is strong regulatory and institutional backup, reducing trade restrictions reduces public sector corruption (Richards et al. 2003). In some situations, trade liberalization may not bring about a real reduction in corruption, merely a change in the pattern of winners and losers.

Trade liberalization is usually promoted within a package of measures, and its impact depends on what else is in the package, such as state downsizing, decentralization, deregulation, privatization, concession bidding and forest taxation, and the capacity and will of the government to implement it. The way in which trade policies interact with these changes determines whether they improve or reduce policy and institutional capability for sound forest management (Seymour and Dubash 2000; Tockman 2001).

Recent analysis has concluded that the impacts on policies and institutions of trade liberalization are positive where there are robust policies and institutions (a virtuous cycle) and negative where they are weak (a vicious cycle). Trade appears to be a magnifier of *existing* policy and institutional strengths and weaknesses rather than a major driver of change (Anderson and Blackhurst 1992; Ross 2001; IIED 2003).

The forest products sector is less concentrated than many other industrial sectors, although in developing countries concentration is much more marked. There is a clear trend toward greater involvement of transnational companies in the sector, particularly for pulp and paper products, but their importance varies. Transnational companies have played a major role in the exports of tropical timber in West and Central Africa, and Southeast Asia, but in countries such as Brazil and the Philippines, they have not been a major factor driving development of the sector (ITTO 2002). Transnational companies may generate wealth through trade, which may provide the basis for improved policy and institutional frameworks in the forest sector (Young and Prochnik 2004). On the other hand, there is a tendency for more exploitative transnational companies to target weaker governance structures (Sizer and Plouvier 2000).

8.3.2.3 Policy Challenges

A range of policy and practice measures have been identified as priorities for improving the impact of trade on forest management (IIED 2003), including:

- revise distorted agricultural trade policies and improve regional development policies (this will have greater beneficial impacts on forestry practice than changes in forest or forest trade policies);

- improve engagement of “underpowered” groups in trade policy decision-making;
- ensure that institutional strengthening occurs before trade liberalization;
- require cost internalization as well as liberalization, and consider the case for protection to achieve the social component of sustainability;
- link trade to improved property rights;
- install policies for equitable and efficient allocation of forest land;
- develop graded incentives for value-added processing that are more closely linked to sustainable forest management;
- prevent tariff escalation on processed products; and
- promote foreign direct investment in responsible forest business.

The most effective way to improve the beneficial impacts of trade is to link trade liberalization to improved, impartially administered property rights—either nationally through decentralization or locally through the empowerment of local and community institutions (IIED 2003).

8.3.3 National Forest Governance Initiatives and National Forest Programs

The United Nations Food and Agriculture Organization estimates that about 190 countries are currently involved in national forest planning of various kinds. There have been two main sources of multistakeholder policy reform processes in recent times: responses to pressure from local levels and responses to international opportunity or to international soft law.

8.3.3.1 National Governance Reform Initiatives Affecting Forests

Significant policy change with many stakeholders involved has emerged from initiatives to support participatory forestry at the local level. Since the early 1970s, many projects have been based, often with donor support, on the notion that local people should be able to participate more in forestry development. The best of these projects subsequently resulted in increased local responsibility for forest resources, improved local rights, increased bargaining power of local actors at the national level, and multistakeholder policy reform as other actors recognized the imperative for it and came to the negotiating table. The greatest positive effects were probably felt in countries of low forest cover such as Nepal and Tanzania, where, as the capacity of local people to manage forests was given greater policy support, the condition of the resource also improved (Brown et al. 2002).

In Europe and North America, experience has been different. Reform has also been generally stimulated by business and environmental agendas. Differences in national government styles and cultures, and in the strength of business and civil society networks, have produced a wide range of national forest planning processes.

Translation to the national level of opportunities and agreements stemming from international policy dialogue has stimulated various approaches to forestry reform (Mayers and Bass 2004). These include the following:

- *National Forestry Action Plans.* National forestry action plans called for by the international Tropical Forests Action Plan were launched by FAO, UNEP, the World Bank, and the World Resources Institute in 1985. Never before had there been such multi-country attention aimed at benefiting tropical forests. Many donors and larger NGOs supported the initiative and at one point more than one hundred countries were

implementing or developing national forestry action plans within the framework of TFAP. The TFAP could be characterized as a top-down, quick but comprehensive fix to the perceived tropical forest crisis, the perception being promoted by NGO and media concern about “deforestation.” TFAP set a “standard” for a balanced forest sector for the next decade and defined a new liturgy for forestry aid planning. But in practice it resulted in fewer improvements than had been hoped. TFAP was not able to challenge the inequities and perverse policies that underlay deforestation, and then to build the necessary trust between governments, NGOs, local people, and the private sector. Its standardization within a global framework and the exigencies of the aid system that supported it meant that the TFAP did not adequately recognize diverse local perceptions, values, capacities, and needs. Because of such weak links between causes of problems and identified desired impacts (a persistent problem in the forestry context), TFAP in effect contained few measures that could be reasonably expected to achieve its objective of reducing deforestation (Shiva 1987; Sizer 1994).

- *Forestry Master Plans.* Forestry master plans were led mainly by the Asian Development Bank (with Finland as a frequent co-donor) and consisted of extensive studies of all parts of the sector. The studies were not very participatory nature, and they constituted the basis for a forest policy and investment plan principally directed at commercial functions. Agreement was reached with TFAP that a country could be involved with TFAP or forestry master plans but not both. The countries that used forestry master plans included Sri Lanka, Nepal, Bangladesh, the Philippines, Thailand, Pakistan, and Bhutan.
 - *Forestry Sector Reviews.* Forestry sector reviews were required by the World Bank in a range of countries to qualify for sectoral support. Their format was similar to that of the forestry master plans. Countries that developed forestry sector reviews included Kenya, Malawi, and Zimbabwe. The long lists of policy prescriptions contained in forestry sector reviews were largely ignored once support had come and gone.
 - *National Environmental Action Plans.* National environmental action plans were undertaken from the mid 1970s to the early 1990s at the behest of the World Bank; in some countries, they overlapped with forestry sector reviews. They were effectively a form of conditionality and today have been eclipsed by comprehensive development frameworks and poverty reduction strategy papers.
 - *National Conservation Strategies.* National conservation strategies were popular in the 1970s and early 1990s when about 100 countries prepared them, many with technical support from IUCN and some showing creativity in both multistakeholder processes and practical linkage of environment and development. While many fell by the wayside, a few (such as the Pakistan National Conservation Strategy) are now providing a valuable platform for addressing economic growth and poverty alleviation.
- Several initiatives stem from the UNCED 1992 multilateral environmental agreements and have a mixed record in influencing national forestry planning, including the following (OECD and UNDP 2002):
- *National Biodiversity Strategies and Action Plans.* National biodiversity strategies and action plans were stimulated by the requirements of the 1992 Convention on Biological Diversity. About 70 countries have completed them, some supported by the GEF. They often lack analysis of forestry’s use of biodiversity as well as integration with other plans and strategies. A few highly participatory NBSAPs have considerable momen-

tum and potential impact on forestry decision-making, for example in India and Guyana.

- *National Action Programs.* National action programs to combat desertification were a response to the 1994 Convention to Combat Desertification. Many dryland countries have developed NAPs, with 50 of them receiving funding from UNDP's Office to Combat Desertification and Drought. A few national action plans have analyzed and stimulated actions in forestry. They vary greatly but have tended to be developed by ministries of environment with only weak links to key processes such as decentralization and land reform that may have major effects on land use and desertification.
- *National Communications.* Annex 1 parties to the UNFCCC must submit periodic national communications to the UNFCCC Secretariat reporting on their actions to address climate change. By April 2003, some 100 developing countries had submitted such reports, with only a few covering carbon source and sink dimensions of forests.

Despite their best endeavors, the net effect of the multilateral environmental agreements is at best to provide a source of ideas to national-level debate about forests. They do not provide an integrated legal regime that views forests, and those that depend on them, in a holistic way. Countries both poor and wealthy are thus generally able to escape from their commitments. Two integrating frameworks currently holding sway in international debates aim to have more power at the national level:

- *National Sustainable Development Strategies.* National sustainable development strategies are to be adopted by all governments following the 1992 Earth Summit. The 2000 Millennium Development Goals were signed by 147 heads of state, accompanied by targets, including to "integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources." There are few national sustainable development strategies, although the recent development of guidance and lessons for practitioners (OECD and UNDP 2002) may stimulate more.
- *Poverty reduction strategies.* Poverty reduction strategies were initially required by the IMF and World Bank as a basis for access to debt relief in highly-indebted poor countries. Poverty reduction strategy papers have been required by all countries supported by the International Development Association since July 2002. Interim poverty reduction strategy papers (I-PRSPs) are road maps to full PRSPs. As of April 2003, 26 full PRSPs and 45 I-PRSPs had been prepared. Bilateral donors are also increasingly subscribing to poverty reduction strategies and they have thus emerged as a central determinant of the development agenda in many countries. The recognition of forests as a development asset has so far been limited in many poverty reduction strategies. Of the 11 PRSPs and 25 I-PRSPs in sub-Saharan Africa, 74% touched on forestry issues but almost none were convincing about forests-poverty links and forests' future potential (Oksanen and Mersmann 2002).

8.3.3.2 National Forest Programs

National forest programs are now being strongly promoted on the understanding that they follow a country-led approach, rather than an international program or precept in the style of the TFAP (UNFF 2002; FAO 2004). The notion of NFPs was developed by the international Forestry Advisers Group (an informal group of aid agency forestry advisers), adopted by FAO (FAO 1996), then endorsed by the Intergovernmental Panel on Forests (Six-Country Initiative 1999).

All countries that have taken part in U.N. forest policy dialogues have adopted the requirement for a national forest program. It is consensus-based soft international law. Agenda 21, the UNCED action plan (UNCED 1992), invited all countries to prepare and implement national forest programs and stressed the need to integrate these activities within a global, inter-sectoral, and participatory framework.

The post-UNCED intergovernmental negotiations on forests stress the role of NFPs, and the current United Nations Forum on Forests action plan commits countries to pursuing NFPs (UNFF 2002). Regional approaches to pushing NFPs are also beginning in Europe (MCPFE 2002). Meanwhile the European Union requires countries to have NFPs or their equivalent in order to receive forest subsidies (Glück et al. 2003). The NFP concept currently promoted at the international level (FAO 2004; World Bank 2002) puts particular emphasis on the following:

- multistakeholder involvement in forest decision making;
- means for cooperation, coordination, and partnership;
- secure access and use rights;
- research and traditional knowledge;
- forest information systems;
- study and policies on underlying causes of deforestation/degradation;
- integrating conservation and sustainable use, with provisions for environmentally sensitive forests, and for addressing low forest cover;
- codes of conduct for the private sector; and
- monitoring, evaluating, and reporting on NFPs.

Although there is probably no example of a contemporary NFP that has achieved optimal systems for all of the above, Malawi, Uganda, Brazil, Costa Rica, Vietnam, India, Finland, Germany, and Australia are leading the way (Bird 2002; Humphreys 2004; Mayers et al. 2001; Savenije 2000; Thornber et al. 2001). However, it is too early to see significant results. Many NFPs were judged to be "stalled," due to lack of institutional, human, and financial capacity, as well as lack of adequate policies, poor institutional co-ordination, and deficient mechanisms for public participation (FAO 2004). Widespread agreement on the need for "country-driven, holistic" processes is not matched with implementation.

If NFPs are to succeed, they need to avoid the mistakes of many NFAPs, FMPs, FSRs and the like that remained exercises on paper only. They failed to catalyze the detailed actions expected of them, in general because they failed to engage with political and economic reality to show not only what needs to change, but also how it can change, and how such change can be sustained.

8.3.3.3 Policy Challenges

Experience suggests that the best hope lies in developing local processes and systems that bring together the best that exists locally, and filling gaps where needed with the help of international thinking (Mayers et al. 2001; OECD and UNDP 2002). These processes include the following:

- *political processes* that install and maintain forestry's potential and NFP priorities at a high level, and provide the means to revise policies;
- *participation systems* that enable equitable identification and involvement of stakeholders, including previously marginalized groups, and create space and responsiveness for negotiating, vision, roles, objectives, and partnerships;
- *local-benefit "screening" processes* that ensure that the forest sector keeps working to optimize its contributions to poverty-reduction and local livelihoods;

- *information and communication systems* that generate, make accessible, and use interdisciplinary research and analysis; form clear baselines; and get plans well communicated with strong “stories”;
- *monitoring systems* that can pick up and communicate the key changes in forests and human well-being;
- *financial systems* that generate and manage adequate resources and ensure investment conditions, internalize externalities, and promote cost-efficiency;
- *human resource development systems* that promote equity and efficiency in building social and human capital, with an emphasis on holding on to tacit knowledge and promoting innovation;
- *extra-sectoral engagement processes* that put synergies and potential conflicts with other sectors and macro-plans at the heart of thinking and action; and
- *planning and process management systems* that demonstrate efficiency (strategic, not overly comprehensive actions with realistic timeframes), transparency, accountability, and therefore legitimacy in decision-making.

8.4 Rights to Land and Resource Management

8.4.1 Direct Management of Forests by Indigenous Peoples

Direct management of forests by indigenous and traditional peoples occurs in its purest form in two utterly different institutional contexts: where states exercise little or no effective control over territory, creating space for autonomous management of forest resources, or where a highly sophisticated state with an indigenous population acknowledges significant sovereignty to native polities. Canada and New Zealand, and to a lesser extent Australia and the United States, are examples of the latter. The former scenario is almost exclusively restricted to the tropical world. Most indigenous peoples inhabit a more ambiguous political and institutional landscape, where land tenure can be restricted to usufruct, conceded but heavily regulated, or denied altogether. Even where sovereignty is formally conceded to indigenous peoples, such as in Canada, its recognition in practice may be weak (Colchester 2004). In these contexts, complex interactions with governments and a surrounding non-indigenous civil society determine natural resource management, including management of forests (Redford and Mansour 1997).

8.4.1.1 Impacts of Forest Management by Indigenous Peoples

The processes of colonization and globalization have affected indigenous peoples for centuries, and provoked major changes for most of them, with transitions from permanent to shifting agriculture and back again, geographical displacement, rapid modifications in trading patterns, and economic articulation with the outside world. This universal historical experience is contrary to the many mythic representations of indigenous expertise in natural resource management as linked to very longstanding occupation of a particular natural environment.

The defining characteristics of natural resource management by indigenous peoples across cultures are flexibility, versatility, adaptability to change, and heavy investment in the training of resource management specialists with broad expertise. Indigenous natural resource management tends to be geared toward broadly based livelihoods composed of the simultaneous exploitation of multiple ecological niches and processes. Its defining characteristic is the ability to adapt effectively to the many externally forced

changes of habitat and economy that history has imposed upon indigenous peoples.

For forests, this has usually involved a paradoxical combination of intensive but diffuse management—intensive in the sense that a wide variety of ecological processes in forests (succession, species composition, forest structure) are heavily manipulated by indigenous peoples, but diffuse in the sense that this manipulation is so geographically widespread that it often becomes difficult to draw the boundary between anthropogenic and natural forests. This has two common consequences: a mimicking of natural processes through cultural means, which underlies the greater integrity and functionality of forests in indigenous areas, and difficulty in handling specialization and intensification. This has become a perennial problem in sustainable development projects involving forest management or natural resource management in general in indigenous areas.

Indigenous control of traditional homelands is often presented as having environmental benefits by indigenous peoples and their supporters, although the dominant justification continues, rightly, to be based on human and cultural rights. While little systematic data yet exists, preliminary findings on vegetation cover and forest fragmentation from the Brazilian Amazon, where this work is most advanced, suggests that the creation of an indigenous area is at least as effective a protection strategy as the creation of a strict-use protected area.

However, many well-documented examples exist of local exhaustion of a particular natural resource in indigenous areas, for a variety of reasons (Robinson and Bennett 2000). The conquest of land and usufruct rights and expansion of indigenous areas systems is often followed by population increases and greater pressure on natural resources, at least in the short term. The very consolidation of cultural autonomy and a legal and property regime inherent in a successful indigenous claim to land opens up the possibility of new arrangements, such as leases, concessions, and compensation payments, whose net effect is to reduce direct natural resource management by indigenous peoples, or render it controversial.

8.4.1.2 Policy Challenges

There are many documented examples of successful environmental management in individual indigenous areas, either directly or in some form of shared management in which indigenous representatives have a significant say. Nevertheless, the non-indigenous institutions with technical expertise in natural resource management, both governmental and non-governmental, have generally failed to devote the same attention to the development of applied knowledge and methodologies for indigenous areas as they have to national parks.

Indigenous organizations across the world are often poorly informed about technologies and techniques that are routine for other resource management agencies—remote sensing, satellite imagery, zoning, monitoring, and formal management plans—that may have potential for reinforcing natural resource management in indigenous areas. In their absence, there is a shortage of quality field data to inform policy, a demand increasingly heard from indigenous organizations themselves.

Culturally appropriate and technically sound cooperation between indigenous and non-indigenous organizations to reinforce natural resource management on indigenous lands is rare; achieving it should be a concern for governments and civil society alike.

8.4.2 Devolution and Local Forest Management and Local Movements for Access and Use of Forest Products

Governments and donor projects have developed diverse institutional arrangements to provide rural people more formal rights to

forests and their management. Millions of the rural poor have participated in local forest management policies and programs during the last two decades. The results have been mixed. Most arrangements have maintained and even extended central government control (Sundar 2001; Fisher 1999; Malla 2000; Balad and Platteau 1996; Edmunds and Wollenberg 2003; Shackleton et al. 2002). While local people generally have better legal access to forests and some have higher incomes, many have also suffered negative trade-offs (Sarin 2003). Forestry has not often been the best entry point for integrated resource management and rural development. Local people have usually not shown a consistent interest in forest conservation (Shackleton and Campbell 2001).

Triggered by these experiences and the increasing complexity of demands from different interest groups, local forest management policies are shifting. They increasingly involve not only collaborative management arrangements between a local group and the government, but a range of stakeholders and acknowledgement of overlapping systems of management and diverse interests. There is more emphasis on facilitating decisions through negotiation. There is also increasing recognition of the need for frameworks that better emphasize local peoples' rights to self-determination and enable more effective representation of the rural poor in negotiations. The rural poor and their federations and advocates are bringing a new sophistication to negotiations and increased demands for their voices to be heard (Singh 2002; Britt 1998; Colchester et al. 2003).

8.4.2.1 Scope and Scale of Local Forest Management Policies

Local forest management programs now occur around the globe. In India, more than 63,000 groups have enrolled in joint forest management programs to regenerate 14 million hectares. In Nepal, 9,000 forest user groups are trying to regenerate 700,000 hectares of forest. In Brazil, farmers participate in managing 2.2 million hectares as extractive reserves. Half the districts in Zimbabwe have CAMPFIRE (Communal Area Management Programme for Indigenous Resources) schemes. More than half of the natural forest in the Gambia (17,000 hectares) is under community forest management. The programs generally have resulted in significant levels of improved resource management and have improved access of the rural poor to forest resources, but have fallen short in their potential to benefit the poor (Upreti 2001).

The institutional arrangements of the different approaches to local management have strongly influenced how policies affect local people. Formal arrangements include corporate, legal organizations composed of rights holders (such as rubber tappers' organizations in Brazil, *ejidos* in Mexico, trusts in Botswana, conservancies in Namibia, and communal property associations in Makuleke, South Africa). There are also village committees facilitated by government departments, such as the village natural resource management committees in Malawi, and forest protection committees in India. The Gambia's "Community-controlled State Forests" program encourages communities that have designated community forests to help protect the surrounding state forest area in exchange for a share of the resulting income. In the Philippines and China, contractual agreements between the government and households or individuals have been developed where individuals exercise varying degrees of authority over species selection, harvesting practices, sale and consumption, and the distribution of benefits. In addition, there are local government organizations such as rural district councils in Zimbabwe and *panchayats* in India, and multistakeholder district structures aligned to line departments such as *Tambon* councils in Thailand and wildlife management authorities in Zambia. Arrangements allocate vary-

ing degrees of rights to forest and land. Many impose forest management requirements.

Self-initiated local responses to problems in access and use of forest products have also proliferated in recent years; they are collectively more significant than efforts led by governments or international processes, but they require the latter's support to spread. Such local organizations include *campesino* forestry organizations in Central America, forest user groups in Nepal, the National Council of Rubber Tappers in Brazil, people's natural resource management organizations in the Philippines, and the Landcare movement in Australia and elsewhere.

8.4.2.2 Effectiveness of Devolved Control

The degree of control transferred by the state under these different institutional arrangements has affected the outcomes for local people. Bureaucratic control was higher and the responsiveness of programs to local needs lower where arrangements allocated control to higher levels of social organization, local government, or district structures. In such cases, state interests in resource production, revenues, and environmental conservation more strongly overrode villagers' interests in livelihood needs. Existing capacities for management were weakened (Edmunds and Wollenberg 2003).

Local people were able to win more benefits for themselves where they had strong local organizational capacity and political capital to mobilize resources and negotiate for better benefits. NGOs, donors, federations, and other external actors had a key role in supporting local interests. Where local groups managed their own forests without state intervention, however, they were not necessarily better off, since without government support, they often had difficulty implementing or enforcing their decisions (Shackleton and Campbell 2001).

Although access to some important subsistence products improved, access to other important local resources such as timber or game remained restricted. Where financial benefits occurred, governments often failed to deliver on their promised share of incomes. Benefits from timber and valuable NWFPs were often reserved for, or at least shared with, the state or local elite (Shackleton and Campbell 2001). Only in a few exceptional cases did poor communities receive substantial financial benefits.

The improved formal access to forests has helped in most cases to protect a vital role of forests as safety-nets for rural people to meet their basic subsistence needs. However, the benefits to be gained beyond the subsistence-level were limited. Property rights would need to extend to more secure rights over valuable resources, for the poor to benefit substantially. Programs focused on organizing collective action around the management of a single resource such as forests may also divert effort from other sources of livelihood. Forests are not always the most important resource for poor people; the economic and social environment can create pressures to convert forests. Many of the poor might be better off with land reform measures that are not linked to forest management, but these programs are not in the interest of forest departments.

Co-management has demonstrated the difficulty of dividing roles and responsibilities, especially where the interests of the groups involved are highly divergent. Forest agencies have had varying experiences in organizing collective action. Romantic ideals about harmonious communities and the local knowledge and capacities of "traditional peoples" have been counterbalanced by the internal conflict and lack of leadership in many communities and the difficulty of organizing collective action where local social capital is weak (Stanley 1991; Gibson et al. 2000). Many

co-management efforts rely on the role of outside agents to facilitate group action and sustaining group action has proven difficult. Other stakeholders such as local governments or NGOs often create their own sets of incentives or pressures for local people that work against co-management initiatives (Edmunds and Wollenberg 2003).

8.4.2.3 Policy Challenges

State officials and local people have had different expectations of what devolved management was supposed to achieve and how. Forest departments have mostly controlled the terms of devolution and co-management schemes. There is now a need to develop the institutional arrangements and capacities that enable people in forest areas to have the rights and power to bring about a fair division of control, responsibility, and benefits between government and local people. Checks and balances need to be in place to ensure that no one group, including the local elite, controls benefits and decision-making.

Frameworks for natural resource management that are developed more locally and then linked to national objectives have been shown to be more flexible and responsive to local interests. Relevant local stakeholders can develop these frameworks, with special support given to the disadvantaged poor to negotiate for their interests. Experience suggests that local responsiveness will be higher to the extent that effort is made to monitor and evaluate impacts and that institutional arrangements facilitate good communication and learning about these impacts among stakeholders. The learning process should include both local interest groups and national policy-makers to best manage different interests.

Policy frameworks could better assist self-initiated local responses to problems in access and use of forest products to build on what they are already doing, and to enable new partnerships. Multistakeholder poverty-forests learning processes could be fostered with codes of conduct for supporting local initiatives and integrating them in national forest programs and poverty reduction strategies.

8.4.3 Small-scale Private and Public-Private Ownership and Management of Forests

Small-scale private (non-industrial, non-community) ownership (or “family forestry”) is very common in Western Europe and in the southern part of the United States. In Sweden, half of the forest area (with 60% of the production of wood) is owned by over a quarter of a million people. In Finland, over 75% is privately owned. An average holding in Sweden is around 50 hectares; in Finland, 30 hectares; in Germany, 7 hectares; and in France and Spain, below 5 hectares. Experiences from Scandinavia and from continental Europe indicate that privately operated forestry has strong sustainability credentials (National Board of Forestry 2001).

Since the discussion below is based on experiences mainly from Western Europe, some lessons may be possible to apply to forestry in other parts of the world, while some may not. Fundamental differences in the institutional framework and in culture will affect the outcomes. Private ownership is not merely a judicial matter—it is a matter of culture and tradition. More positively, some factors mentioned may be of importance also in countries with quite different institutions, such as local community or village control (or ownership) over the forest.

Small-scale private ownership may lead to closer management and more efficient economic use in the self-interest of the owner. Planting, pre-commercial thinning, and collection of firewood are well suited for do-it-yourself work. Gathering of berries and

mushrooms, hunting, and recreational activities can often be conveniently combined with planning or supervision of forest production activities. Private ownership may lead to a greater sense of responsibility assumed by the owner, which may foster long term thinking such that sustainability is naturally sought, partly as a risk reduction strategy.

When the imperative of biodiversity conservation was brought to the fore in Scandinavia in the 1970s, a difference was observed between privately owned forests and large-scale corporate or public forests. In general, the private forests were more biologically varied (especially at a landscape level). This led, in Sweden, to private forest ownership being fully recognized in policy whereas previously large-scale forestry had been seen as the priority model (Klingberg 2004).

Constraints that have arisen, and ways in which they have been overcome primarily in the Scandinavian context, are assessed below (Klingberg 2004):

- *Efficiency.* Small holdings can be technically inefficient, leading some owners to cooperate with neighbors. Originally, these associations worked as wholesalers, assembling round wood and negotiating prices with large pulp mills and sawmills. Today they are large economic enterprises, organizing harvesting operations with modern machinery and professional staff, which single owners cannot afford. The associations have also invested in sawmills, pulp mills, and bioenergy production, thereby securing demand for wood harvested.
- *Knowledge and competence.* Lack of knowledge can result in mismanagement or even destruction of the holding. Do-it-yourself activities also tend to have higher accident rates than professional lumbering. Both the associations and the government work to solve these problems through training and information provision.
- *Raising standards.* The associations in Sweden are active in raising both forest production and the level of environmental protection. Certification is being pushed, with higher standards than those found in the legislation.
- *Long-term perspective.* A fundamental factor is the long-term thinking by many private owners, who plan to pass on their holdings to younger generations. Regenerating harvested forests is an established norm.
- *Combined activities.* Many small owners combine other jobs with the income from the forest, thus forming viable rural livelihoods.

Property rights are fundamental to the prospects for family forestry. Laws and regulations must back up smallholders’ ownership and property rights. In many countries, ownership legislation and the system of land registry may not be conducive for private forestry holdings.

In the Nordic countries and many continental European countries, training and dissemination of knowledge has been used systematically to improve small-scale private forestry. For example, the Swedish Regional Forestry Boards have for over 50 years both been responsible for enforcing the Forest Act and for disseminating extension material and running study circles and courses with forest owners.

Boxes 8.1 and 8.2 provide assessment of two important examples of larger-scale private involvement in forest management—public-private partnerships and conservation concessions.

8.4.4 Company-Community Forestry Partnerships

8.4.4.1 Spread and Effectiveness of Company-Community Forestry Partnerships

In recent years, a range of partnerships has emerged between forestry companies and communities or groups of smallholders, and

BOX 8.1

Public-Private Partnerships in Forest Management: Some U.S. Case Studies

In the United States, 70% of commercial forests are privately owned. Hundreds of initiatives of public-private collaboration represent a new wave in forest management. Some examples:

- *The Conservation Fund* developed a broad public-private coalition to seize the opportunity represented by Champion International Corporation, which put 120,000 hectares of forestland on the market, much of it within the Adirondack Park of upstate New York. With funds from government and private forest management organizations, TCF purchased the entire 120,000 hectares. Today, some of the lands are protected while others operate as working forests with private forest managers where the future forested state is ensured by conservation easements.
- *Seven Islands Land Company* is among the oldest and largest owners of forests in Maine. With dozens of heirs and nearly 400,000 hectares, there are few similar ownerships anywhere in the world. The owners worked with the New England Forest Foundation to negotiate a conservation easement covering more than 280,000 hectares in northern Maine. The multiyear campaign to raise nearly \$30 million dollars was successfully completed in 2002.
- *Safe harbor* is an approach developed by Environmental Defense to engage private owners in endangered species conservation. Private landowners enter a voluntary agreement with the U.S. Fish and Wildlife Service whereby the owner limits his exposure and potential impacts from threatened and endangered species. The parties identify a baseline and if future management results in an expansion of the population, the landowner's regulatory obligation is limited to the baseline population.

many are widespread globally. They vary widely in terms of types of forest products, types of partners, and the degree of development and equity between the partners. (See Table 8.1.) Out-grower schemes and joint ventures predominate, but several other kinds of arrangements, many informal, have arisen in response to local circumstances. Company-community partnerships are globally widespread, occurring in at least 23 countries in North America, South America, Europe, Africa, Asia, and the Pacific (Mayers and Vermeulen 2002).

Behind the range of partnership types lie a range of motives for entering into partnership. Globalization of investment, trade, and technology, coupled with increasing decentralization and grassroots demands for autonomy, provides strong impetus to both companies and communities. Neither party on its own can access and secure all the means for producing the goods and services it needs. Third parties are also pivotal participants in company-community deals: local and central government; development agencies and NGOs; providers of credit and insurance; certification bodies; and cooperatives, federations, and trade unions.

Evidence to date shows that partnerships can be better than solely corporate forestry, or solely community or small-scale farm forestry, in delivering the wide range of benefits now expected by the partners and by the public at large. Importantly, partnerships are able to provide superior economic returns to both partners in addition to public benefits. But direct economic returns are not always the most highly valued output to either partner. Partner-

ships are foremost a means to share the risks of production and marketing (Mayers and Vermeulen 2002).

Partnerships entail costs that can outweigh benefits under certain conditions, such as inappropriate government policy. (See Table 8.2.) Some impacts of company-community forestry partnerships remain debatable. Effects on local equity and rural development are mixed, and financial returns have often proven insufficient to lift community partners out of poverty, either through direct membership or through knock-on effects such as new employment and upstream/downstream small-scale business opportunities. Furthermore, equity in power between company and community partners is seldom achieved, and often actively avoided by the company partner in spite of the obvious reductions in risk of interacting with a more equal, legitimate partner (Mayers and Vermeulen 2002).

8.4.4.2 Policy Challenges

Making the most of partnerships centers on five key themes:

- iterative approaches to developing equitable, efficient, and accountable governance, both at the contract level and more broadly;
- raising the bargaining power of communities, particularly through association at appropriate scales;
- fostering the roles of brokers and other third parties, especially independent community development organizations;
- sharing the benefits of wood processing as well as production; and
- working toward standards (for example, in licensing requirements or certification) that give equal opportunities to small-scale enterprises.

8.5 Demand-side, Market-driven, and Technological Responses**8.5.1 Public and Consumer Action****8.5.1.1 Evolution of Public and Consumer Action**

Consumer action emerged in the early 1970s as a means of addressing the global loss of forests. Initially, campaigns focused on tropical forests. As well as aiming to bring about actual changes in flows in the trade of commodities deriving from tropical forest areas, they were also used as a means of informing the public in countries such as the United Kingdom and the Netherlands about a distant environmental issue by identifying international trade linkages.

Wider public and political action also developed at this time, and for similar reasons. Various interest groups, such as Friends of the Earth in Europe and the Environmental Defense Fund in the United States, were identifying linkages between multilateral institutions such as the World Bank and bilateral donor agencies and forest-destructive programs in the tropics. As these programs were at least partly designed and managed by agencies accountable to industrial-country democratic governments and, ultimately, funded through taxpayers contributions, the public was encouraged to express concern and demand cessation of the funding of such damaging activities. Mass letter-writing campaigns urged governments to take the appropriate action within the relevant global institutions and to adopt suitable domestic policies and safeguards concerning the use of development cooperation funding.

Such actions continued to grow during the late 1970s and 1980s and, following the lead of interest groups in the United

BOX 8.2

Conservation Concessions

A “conservation concession” is a voluntary agreement whereby governments and other affected stakeholders are compensated for foregoing economic development on public lands. Conservation concessions are modeled after typical resource extraction contracts, such as logging concessions; however, rather than paying for the right to extract natural resources from public lands, the investor pays for the right to preserve the forest.

The conservation concession is a relatively new mechanism, and only two applications have been completed to date. The first is a 100,000 hectare area in Guyana. The second is a 135,000 hectare concession along the Madre De Dios River in Peru. Other conservation concession deals are at various stages of development in countries such as Indonesia, Mexico, and Bolivia. The rate of implementation is significantly impeded by two factors. First, the in-country capacity and organization of many developing-country NGOs to implement conservation concessions is poor; for example, capacity in resource valuation, contract law, and stakeholder analysis is often weak. Second, because of the general unavailability of financing for recurrent management costs or compensation payments, financing for conservation concessions tends to be available only on a project basis.

The components of a conservation concession contract that the conservation investor and the government must negotiate include the following:

- *Payments.* The cost of the conservation concession is calculated to reflect the “opportunity cost” of conservation. This includes the value of foregone employment and taxes incurred as a result of creating the concession.
- *Duration.* The duration of a conservation concession is flexible, but typically is the same as the duration for land use contracts that it is replacing.
- *Management plan and objectives.* The final component of the negotiated agreement is to develop a management plan for the conces-

sion area. The management plan includes a clear statement of the conservation objectives for the concession and performance indicators that demonstrate whether these objectives are being met.

The conservation concession approach is novel. Nevertheless, there is enough experience to identify some of the strengths and weaknesses of the concession relative to other conservation mechanisms. The conservation concession transfers the cost of conservation to stakeholders who are better able and willing to bear it. This apparent strength of the concession can also be a great limitation if resource rights are very valuable, for example, in Southeast Asian forests or in temperate forests with high commercial stocking. Conservation funding may simply be unable to compete with other land uses in these areas.

Because they are not permanent, conservation concessions may encounter less political resistance to implement. Concessions may also be useful to obtain an interim conservation status after which a more permanent mechanism may be sought. The temporary nature of a concession can also be a weakness in some contexts, as it cannot guarantee the permanent protection of any particular forest.

Accountability is one of the greatest strengths of the conservation concession. Annual payments are made only if periodic monitoring and evaluation indicate that the conservation objectives for the concession are being met. Increased accountability also brings with it a greater risk of detecting failure.

One of the strongest criticisms of the conservation concession approach is that it may inadvertently create perverse impacts. For example, countries may be unwilling to create new protected areas if they think that they can attract investors to finance conservation concessions. However, it should be possible to develop policies to mitigate this risk. For example, conservation concessions could be restricted to being a “phase two” conservation mechanism, used only after a country has established a representative network of protected areas.

Table 8.1. Typology of Company–Community Forestry Arrangements, by Partner

Company Type	Individual Tree Growers	Individual Tree Users	Group of Tree Growers	Group of Tree Users
Forest product buyer, processor (large-scale)	outgrower schemes for timber, pulp, commodity wood, or NWFPs	product supply contracts farmer outprocessing	outgrower schemes joint venture for timber or pulp corporate social responsibility project	product supply contracts community processing or farmer outprocessing
	farm forestry support and crop share arrangements		contracts by communities group certification with company support	
Forestry concession or plantation owner (large-scale)	land leased from farmers	co-management for NWFPs	concessions leased from communities corporate social responsibility project	co-management for NWFPs
Small local production or processing enterprise	credit/product supply agreements	product supply agreements	credit/product supply agreements joint ventures	product supply agreements
Environmental service company			forest environmental service agreements	

Table 8.2. Conditions under which Companies, Communities, and Landscapes Win or Lose in Partnership Arrangements

Outcome	Without Partnership Arrangements	With Partnership Arrangements
Companies lose	inadequate supplies from restricted land and resource access high risk of non-cooperation or resistance from communities	transaction costs of developing deals too high process too complicated
Companies win	absence of pressure from communities, law, or market profitable to buy community land, pay off local elites, and massage opinion with public relations	secure supplies of raw materials and/or workforce “social licence to operate” granted by communities and wider society
Communities lose	lack of livelihood-improving opportunities in rural areas lack of legal or bureaucratic permissions to develop land or trees without companies	become locked into dependency, or ripped off by companies pushed into unwise or sub-optimal land uses
Communities win	livelihoods not skewed by single strategies, commodities, or markets self-determination unaffected by company agendas	income generated or services provided where few other rural alternatives available capacity for community-run development options enhanced
Environmental deterioration	forest asset stripping by companies seeking out weak local governance non-forestry land uses may be less optimal or landscape-degrading	inappropriate trees used or natural forest felled other land uses like grazing squeezed or displaced causing degradation
Environmental benefits	land use systems and product diversity more optimal without forestry land and resource control pattern more sustainable without deals	reduced micro-level erosion from forest land uses more forest goods and services in the landscape

Kingdom and United States, were also taken up in other countries, including Australia, Germany, France, Japan, Denmark, Austria, and the Netherlands. Consumer action continued to focus on the tropical timber trade. Significantly, almost all campaigns took a nuanced approach, calling not for a total boycott of tropical rainforest timber but for a “selective boycott” of products that had not been derived from “sustainable sources.” This provided the basis for the later development of forest certification schemes. Consumer action campaigns worked through networks of locally affiliated activists, reinforced through media campaigns that served to highlight the connections between high-profile retail and manufacturing companies and forest management problems in identified areas (such as Brazil and Sarawak). Specific actions included picketing of, and dramatic protests outside, retail outlets, and the application of stickers and posters to shops and wood products. One particular target of such activities was the trade in Brazilian mahogany, which research had shown was largely derived from illegal exploitation of areas supposedly protected for indigenous communities. By the early 1990s, such actions had substantially reduced levels of imports of Brazilian mahogany into some countries.

Related to consumer actions were efforts to ensure that local and national governments in tropical timber “consuming countries” adopted purchasing policies that encouraged the use of timber from “sustainable sources.” As a result of these efforts (also by local and national activist networks), by 1992, several hundred local authorities, including major metropolitan authorities, throughout Europe, North America, and Japan, had adopted such policies. Several national governments (including those of Austria and the Netherlands) also moved toward such policies, though

these evidently ran foul of both EU and GATT trading rules and were never fully implemented. They did, however, send a strong political message to tropical timber producing nations.

Campaigns aimed at the international financial institutions succeeded in drawing public attention to the role of agencies such as the World Bank, and by implication the governments that supported them, in specific projects with major impacts on tropical forests. In some cases, such projects were either halted or significantly altered to reduce environmental and social impacts. Public pressure also succeeded in bringing about multilateral policy change, most notably the adoption by the World Bank of a new forest policy in 1993 that prohibited the use of Bank funds for commercial logging operations in tropical moist forests (World Bank 1991).

Possibly one of the most important results of consumer action between the mid-late 1970s and the early 1990s was the development of forest certification and labeling schemes. In 1987, Friends of the Earth established the “Good Wood Seal of Approval” scheme, which aimed to help consumers distinguish between products derived from “environmentally and socially acceptable sources” and products derived from “destructive” sources. It was underpinned by the belief that, by developing guaranteed markets for “acceptable” products, possibly with a price premium, an incentive would be provided for forest managers to adopt sustainable forest management practices.

The establishment of the Forest Stewardship Council in 1993 coincided with a decline in mass public action concerning forests in a number of “consumer countries,” and the onset of “media fatigue” on these issues. The source of “pressure” on the timber trade thus partly shifted from consumers and the wider public

to trade groupings such as the “1995 Groups” organized by the Worldwide Fund for Nature. Through high-profile marketing campaigns, WWF has encouraged the public to selectively purchase FSC-certified wood products, while simultaneously working collaboratively with timber producing, manufacturing and retailing companies to assist them in gaining FSC certification.

However, during the later 1990s and continuing today, a more radical form of protest has emerged. Focusing on the trade in illegal and “conflict” timber (and capitalizing on various international research initiatives which have documented the wide extent of this problem), environmental pressure groups such as Greenpeace, Environmental Investigation Agency, and Global Witness have conducted high profile “naming and shaming” campaigns against specific forest sector corporations and government agencies. Such campaigns have been waged in many European countries, as well as in North America. These campaigns have contributed to the signing of bilateral agreements concerning illegal wood products between the government of Indonesia and various timber importing countries and the development of a draft policy by the European Union (EU FLEGT) concerning the use of voluntary licensing as a means of distinguishing legal from illegal wood.

Public attention has now shifted to other environmental issues, especially global climate change. The deliberations on global forest issues within the UN framework (such as the Intergovernmental Forum on Forests and UNFF) have not been seen by many civil society organizations as likely to result in significant improvements “on the ground,” and therefore have not provided a useful focus for mass public action and political lobbying (UK TFF 1998). Much of the debate between the various stakeholders on issues such as forest management standards, conservation, and human rights takes place within the context of certification, in which the wider public is little involved.

8.5.1.2 Effectiveness of Public and Consumer Action

Public action has undoubtedly had a number of important and positive consequences (Elliot 2000). However, it is also evident that such actions are very difficult and costly to sustain, particularly as they are dependent on the use of mass media, which suffers from “issue fatigue.” Because of the need for media attention, such campaigns have tended to focus on targets with a high public profile in the countries in which the campaigns take place, especially large companies with operations in tropical forest areas. The response from the target corporation is likely to be to withdraw from the operation altogether (rather than improve its standards) and there have been instances where such operations have been taken over by other companies with lower operating standards (Amazon Financial Information Service 2001–2).

Consumer campaigns and media exposes—such as those concerning illegal logging—do not always fully address the underlying causes of forest loss and degradation, especially the problems of inequitable land tenure and forest community poverty in developing countries.

Where public and consumer actions concern tropical forest issues, they are dependent on a strong understanding of local conditions, which can usually only be derived through close working relationships between civil society organizations in northern and tropical countries. However, few NGOs in developing countries actually have the resources or capacity to sustain such work over long periods of time, and therefore there is a danger that public actions in Europe or North America strongly reflect the views and priorities of “northern” NGOs rather than groups in the countries concerned.

8.5.1.3 Policy Challenges

Consumer campaigns can potentially continue to play an important role both in maintaining public awareness of forestry issues and in encouraging improved forest management. However, it is likely that the only institutions likely to be capable of sustaining the information and media exercises necessary for such campaigns are governments. While these are pressing policy challenges, it would be unrealistic to assume that governments will prioritize them without further concerted work by NGOs to mobilize consumers.

8.5.2 Third-party Voluntary Forest Certification

Certification is the procedure by which a third party provides written assurance that a product, process, or service conforms to specified standards, on the basis of an audit conducted according to agreed procedures. It may be linked with product labeling for market communication purposes. Certification offers independent assessment of the quality of forest management in relation to prescribed standards. It is voluntary, the forest manager being driven primarily by the prospect of access to markets that demand forest products produced in a responsible way, but also by improvements to company reputation and capacity.

8.5.2.1 Current Status of Certification

Forest certification has evolved rapidly. In only a decade, it has become routine practice in an increasingly large range of countries and forest conditions, and several schemes have sprung up. Three concerns are uppermost in assessing its effectiveness as a response to forest problems. First, the early drivers of certification hoped it would be an effective response to tropical deforestation. Now, however, most certified forests are in the north, managed by larger companies and exporting to northern retailers. Second, there has been a proliferation of certification programs to meet different stakeholders’ needs, with the result that no single program has emerged as the only credible or dominant approach internationally. Third, the competitiveness of small and medium-sized enterprises, which may have advantages for sustainability and local livelihoods, is called into question where certification becomes the preserve of larger companies only.

Forest management certification assesses the performance of on-the-ground forestry operations against a predetermined set of standards. If the forestry operations are found to be in conformance with these standards, a certificate is issued, offering the owner or manager the potential to bring products from the certified forest to the market as “certified” products. This market potential is realized by a supplementary certification, which assesses the chain of custody of wood from the forest, through timber processor to manufacturer, to importer, to distributor, to retailer. In this sense, forest certification is market driven.

Accreditation is the process of recognition against published criteria of capability, competence, and impartiality of a body involved in certification, and results in licenses to operate a particular certification scheme. It “certifies the certifiers.”

Certification schemes often make provision for the following:

- *multiple source chain of custody* to enable certification for paper, composite wood, and other products. This may allow processors a mix of certified and uncertified material where this reflects local supplies, and so reduces cost. It may also favor mixture with recycled materials;
- *group certification of smallholders*, to allow several small enterprises to be covered by one certificate, held by the group manager. This can reduce costs, provided group members are sufficiently similar to create scale economies;

- *forest manager certification*, where a professional manager is responsible for several small areas; this, too, reduces costs and creates economies of scale;
- *recycled wood certification*, which accords certified status to reclaimed or recycled wood where chain of custody is known; and
- *ecological zone harmonization of national standards*, to ensure that standards covering similar ecological zones can be rationalized.

Since its emergence in 1993, the FSC has certified forests in all continents, with a rapid increase in the area covered. Numerous other international and national forest certification schemes have more recently been launched, including in the United States, Malaysia, and Brazil. (See Box 8.3.) Many local stakeholders wanted to take charge of the process of developing certification schemes, to ensure they were appropriate to their forest types, enterprise types, and governance systems (Confederation of European Paper Industries 2002).

Where there is contention over a certification scheme, it tends to concern one or some of the following:

- perceived dominance or exclusion of certain parties,
- perceived lack of comparability between standards in a given region, and
- the degree of challenge or “stretch” represented by the gap between normally applied legal standards and the particular certification standards.

Where once there was some hostility between schemes and their supporters, there has been increasing collaboration and mutual support. There is a genuine desire to see certification play a key role among the responses to forest problems. To the extent possible, the individual schemes are beginning to put their differences aside to find an enduring role for certification.

8.5.2.2. Effectiveness and Policy Challenges in Certification

Observations on the effectiveness of certification as a response option include the following (Bass et al. 2001; Eba’a and Simula

2002). First, overall effectiveness in reducing poor forest management and deforestation depends critically on the incentive effects of market-based certification. In practice, the high threshold levels of certification standards (and FSC’s in particular) have provided incentives only to already “good” producers rather than to improving bad practice. However, these “good” producers also now meet all current legal requirements, including those that they might normally not bother to meet. Most of them have also tightened management systems, especially for managing environmental impact. Thus certification has encouraged competition between producers at the high end of competence (just above and below the “certified” threshold). However, there are few incentives to cause the really bad producers to change behavior and be certified. The need for several thresholds (step-wise or phased approaches) is now being discussed, along with ways to complement certification with instruments for illegal logging.

Second, at the level of their standards, most schemes are applicable to many types of forest. Most certification schemes have been able to develop and apply one overarching standard agreed by many stakeholders and there are considerable similarities between the standards. Certification has coped effectively with *complexity* (in standards and their interpretation) and yet also delivers a *simple* message to consumers and producers.

Third, in practice, larger producers find it easier to benefit from certification, as they have better access to information and markets, scale economies, formal management systems on similar forest types, and an ability to bear risks and costs. The area of certified forest under community or small enterprise management is correspondingly much smaller. Many certification schemes have responded with special schemes for group certification of small growers or for certifying entire regions with one management regime. But there are those that question why a small community group occasionally harvesting timber on its own land should be held as accountable as a major corporation harvesting each day on leased public land.

BOX 8.3

Selected Forest Certification Programs

The *Forest Stewardship Council’s* objectives are to promote global standards of forest management, to accredit certifiers that certify forest operations according to such standards, and to encourage buyers to purchase certified products. FSC is one of the first institutions to have been deliberately designed to sustainable development principles. It is a membership organization, with decisions made through meetings of a General Assembly, which is divided into three equal chambers: social, environmental, and economic. All three chambers have Northern and Southern sub-chambers, each with half of the total chamber votes. Governments are not entitled to participate in FSC’s governance, even as observers, although government employees have been very active participants in some FSC national initiatives. FSC has a set of ten principles and related criteria (P&C) covering environmental, social, economic, and institutional aspects of forest stewardship, which apply to all forests, both natural and plantations. These P&C serve as a basis for the development of national and regional forest management standards. Certification standards that are consistent with both the P&C and with FSC’s process guidelines for standards development are eligible for FSC endorsement. Such standards have been developed by both FSC-organized national working groups and by independent processes. FSC owns a trademark, which may be used to label products from certified forests. It has so far certified 37 million hectares in 55 countries (as of April 2003).

The *Programme for Endorsement of Forest Certification Schemes*

(previously called the Pan-European Forest Certification Framework) is a voluntary private-sector initiative, designed to promote an internationally credible framework for forest certification schemes and initiatives. Its criteria are consistent with the intergovernmental Pan-European Criteria and Indicators for Sustainable Forest Management, thereby attracting considerable support from both European and national governments. National certification schemes that meet PEFC requirements can apply for endorsement and the right to use the PEFC trademark for product labeling. National PEFC governing bodies set standards and operate national schemes, and are represented on the PEFC Council Board. The initiative was given strong impetus by Finnish, German, French, Norwegian, Austrian, and Swedish forest owners, who wished to ensure that small woodland owners are not disadvantaged by certification and that local conditions are accounted for. It was supported by the national forest certification schemes that had been emerging in some of these countries, which felt themselves to be individually too small to develop an adequate presence. PEFC started in 1999; as of June 2003, it had certified 47 million hectares in 14 countries.

At the level of individual countries, the number of *national certification programs* under development is increasing rapidly. These include the Sustainable Forestry Initiative in the United States, and systems in Canada, Brazil, Malaysia and Indonesia.

Fourth, certification is largely document-based, and is predicated on formal, structured means of planning and monitoring. In practice, this assumption is biased against traditional societies and “part-time” foresters. Some current certification standards and procedures cannot recognize good management in some of the complex land use systems of indigenous and community groups.

Fifth, some environmental and social services are produced at levels other than the forest management unit (such as the landscape or the nation), which may not be under the control of the certified enterprise but which require its active engagement. Further developments are needed to ensure that certification encourages and recognizes improved relations between the forest management area and surrounding land uses.

Sixth, certification is a cost-effective complement to traditional administrative regulation. In all countries, certification is, at a minimum, encouraging some companies to meet legal requirements. In some countries, state forest authorities support certification as a “privatized” form of forest monitoring, and are making incentives available. In countries where regulation and enforcement is weak, certification has ensured that at least some producers are meeting not only legal requirements but also higher standards, and that this is monitored.

Seventh, certification depends for success on its credibility. The key ingredients are participation in defining standards to ensure they reflect many stakeholders’ needs, consultation of local stakeholders when certifying forest management, and verification by third parties using tried-and-tested mechanisms with precedents in other sectors. Proliferation of certification schemes, which is leading to consumer confusion and a reluctance of some firms to be certified at all, has undermined the credibility of the approach and prompted considerable efforts by the wood products industry to investigate the potential of mutual recognition among schemes.

Eighth, in practice, certified products command only a minority of the forest products market (about 4% globally in 2003), with highest market penetration in Western Europe. Certified producers tend to gain market access, rather than a price premium (although a premium is available in some segments). More needs to be done to educate consumers about sustainable forestry and certification if the demand is to rise significantly. However, if market benefits have proven elusive, other incentives for certification are becoming apparent, such as certification to secure access to resources such as land, finance, and insurance.

8.5.3 Wood Technology and Biotechnology

Wood technology responses to date have been focused primarily on species used in industrial plantations, which must have wood properties suited for the products to be manufactured (Zobel and van Buijtenen 1989). There is considerable variation within a species, from pith to bark at a given height in the tree, and from base to top of tree, among trees within a stand, among stands within a region, and among regions (Kellison 1967). The phenomenon holds true regardless of the property, whether it be basic density, fiber dimensions, cellulose content, lignin content, moisture content, resin content, or any other trait of interest. This variation allows for genetic selection for any trait of economic importance (Zobel and Talbert 1984).

The wood properties of greatest economic importance for industrial manufacturing are basic density, fiber dimensions (length, width, lumen diameter, cell wall thickness, microfibril angle), number of fibers per unit area, and cellulose content. Conventional breeding programs have been effective in changing commercially important wood properties (Zobel and Talbert 1984).

The property that has received most attention is wood-specific gravity or wood density. The reason for concentrating on wood density is its correlation with chemical pulp yield, strength properties of paper and paperboard, and strength properties of solid wood products, especially lumber.

The trend is for wood production to be shifting from the temperate and boreal regions of the world to certain parts of the tropics and subtropics (Kellison 2001). The major reason for that trend is the high growth rates of the trees, almost all of which are exotics, at the lower latitudes. While it will be many years before pulp production from northern plantations is greatly reduced, these plantations will represent a declining share of the global market. The reduction may be quickened if depreciation and amortization continue to exceed capitalization, which in the North American industry for example, has been the case every year since 1996 with the exception of 1999 (Connelly et al, 2004).

From a biological standpoint, the major species groups that are being intensively managed in plantations are *Pinus*, *Eucalyptus*, and *Acacia*. The pines receiving greatest attention are *P. taeda* and *P. elliottii* from the southern United States, *P. radiata* from California, *P. caribaea* var. *hondurensis* from Central America, and *P. patula* from Mexico. The eucalypts species of greatest importance are *E. grandis*, *E. urophylla*, and *E. globulus*, *E. teriticomus*, and *E. camaldulensis*, all of which have their origin in Australia and the islands of Indonesia. The acacias, too, have Australia as their origin; they include *A. mangium*, *A. mearnsii*, *A. auliciformis*, and *A. crassifolia*.

Using the same silvicultural practices, forest productivity of the *Pinus* species is at least twice as great in the exotic environments as in their indigenous habitats, and the rotation ages are typically 20% shorter. Similarly, the species of eucalypts and acacias produce 20–to 60 cubic meters per hectare per year, with harvest ages ranging from 5 to 12 years. Only with the most intensive silviculture, including fertigation (the application of fertilizers and water in metered amount through a drip-irrigation system), can angiosperm plantations in the temperate zones approach these growth rates. Even where plantation forestry is practiced in the temperate zone, a cost disadvantage exists in the economics of producing the wood.

The advantages of plantation forestry in the tropics and subtropics for fiber production so far outweigh the opportunities in the temperate and boreal zones that the developing countries to either side of the equator will benefit at the expense of their northern neighbors. The prognosis is that the plantation forests in the temperate and boreal zones will increasingly be managed for solid wood products. Fiber processing will be only a by-product of saw log forestry. (See Box 8.4.)

8.5.4 Commercialization of Non-wood Forest Products

Commercialization of non-wood forest products has become a means, promoted by researchers, conservation and development organizations, and, more recently, governments, to achieve rural livelihood improvement in an environmentally sound way. The category NWFP includes all products that are derived from forests with the exception of timber. In practice, the definition of the term has been ambiguous and inconsistent (Belcher 2003). Some authors restrict the category to products of natural reproduction, while others include managed or cultivated products. Generally speaking, the category includes plant, animal, and fungus species used for fuel, food, medicine, forage, and fiber, that have valuable chemical components or that are used for ritual purposes.

BOX 8.4

Wood Products Manufacturing Technology: A U.S. Case Study

Over the past 20 years, most operating North American softwood sawmills have been re-equipped with a wide assortment of highly automated equipment optimized for processing small logs. Lumber recovery factors have increased by nearly 50%, and productivity has nearly doubled. As sawmill recoveries have improved and plywood production has declined, chip production from these wood products manufacturing facilities has also been reduced. During this same period, raw material demand from the pulp and paper industry has increased nearly 20 percent. The industry has satisfied nearly all of this demand with recycled fiber, and that trend is expected to continue.

Total demand for roundwood has almost doubled in the United States over the past 25 years, only part of which is due to increases in the demand for pulpwood. Most of the increase has come from rapid growth in the strand products industry, and most of that added demand has been for hardwood, which has helped create a market for this low-cost wood. Strand-based products use softwoods as well, and that industry will likely

expand into softwood growing areas where the price is competitive with hardwood sources. In the 1990s, the trend away from large diameter logs accelerated with the virtual elimination of timber sales from federal lands in the Pacific Northwest. With the reduced availability of large diameter logs and the growth of oriented strand board and engineered products, the demand for (and relative value of) these large logs has also declined.

Shorter rotations are more economically competitive than the long rotations needed for large logs, and improved efficiency in processing smaller sawlogs plus rising prices for fiber grade logs combine to support intensively managed forests in the United States. These forests can produce nearly 100% more annual growth than forests managed to produce large sawlogs.

In 1980, plywood manufacturing was concentrated mainly in the southern and western part of the United States. The net effect of substituting oriented strand board for plywood has been a net migration of panel industry jobs from the west to the north.

Interest in NWFPs began in earnest in the late 1980s and early 1990s, in conjunction with increasing global concern about deforestation and rural poverty. Forests gained heightened appreciation as sources of multiple products and services, and as important sources of livelihood for forest-based people (de Beer and McDermott 1989; Falconer 1990; Plotkin and Fomolare 1992). Researchers began to document the tremendous range of products used by forest people. Optimistic comparisons suggested that total NWFP values approached or exceeded timber values from the same forests (e.g., Peters et al. 1989). More realistic assessments followed, giving lower estimates (Godoy and Bawa 1993), but a movement had started. Environmentalists and social activists championed the idea that NWFPs extracted from the forest could provide an environmentally sustainable basis for livelihoods, leading to the establishment of “extractive reserves” for rubber, Brazil nuts, and other NWFPs in the Brazilian Amazon beginning in 1990, and exploration of the potential for similar approaches throughout the tropics (Ruiz-Pérez and Arnold 1996; Neumann and Hirsch 2000).

The underlying assumptions, often implicit, were that NWFP harvesting is more benign and valuable than timber harvesting, that it benefits poor people, and that it provides incentives for local people to conserve forests. In fact, none of these premises is necessarily true, and positive outcomes are only likely under restricted conditions (Ruiz-Pérez et al. 2004).

8.5.4.1 Constraints on Implementation

The vast majority of NWFPs are consumed directly by the people that collect them and their families. Some are important mainstays in the household economy. The ubiquitous use of bamboo in the construction of buildings and utility items in rural areas, or the regular consumption of wild meat and vegetables, are examples. Other NWFPs are used infrequently, but can be critically important as sources of food when other sources are unavailable. Such emergency foods can make the difference between life and death.

A smaller, but still considerable, number of NWFPs are produced for sale or barter. These include various fruits, nuts, and vegetables that are primarily traded in local and regional markets and “bush meats” that are traded in large quantities in urban markets (Brown and Williams 2003). Other products find demand in more distant markets. High value mushrooms are collected in re-

mote forests in China and sold the next day in supermarkets in Tokyo, and various herbal medicines and essential oils are sold in the growing western health and beauty markets.

A combination of factors has led to growth in some NWFP markets. The extension of the market system to more remote areas has created both the demand and the opportunity for increased cash incomes by NWFP producers. Globalization and growing interest in various kinds of natural products such as herbal medicines, wild foods, handcrafted utensils, and decorative items have increased demand and trade in these products. And development projects have increasingly sought to increase income opportunities, including through the production, processing, and trade of NWFPs. Still, the majority of traded NWFPs are sold in relatively small quantities (per producer; collective quantities can be very large), and for relatively low prices by the raw material producers. They are important in helping households to meet current consumption needs, and some are relied on as the main or the only regular source of cash income. Few NWFPs have large and reliable markets, and these tend to be supplied by specialized producers using more intensive production systems (Belcher et al 2003).

There is strong evidence that the poorest of the rural poor are most dependent on NWFPs (Neumann and Hirsch 2000), that the poor frequently use NWFPs as an “employment of last resort” (Angelsen and Wunder 2003), and that NWFPs serve an important safety net function (McSweeney 2004). Cavendish (1998) explains this in terms of the economic characteristics of forest-dependent people and of the products themselves. Many forest products are available as common-property resources in traditional systems or as de facto open-access resources, in state forest lands for example. They can be harvested and used with little processing, using low cost (often traditional) technologies. Some NWFPs are likely to be available for direct consumption or sale when crops fail due to drought or disease, or when shocks hit the household such as unemployment, death, or disease (Cavendish 1998).

The same factors that tend to make them important in the livelihoods of the poor also limit the scope for NWFPs to lift people out of poverty. Markets for many of these products are small and many are “inferior products.” Naturally reproducing products tend to be dispersed, with seasonal and annual fluctua-

tions in quantity and quality of production. Individual harvesters are limited in the amount that they are able to harvest. Open access resources are highly susceptible to overexploitation. The remote locations where wild NWFPs tend to be produced often have poor market access. All of these factors put producers in a weak bargaining position relative to traders who typically provide transport, market connections, and credit to NWFP collectors in classic patron-client relationships. In some respects, such products can be viewed as “poverty traps” in that people rely on NWFPs because they are poor and do not have better alternatives, but they are unable to use these resources to break out of poverty (Neumann and Hirsch 2000).

As Dove (1993) noted, in those cases where NWFPs have high value, they tend to be appropriated by people with more power, more assets, and better connections. This might happen through coercion and physical control of the trade, but more often control is achieved through domestication, when market forces lead to intensified and specialized production.

Homma (1992) developed a simple economic model that shows how high demand for NWFPs can over time lead to over-exploitation of the naturally regenerating resource base, production on plantations outside of forests, and increased competition from synthetic substitutes. Empirical studies such as that by Belcher et al (2003) found strong evidence for this trend in a comparison of commercially traded NWFPs.

8.5.4.2 Effectiveness of Commercializing Non-wood Forest Products

There have been successful efforts to promote NWFP commercialization through combinations of technical and capacity-building interventions to improve raw material production, processing, trade, and marketing, and through improved policy and institutional frameworks. Resource tenure is a key factor, and considerable effort has been invested to help communities gain recognized rights and responsibilities to manage and use forest resources (as discussed in the section on collaborative forest management).

Simple interventions can be very effective. Providing a weigh scale and information on commodity prices and quality requirements of wholesale buyers in a trading center can help remote producers gain a better bargaining position. Collective investment in a building for storage or in a drying machine gives producers of perishable commodities more flexibility in their marketing. Improvements in processing and marketing, to improve product quality and reach more valuable markets, add value, creates more income downstream in the market chain, and increases demand and earnings for raw material producers.

The empirical evidence is mixed. There are success stories where production has been improved, markets have increased, and income generation has improved. Problems may also arise however, with inequitable distribution of benefits, stronger groups gaining control at the expense of weaker groups, and overexploitation of resources.

On the conservation side, success has been limited. The idea that NWFP harvesting has a lower impact than timber harvesting may be true in extensive, subsistence-oriented systems. But as products enter commercial markets, pressure on the resource base increases. Open-access resources are notoriously susceptible to overexploitation, and species-level impacts can be severe. All cases based on naturally regenerating resources in one major study of commercial NWFP cases (Belcher et al. 2003) reported declining resource bases. Harvesting that reduces stocks (for example, agarwood, palm-heart, wood for carving), especially of slow

growing, slow-reproducing species, typically has faster and more severe impacts than harvesting of flows (for example, fruit, nuts). But harvesting pressure can also reduce reproductive success (by removing flowers or fruit), threatening longer-term sustainability.

At the ecosystem level, the hypothesis that increasing NWFP value could provide incentives for forest conservation has not been confirmed. To be true, it would require that the people who benefit from NWFP production are major agents of deforestation or that they have influence over those agents, and that low-intensity NWFP production is the most economically rewarding use of the forest. In practice, this linkage is often missing. The intended beneficiaries of NWFP development activities often are not the main agents of deforestation and do not have control or even influence over decisions to log or convert forest. Increased value does not automatically translate into effective incentives for conservation (Salafsky and Wollenberg 2000). Moreover, successful commercialization may create incentives to intensify NWFP production through enrichment planting or cultivation. To the extent that this is done in natural forest areas, it will result directly in reduced biodiversity or outright conversion of the management unit to an NWFP plantation.

8.5.4.3 Policy Challenges

Many NWFPs do not have scope for commercial development but are extremely important in millions of households. This has not been recognized adequately; for example, the contribution of forests to livelihoods has been chronically overlooked in poverty reduction strategy papers (Oksanen and Mersmann 2002). These values alone may be enough to justify forest conservation and enhancement.

A smaller but still substantial subset of the NWFP category has important local, regional, or international markets. Some of these markets are growing, and there are opportunities to increase incomes and employment-generation through targeted policy and project-level interventions. Typically, NWFPs have been ignored by policy. They are often covered by forest regulations designed for timber management, for example, or are not considered at all. Management of naturally regenerating resources can be improved with policy that more effectively gives incentives for sustainable management. Rattan harvesting concessions in Asia, for example, are frequently allocated over large areas to non-local concessionaires for very short periods. The concessionaires thus have no incentive to harvest sustainably or to invest in regeneration and local people benefit only from low-paying jobs as harvesters. Basic biophysical research is lacking for many valuable NWFPs, constraining efforts to improve management. More investment is needed in this area. One promising area is joint-production of timber and non-wood products. Improvements will require appropriate sivicultural research and new kinds of company-community partnerships.

For livelihoods improvement, the key interventions may be in resource control and in market development and capacity building for small-scale producers to enable them to compete in tough markets. In this vein, it is necessary to keep in mind that the rural poor typically have diverse economic activities and are risk averse. NWFP-oriented interventions should try to keep other options open and not focus exclusively on one activity.

There are inherent contradictions between commercial development and biodiversity conservation, at least at the level of the management unit. Increased demand leads to overexploitation of naturally regenerating resources, especially under the open-access conditions that prevail in many natural forest areas. Where conditions allow, producers tend to increase their management inten-

sity, moving toward cultivation in horticultural or plantation systems. At the management unit this means converting forest to domesticated systems, with associated biodiversity loss. Conservation objectives might be achieved if such systems successfully reduce pressure on remaining natural forest.

8.6 Land Management Institutions, Investment, and Incentives

8.6.1 Natural Forest Management in the Tropics

Whenever management was attempted with the intent to conserve and utilize natural forests, one model became dominant (Troup 1940). Based on the earlier concept of sustained yield, wood supply was designed to be continuous over generations, with harvests planned not to exceed growth. Maintaining environmental quality and safeguarding rural employment were other key objectives of this response. Knuchel (1953) provided an early description of the technical approach. However, the practice of natural forest management in the tropics, and in particular the wet tropics where stocks of high value timber species are found, has proved problematic (Bruenig 1996; Dawkins 1957; Putz et al. 2000). Controversy has long raged over the potential for “sustainable” forest management as a viable economic activity in the tropics (Leslie 1977; Poore 1989; Dawkins and Philip 1997), in part as a result of the restrictions it places on timber harvest levels. This dispute continues (Rice et al. 2000; Pearce et al. 2003). Land allocations or appropriations for other purposes, and overexploitation of other forest resources for subsistence use or commercial gain, have also undermined the prospects for long-term natural forest management.

Nevertheless, since the early 1990s, huge investments have been made to promote improved management of natural forests and see it put onto an operational footing in a large number of countries (ITTO 1998). Over the last decade, an increasing (although ill-determined) amount of tropical forest has come under some form of management, which aims to achieve product utilization while conserving the natural resource. Reduced impact logging techniques have been especially popular. (See Box 8.5.)

8.6.1.1. Constraints on Implementation

In a large number of tropical timber-producing countries, poor governance undermines the management system (Brown et al.

2002). Timber licensing systems are frequently opaque, subject to considerable political patronage, and the beneficiaries are not publicly known (Gray 2002; Sizer 1995 and 1996). As a result, forest managers have limited influence over those given the rights to harvest timber and find it difficult to exert sufficient control to safeguard ecosystem health. However, interest in, and support for, forest law enforcement has recently become a major policy concern, as the extent of illegal logging has become more widely known and recognized as a significant constraint on new forest management initiatives (World Bank 2002).

Forest management has tended to be more successful where no viable land-use alternative exists. However, even then, low yields together with heterogeneous species distribution patterns have limited the viability of natural forest management. In contrast to temperate regions, valuable tree species occur at very low stocking levels over much of the tropics, and their spatial distribution is poorly understood (and therefore difficult to predict). In addition, many tree species suffer from a high incidence of natural defect in the wood that precludes otherwise desirable trees from being felled. High levels of previous timber exploitation are a further limiting factor that is becoming increasingly important in forest areas where access is good. The considerable cost of specialized machinery for logging heavy tropical hardwoods also poses a constraint, particularly for small-scale operators. Sustainable forest management in the tropics is frequently uneconomic if viewed in timber production terms alone.

Natural forest management has proved difficult to implement on a large scale, especially where access is limited. An annual felling coupe of 500 hectares in mixed tropical forest seems about the maximum that can be managed within one planning unit, without exceptional levels of management inputs. Many timber concessions in the tropics exceed this limit, despite lacking staff with the necessary management skills and associated resources.

A history of forest management in the region is helpful. Natural forest management is an information demanding process, which relies heavily on written records due to the long-term nature of many of its constituent activities. Where management records have been lost, this has proved to be a serious constraint to reviving forest management after periods of neglect.

Staff continuity within many forest authorities has suffered during the diverse changes in their structure and function in recent years. Despite much attention to institutional reform, roles and responsibilities have not always been clarified or backed-up

BOX 8.5

Reduced Impact Logging

Reduced impact logging comprises a set of harvesting practices that reduce impacts to residual vegetation, soils, and other environmental attributes compared with unplanned harvesting practices. RIL can reduce damage by as much as 50% compared with conventional logging (Pinard and Putz 1996; Holmes et al. 2002; Killmann et al. 2002).

Typically, RIL requires thorough resource inventories and careful harvest planning. Roads, skid trails, and log landings are planned and constructed so that they adhere to engineering guidelines designed to minimize soil disturbance. Directional felling techniques are applied to minimize damage to the residual stand and stumps are cut low to reduce waste. Heavy machinery is required to remain on skid trails and roads in order to limit soil disturbance and damage to vegetation. A post-harvest assessment is essential in order to provide feedback to loggers, concession holders, and forest department personnel (Dykstra 2002, 2003).

RIL can also be more efficient and cost-effective than unplanned harvesting. In the Brazilian Amazon under RIL, the overall cost per cubic meter of wood produced was 12% less than under conventional logging (Holmes et al. 2002). However, under different conditions, applying RIL can be costly. In the Malaysian State of Sabah, profits reportedly fell substantially when a switch was made from conventional logging to RIL (Tay et al. 2002). Other studies confirm that log production under RIL is often 20% lower than under conventional logging, due mostly to restrictions on logging in environmentally sensitive areas (Killmann et al. 2002). Financial benefits associated with the application of RIL are largely due to better planning and improved supervisory control. To obtain these savings, technically competent planners, loggers, and supervisors are essential. Personnel with the skills needed to apply these practices are rare in many parts of the tropics, so human resource development is a critical requirement for the adoption of RIL.

with development of capabilities. The desirable separation of the functions associated with forest management, forest regulation, and revenue collection have often not been made. The decline in forest management expertise has diminished the capacity of institutions to adopt flexible responses and has led to standardization of forest management prescriptions. Without increased funding to strengthen forestry institutions, this situation will remain a significant constraint to the successful application of this response.

Forest management is a field activity where the sequencing of a number of operations is critical to success. However, difficult working conditions are frequent, and matters are made worse by the lack of attention given to the health and safety of field staff in many countries. Education and training requirements remain poorly addressed, resulting in a lack of appropriately trained staff and the non-functioning of local professional associations.

Finally, in the species-rich tropics botanical identification is a constraint, particularly where emphasis is now given to the management of rare and non-tree species. Another shortcoming is the lack of attention given to the regeneration of the forest, despite considerable research investment. Studies continue to have limited impact on the implementation of forest management in many countries. More could be done to design effective dissemination strategies of research results that target forest managers.

8.6.1.2 Effectiveness of Response

Natural forest management has been successful in maintaining ecosystem health when it has also provided direct benefits to local communities. State authorities, without the involvement of local communities, carry out much forest planning with forest revenue appropriated by central government. This approach became common in tropical forests with disappointing results, in that it was unable either to safeguard the forest resource or to support local human well-being. The situation is now slowly changing. Not only is this helping to conserve the forest ecosystem, it is making a wider contribution to human well-being by offering an example for application in other public sectors.

8.6.1.3 Policy Challenges

Diverse, locally tailored solutions are needed for securing both wood supplies and forest environmental services. Wherever such solutions are developed, governance frameworks should become sufficiently flexible to support them. There is a compelling case for governments to give greater weight to locally determined approaches that provide solutions to the trade-offs associated with the management of natural forests.

8.6.2 Tree Plantation Management

The global area of tree plantations was 187 million hectares in 2000, a significant increase over the 1990 estimate of 43.6 million hectares (FAO 2001a). Although plantations are equivalent to only 5% of global forest cover, they were estimated to supply about 35% of global roundwood in the year 2000, and it is predicted that this figure will increase to 44% by 2030. (See *MA Current State and Trends*, Chapters 9 and 21.) Plantations will play an increasing role as natural forest areas decrease (largely in developing countries), are designated for conservation or other purposes (largely in developed countries), or are economically inaccessible (CIFOR 2003).

In addition to wood, it is possible for forest plantations to provide other environmental, social, and economic benefits, including NWFPs such as honey, resin, and medicinal plants; combating desertification; absorbing carbon to offset carbon emissions; protecting soil and water; rehabilitating lands exhausted

from other land uses; providing rural employment; and, if planned effectively, diversifying the rural landscape and maintaining biodiversity. These contributions have been recognized by a number of the U.N. conventions. Afforestation and reforestation qualify for support under the Clean Development Mechanism of the UNFCCC for development of carbon sinks, the Global Mechanism of the Convention to Combat Desertification, and the Global Environment Facility for rehabilitation of degraded lands under the CBD.

Trees are increasingly being planted to support agricultural production systems, community livelihoods, poverty alleviation, and food security. Communities and smallholder investors, including individual farmers, grow trees in shelterbelts, home gardens, and woodlots and in a diverse range of agroforestry systems to provide wood, non-wood forest products, fuelwood, fodder, and shelter.

There is a strong trend toward commercialization and privatization of state forest plantation resources in an endeavor to manage these resources more effectively and efficiently in response to free market forces. However, about half of the global forest plantation estate is grown primarily for environmental and ecological rehabilitation and protection, and so is not suitable for management for industrial purposes.

Plantation managers in many countries are under pressure to ensure that their forest plantations form an environmentally and socially friendly source of world roundwood, fiber, fuelwood, and non-wood forest products. Certification, government procurement policies, and public pressure in relation to forest plantation siting and management are behind this.

8.6.2.1 Constraints

Not all afforestation has positive economic, environmental, social, or cultural impacts. Without adequate planning and appropriate management, forest plantations may be grown in the wrong sites, with the wrong species or provenances, by the wrong growers, for the wrong reasons. Examples exist where natural forests have been cleared to establish forest plantations or where customary owners of traditional lands may have been alienated from their sources of food, medicine, and livelihoods. In some instances poor site and species matching and inadequate silviculture have resulted in poor growth, hygiene, volume yields, and economic returns. In other instances, changes in soil and water status have caused problems for local communities. Land-use conflicts can occur between forest plantation development and other sectors, particularly the agricultural sector and with communities who may be alienated from their traditional land resources.

8.6.2.2 Lessons Learned

Incentives (direct and indirect) have often been used by governments to encourage investment by the private sector to stimulate accelerated rates of afforestation. However, these have sometimes stimulated inappropriate activities (CIFOR 2003).

Surplus or marginal agricultural and degraded lands are increasingly targeted for afforestation. However, land-use conflicts can arise when the land perceived as available and accessible is actually used for grazing and provision of non-wood goods and services, often according to customary or traditional land-use rights (Anon. 2003).

Price pressures may threaten the range of forest plantation benefits as approximately half of all forest plantations are driven by wood profitability. There are early warning signs that leading countries in forest plantation development (New Zealand, Chile,

Australia, Finland, and Sweden) are feeling the pressure of depressed prices for a range of forest products.

There are strong pressures toward short rotation, fast growing, lower-valued forest plantation products, which provide fiber for breakdown and reconstitution into a wide range of products in the form required by the consumer. Productivity can be sustained through reduced impact harvesting and practices that reduce soil erosion, conserve water, and maintain soil fertility through subsequent rotations. Appropriate management techniques for planted forests can also help conserve or even enhance biological diversity. Protection from fires, insects, and disease is critical (FAO 2001b and 2001c; Evans and Turnbull 2004).

There have been serious concerns regarding large-scale monocultures. There is increasing recognition that semi-natural and mixed-species, mixed-age plantings can provide a larger range of products, provide “insurance” against unfavorable market conditions, reduce the effects and economic consequences of insect and disease attacks, harbor greater diversity of flora and fauna, contain the spread of wildfires, and provide greater variety and aesthetic value in the landscape (Evans 1999; CIFOR 2003).

8.6.2.3 Policy Challenges

In areas where land degradation has occurred, afforestation can play an important role in delivering economic, environmental, and social benefits to communities. In these instances, forests and trees must be planted in ways that will support livelihoods, agriculture, landscape restoration, and local development aspirations (Anon 2003).

Caution is widely urged on the complex issues of bio-security (particularly relating to invasive insects, diseases, and forest plant species and the adoption of sound phyto-sanitary procedures) and the application of biotechnology (genetic modification, cloned germplasm, hybrid stock). Both these issues have potential positive and negative impacts on forest plantation health, vitality, productivity, and sustainability. In unregulated situations, there is increasing evidence of insufficiently proven germplasm (insufficient laboratory, field and demonstration trials) being used and incidences of bio-prospecting, which increase the potential for genetic pollution.

8.6.3 Fuelwood Management

Woodfuel remains one of the larger outputs of the forest sector, in some situations the largest. However, consumption of fuelwood has recently been shown to be growing less rapidly than had been estimated earlier. Increasing urbanization and rising incomes are reflected in a slowing down in the rate of increase in use of fuelwood as users switch to more efficient and convenient sources of energy. In some regions, including much of developing Asia, total consumption is now declining. In others, it appears to be approaching a peak (FAO in press). Charcoal use, on the other hand, is still growing, forming a much larger proportion of the woodfuels total in Africa and South America (and some countries in Asia). Charcoal is the main transition fuel to which fuelwood users shift as they move up the “energy ladder,” and it is often a major urban fuel. It is also an important industrial fuel in some situations.

8.6.3.1 Impacts on Ecosystems

Supplies of fuelwood and wood for charcoal are drawn from a much wider base than just forests. Information from 13 countries in Asia showed that, in five countries, more than 75% of fuelwood came from outside forests (RWEDP 1997). Much fuelwood production for sale is a by-product of land clearance for

agriculture. Significant pressures on forest and woodland from woodfuel harvesting are mainly associated with areas supplying urban demand for charcoal (SEI 2002; Ninnin 1994). In dryland forests in parts of Africa, production of charcoal as the main wood output can materially alter the structure and productivity of the forests.

Overall, demand for fuel is seldom likely to deplete or remove forest cover on a large scale. There is not a “fuelwood crisis” of magnitude, and with such potentially dire consequences in terms of forest depletion, as to require major interventions to maintain or augment supplies (Deweese 1989). Areas of concern are generally limited to situations where there is concentrated and growing urban demand for charcoal.

8.6.3.2 Impacts on Users

Use of wood as a fuel may be less of a concern to the security of the forest estate than has in the past been feared, but it constitutes a large part of the contribution that forestry can make to livelihood security and poverty alleviation. Most use is still of a rural subsistence nature. Gathered supplies of fuelwood still constitute rural households’ main source of domestic energy.

The poorest tend to be disadvantaged by shifts to bring remaining common pool resources under sustainable management. Fuelwood harvesting tends to be restricted in this process, and women’s needs for fuelwood commonly have lower priority than those of men for forest products for sale. Women practice a range of measures to respond to reduced access to fuelwood supplies, and seldom list this high among their concerns, but it is still likely to involve a cost to them, if only in terms of increasing collection time or having to shift to less favored fuels.

8.6.3.3 Fuelwood Opportunities and Response Options

Though wood is the principal source of energy for cooking and heating for so many of the poor, it is the least efficient. Unless they have access to technology to convert wood and charcoal into modern forms of energy, real costs of energy from woodfuels can be high even for the poor. In contrast, industrial scale dendro power is gaining in interest in some parts of the world. (See Box 8.6.)

Considerable efforts have been devoted to encouraging adoption of improved wood-burning stoves. These have had some impact in urban areas of some countries, but little success in rural areas. Assessments indicate that lack of success was often due to failure to understand that users valued stoves for reasons other than fuel economy and that “improved” stove designs had not addressed these needs, or due to the constraints posed by the cost of purchasing stoves. Some evidence suggests that where stoves are seen as saving money (in towns) they are popular, but where they are merely saving time or biomass (in rural areas) men are not prepared to spend money purchasing them.

Recent attention to improved stoves has shifted from increasing efficiency of woodfuel use to reducing damage to health from airborne particulates and noxious fumes associated with the burning of wood and charcoal (IEA 2002).

The effective transfer and enforcement of local rights are important considerations. Issues that often remain to be resolved include the continuing role of forest departments, community leaderships with interests at variance with those of their members, and difficulties in devising and putting in place control and management mechanisms with transaction costs less than the value of the woodfuel.

The potential and constraints of woodfuel selling as a source of income for the poor are poorly recognized in forestry or poverty

BOX 8.6

Dendro Power

Dendro power involves the use of wood-based materials for power generation (RWEDP 2000). One useful feature of dendro power is its potential to use sustainably grown fuelwood. Interest in dendro power is gathering momentum due to its multiple benefits of renewable power, reforestation, and income generation (especially in rural areas). On a global scale, it has potential to reduce air pollution, and increase carbon sinks. It is considered to be an environmentally benign power source, with zero carbon emissions if properly managed. Dendro power is used on a limited scale in countries such as Sweden, Finland, Netherlands, United Kingdom, Brazil, United States, as well as in many Asian countries, including Thailand, China, India, Malaysia, Indonesia, and the Philippines.

At present, most of the biomass-fuelled electricity generation is through steam turbines with net efficiencies of about 20–25%. In thermo-chemical processes, the biomass product is heated to break it down into gases, liquids, and solids. These are considered to be higher value and more

convenient products. Further processing produces gases and liquid fuels like methane and alcohol. Methane can be used in gasification processes to produce electricity and liquids that are used as transportation fuels. Gasification technologies have the potential for higher conversion efficiencies of up to 45%. Integration gasification combined cycles are the latest development that combines gas and steam turbines to produce even higher efficiencies.

The success of dendro power generation depends on its ability to supply adequate fuel at low costs on a regular basis without over-exploiting the source. The generation of power requires a huge quantity of wood. A project in the range of 20–40 megawatt requires some 12,000 hectares of fuelwood plantation, or a \$50–100 million investment (Hulcher 1995, as quoted in Bhattacharya 2001). Fuel sources can be grown on degraded land, thereby utilizing land not suitable for other activities. The energy source can be grown and managed as dedicated plantations, or as agro-forestry systems or in woodlots (Fernando 2003).

reduction initiatives. Market demand for woodfuels can provide an important source of income for the poor. But reliance on it can also impede progress out of poverty, especially with large and rapid structural changes in urban market demand for woodfuels. There is a need for better understanding of such changes, and how best to support producers.

There has been a general failure of control measures to put commercial woodfuel production on a more sustainable basis. Initiatives to raise prices closer to replacement values, and to capture some of this in ways that would contribute to meeting the costs of management and regeneration, have not had much success. Transaction costs of trying to control collection from natural forests, and to differentiate in the marketplace between fuelwood from natural and planted sources, are often too high compared to the value of the wood being traded. This might be overcome by implementing such controls more effectively. However, this would raise costs for producers and lead to higher prices for urban users, resulting in considerable hardship for the latter, and aggravating problems of underinvestment and poor productivity by the former (SEI 2002).

8.6.3.4 Policy Challenges

The need to incorporate woodfuels more fully into the forestry mainstream has not been adequately addressed, despite the growing focus on giving forestry a stronger livelihood orientation. At the policy level, more effective recognition of the needs of the landless and very poor is needed in the process of making decisions about changes in land tenure and use. These considerations can also reinforce the case for conversion of open access use into common property rights. While privatization can create a more favorable environment for those with rights to land to invest in woody production, it can severely disadvantage those without land, unless their needs are recognized and taken into account.

Significant constraints are too often imposed on those who can participate in production, and can create distortions to trade and markets: competition from subsidized woodfuel supplies from government forests; taxes and other charges to generate government revenue from fuelwood trade; restrictions imposed in the name of conservation and prevention of “excessive” forest harvesting; and other regulations governing private sale of and trading in woodfuels. Such interventions are often unnecessary, counterproductive, or poorly designed and implemented, and need to be critically examined.

8.6.4 Carbon Management

Though there is not yet agreement on the modalities for implementing carbon forestry projects under the Kyoto Protocol, a wealth of experience has been developed as a result of more than a decade of pilot programs. Although many of the early initiatives were based on forest conservation or management, afforestation activities now predominate, perhaps reflecting the international decisions to allow only afforestation and reforestation activities into the CDM for the first commitment period. Afforestation and deforestation activities are attractive from a development point of view, and their carbon benefits are real, measurable, and marketable. Countries are increasingly recognizing the importance of forest cover for their water and soil management and for reduced vulnerability to extreme climatic events.

There are a number of issues that remain undecided in relation to the implementation of carbon forestry activities. These can be broadly grouped into technical, policy, and market uncertainties.

- *Technical uncertainties.* Issues relating to the validity of land use activities as a carbon sink and the quantification of net greenhouse gas benefits remain controversial among the scientific and policy making community.
- *Policy uncertainties.* The lack of agreement, at the international level, on the eligibility of forestry activities in mitigating climate change has to date been a major factor in restraining the extent of project development on the ground.
- *Market uncertainties.* The market for purchasing forestry based carbon offsets or investing in projects has reflected the ongoing technical and policy uncertainties and controversies of the land use sector. In particular, the withdrawal of the United States from the Kyoto Protocol process has reduced the market for forestry-based Joint Implementation and CDM projects substantially.

The likely impact of JI and CDM is largely dependent on the specific rules still being developed and the response of the carbon market to increased supply of forestry-based carbon offsets. Despite the early stages of implementation of climate change initiatives, experience to date has identified some important lessons that could inform the future debate on these issues. (See Table 8.3.)

8.6.5 Fire Management

There is a major effort underway to re-introduce fire as an effective ecosystem process in those forest areas where the lack of fire

Table 8.3. Lessons Learned from Forest-based Carbon Sequestration Projects

Experiences and Lessons	Possible Action and Future Opportunities
Fragmentation: the carbon benefits of land-based activities tend to be dealt with in isolation, rather than with other benefits or objectives	Integration: the integration of carbon benefits with other objectives, services, products, and benefits at the landscape level is essential.
Costs: the project development cycle has high transaction costs that act as a barrier to many projects, specifically small or development oriented projects	Cost reduction: approaches are needed to reduce the costs of project development to individual initiatives (e.g., provision of seed capital, simplified procedures for technical analyses, bundling, etc.)
Scale: small projects often result in multiple local benefits but are often not feasible due to high costs and limited carbon products	Bundling: the gathering together of small-scale projects under an umbrella scheme will result in the economy of scale, ensure local benefits are secured, and add robustness to smaller projects.
Limited funding: the income generated through the sale of carbon offsets is rarely enough to fund the development and implementation of projects	Innovative financing: measures that attract additional financing are needed, for example, through integration with other objectives and conventions or higher pricing for additional benefits.

has contributed to forest health problems and the increasing occurrence of uncharacteristically severe wildfires (USDA Forest Service 2000). The objectives have been severalfold: protect human life and property in fire-adapted ecosystems, reduce ecological damage to forests, avoid excessive suppression costs, restore ecosystem integrity and health, protect wildlife habitats and biodiversity, and lower air pollution problems (Mutch et al. 1993; Neuenschwander and Sampson 2000; USDA Forest Service 2000). Significant technical and political obstacles must be addressed if the effort is to be successful. The technical obstacles generally revolve around the current fuel conditions in these forests, or the existence of large, uniform areas of unhealthy or mature stands. These require careful management interventions that either reduce fuels to levels that allow fire to burn in historically characteristic ways or break up large areas of uniform conditions so that landscape patchiness is restored (Covington and Moore 1994; Mutch et al. 1993; USDA Forest Service 2000).

While most of the techniques have been well tested at research plot levels, there is limited experience at the large landscape levels needing treatment in areas like the western United States, northern Canada, or Russia. These problems are made more complex in those areas where significant human populations exist. Even with fuel reductions and carefully prescribed burning to restore fire to its ecologically required levels, the amount of air pollution created may exceed what people will tolerate (Neuenschwander and Sampson 2000). Political opposition to the inevitable risks of using fire as a forest management tool, the considerable costs involved in effectively managing an active fire program, and the pollution and human health impact that will be intentionally generated are significant and will require carefully crafted strategic approaches that generate widespread public support if they are to be overcome (USDA Forest Service 2000).

8.7 Summary Lessons

Civil society and private sector players are becoming as important as government in developing responses; furthermore, their involvement helps ensure that policy outcomes are more durable. Urban and market players are increasingly significant. This reflects growing public concern to secure a range of ecosystem services from forests and other wood-producing ecosystems. Innovative responses, such as many forms of partnership to create balanced land use for wood and other benefits, and certification to assure such a balance, are offering new forms of “soft policy” that influence government strongly.

Consequently, *multistakeholder policy processes*, from local to international levels, are becoming significant in developing, debating, and reviewing response options. They are important in deciding on the balance between the public and private benefits to be obtained from wood-producing ecosystems. However, they are still often poor at identifying and involving marginal groups, for which brokers can be helpful. Many are also one-off, rather than installing continuous improvement systems that keep up with the dynamics of wood supply and demand and deal with change.

Ultimately, *public perceptions and beliefs* are key. For example, progress needs to be made in improving public understanding of the wide land use spectrum that potentially provides wood, and therefore of the legitimacy of plantations as wood-producing ecosystems, potentially freeing up other land for other ecosystem benefits.

There has been a strong trend toward *privatization or decentralization* of control over forests, forest management services, and enterprise. This, together with other forms of liberalization and structural adjustment, has helped to remove perversities that acted against sustainable wood supply. It has helped to create a wider range of “willing stewards” of forests and wood-producing lands but has not always conferred adequate rights and powers on them to enable them to exercise stewardship.

Market-based responses are redistributing rights to stakeholders, making them more effective in securing both wood supplies and other ecosystem services. Market approaches to allocating use rights to public lands, and voluntary certification, are helping to change the structure of wood industries. However, it is usually existing “good practice” companies that are benefiting. Step-wise incentives are needed to encourage the bulk of wood producers to gradually develop existing capacity from a low base, to cover transaction costs, and hence to improve forest management practice. Other responses are needed to “close doors” to bad practice; these are unlikely to be market-based, but will need legal action and enforcement.

To shift wood production toward sustainability is a challenge that goes beyond selecting individual “responses” toward restructuring governance of the sector. Progress is made by *coherent sets of interacting responses* that suit a particular case, country, wood market, or governance structure. A coherent, effective “set” of response options might differ depending on the prevailing context. (See Table 8.4.) Developing an effective set of responses is, therefore, largely a *governance and institutional development* question. Urgent requirements for institutional strengthening tend to be at the local level, for it is only through local institutions that sustainable forest management can be precisely defined and pursued, and decisions made on the balance with other activities. A clear institutional separation of forest regulation, management, enterprise, and revenue collection tends to be needed among government authorities for environmental services such as carbon storage as well as for wood.

Table 8.4. How Responses Can Differ in Various Contexts
(Mayers et al. 2002)

Prevailing Governance	Potentially Effective Response Options: Key Entry Points for Governance Change
Command and control	role, powers, and accountability of authorities legislation development extension and enforcement
Privatization to corporate or civil society interests	deregulation standards and certification market reforms, royalties, and rents ombudsmen monitoring
Nationalization of enterprises and services	major institutional and legal changes user rights compensation mechanisms
Devolution of power to local authorities and/or civil society groups	empowerment costs/transition problems of divestment capacity development
Other approaches to decentralization	empowerment rights assurance capacity development negotiation
Cross-sectoral consensus and partnerships	participation/representation mechanisms and resources availability of information capacities of civil society groups

Better *information* is also needed both about the dynamics of wood supply and demand, and about the costs and benefits of the different response options and their distributional effects. Some of the more recent responses appear to have caused significant changes, but there have been relatively few independent assessments of what they have achieved. Furthermore, there is inadequate information about how forests and other wood-producing ecosystems behave under multi-purpose production regimes, especially in terms of the best possible balance between wood and other benefits. Casting responses in stone will rarely, therefore, be a good idea. Whatever its form, sustainable forest management will be information-intensive and all response options may need to invest more in integral information and review functions. Table 8.5 summarizes the assessment of response options.

Table 8.5. Summary Assessment of Responses: Wood, Fuelwood, and Non-wood Forest Products

Response	Pre-conditions	Degree of Uptake	Constraints	Links and Trade-offs	Quality of Evidence	Assessment of Effectiveness	Key Policy Challenges
Title of activity	Key contextual factors required before response can be effected	Indication of spread and degree of adoption of response	Key obstacles preventing up-take	Relationship with other responses	Strength and credibility of information on the response and its impacts	Impact of response in improving ecosystem health and human well-being	Governance actions required to support response
International forest policy processes and development assistance	High level of public concern. Willingness of stakeholders to engage, particularly governments. Moderate national political commitment.	Thirteen years of inter-governmental policy dialogue. Several major NGO-led and private sector-led initiatives. Forestry-specific development assistance declining.	Excessively dominated by governments. Engagement with extra-sectoral frameworks still weak. No consensus on a legally binding international instrument in forestry.	Strong links with national forest governance initiatives/programs and certification; moderate with natural forest and plantation management; rather weak with trade liberalization and others.	Strong, in international convention and U.N. Forum on Forests secretariats and among monitoring and "watchdog" NGOs.	Weak direct impact. Moderate effect in setting overarching framework and catalyzing other response actions. Moderate effect in establishing common language on sustainable forest management.	Integration of agreed forest management principles and practices in financial institutions, trade rules, global environment programs, and global security decision-making. Implementation at regional to national levels.
Trade liberalization	Few factors required—since trade liberalization is pushed by most international agencies.	Widespread adoption of liberalization prescriptions. When non-tariff measures and effect of subsidies are taken into account, the net trend internationally is probably toward increased protection rather than liberalization.	Agricultural trade policies and regional development policies have greater impacts than forest trade policies.	Weak links to international forest policy dialogue. Moderate links and some trade-offs with national forest governance initiatives, natural forest management, and plantation management.	Weak. Trade flows information is strong—but impacts information is weak. Beginning to improve in international agencies and NGOs.	Impact contingent on governance. Magnifies the effect of governance—making already good forest governance better, making bad forest governance worse. Tends to concentrate control over forest management. More positive impacts when linked to improved, impartially administered property rights.	Improve engagement of "underpowered" groups in trade policy decision-making. Ensure institutional strengthening occurs before trade liberalization. Require cost internalization as well as liberalization, and consider the case for protection to achieve the social component of sustainability.
National forest governance initiatives and national forest programs	High level political commitment and stakeholder willingness to engage required.	Major forestry processes, acknowledged by many countries; at best, main overarching response into which others fit; at worst, irrelevant to more focused responses.	Lack of political engagement of forest planners; weak institutional, human, and financial capacity; weak stakeholder negotiation processes.	Strong to international policy processes; weak to local-level implementation.	Strong, on the formal national steps taken (FAO database); weak on local assessment of impact.	Moderate in many contexts and promising to be strong in some, but as yet uncertain. Previous related planning processes have had limited impact.	Foster genuine stakeholder negotiation and buy-in; keeping objectives strategic, politically high-profile and focused; implementing agreed actions. Ensure NFPs drive progress to good forest governance.

(continues)

Table 8.5. Continued

Response	Pre-conditions	Degree of Uptake	Constraints	Links and Trade-offs	Quality of Evidence	Assessment of Effectiveness	Key Policy Challenges
Title of activity	Key contextual factors required before response can be effected	Indication of spread and degree of adoption of response	Key obstacles preventing up-take	Relationship with other responses	Strength and credibility of information on the response and its impacts	Impact of response in improving ecosystem health and human well-being	Governance actions required to support response
Direct management of forests by indigenous peoples	State exerting no control over territory, or state concedes significant sovereignty to native polities.	Limited to date; prevails in a few "failed states" and in North America, Australia, and New Zealand.	Poor recognition of indigenous peoples by states. Weak uptake of methodologies that can improve management in indigenous areas.	Weak links to many other responses. Strong links to specific international conventions.	Weak on impacts—heavily dependent on coarse-filter, secondary data. Strong information on indigenous peoples in forest areas.	Uncertain since information is weak (recognition of indigenous land claims does not often lead to direct forest management by indigenous peoples). Initial evidence suggests that as effective as strict-use protected area.	Culturally and technically sound cooperation between indigenous and non-indigenous organizations for natural resource management.
Collaborative forest management and local movements for access and use of forest products	Effective local institutions (for collaborative forest management) and concerted government devolution and support for devolved arrangements.	Widespread around the globe although not an abundant response.	Internal conflict and lack of leadership in many communities. Over-bureaucratic government—or reluctance to cede sufficient control.	Strong links to national governance initiatives and moderate links to natural forest management in the tropics and commercialization of non-wood forest products.	Strong—many rigorous case studies and situation analyses.	Strong on improved resource management and access to forest resources for participating groups, but much more uncertain in impact on poverty and human well-being.	Develop the institutional arrangements and capacities for people in forest areas to have the rights and power to bring about a fair division of control, responsibility, and benefits between government and themselves.
Small-scale private and public-private ownership and management of forests	Private long-term tenure and transfer rights over forest and plantation areas.	Country specific, dependent on tenurial system—small-scale private ownership prevalent in Europe and North America, and increasing in Latin America and Asia. Public-private ownership and conservation concessions limited in area and maturity.	Economic viability of small forest areas—opportunity cost of other land uses often too great. Public-private arrangements constrained by few private investors. Conservation concessions untested as yet.	Strong links to national forest governance initiatives and plantation management. Conservation concessions link or trade-off with natural forest management in the tropics.	Strong in Europe and North America. Experimental response only for conservation concessions.	Strong for small-scale private management where tenure is secure, information is well focused, and economies of scale are achieved through association of owners.	Support for security of tenure, effective market and technological information, and development of management capability.

Company–community forestry partnerships	Companies requiring secure forest asset base but restricted in own abilities to control it. Degree of organization of smallholders or communities.	Evident in several countries in each of: North America, South America, Europe, Africa, Asia and the Pacific. Increasing emphasis in some countries (e.g., China); shifts from tight partner contracts to looser arrangements in others (e.g., India).	Lack of policy or public pressure for companies to engage. Mistrust of companies by potential local partners. Weak third party “brokering” agencies.	Strong links to plantation management. Moderate links to national governance initiatives, public and consumer action and natural forest management in the tropics.	Moderate. Information base on the response only recently developing through case study and global review work.	Moderate. Where preconditions are met, better than solely corporate or small-scale farm forestry. Impacts often indirect (e.g., companies improving long-term survival and communities better securing tenure through partnerships).	Development of governance frameworks that require accountability of partnerships; support for the bargaining power of community-level associations; enabling the emergence of third-party support agencies.
Public and consumer action	Effective use of analysis of problems in generating appropriate messages for the public and consumers.	Widespread in the north, growing in the south.	Relies on strength of NGOs to mobilize public and consumers. Periodicity of interest from public and media, and from governments and corporations in responding.	Strong links as stimulus to national forest governance initiatives and forest certification. Moderate links to international forest policy processes, natural forest management in the tropics, and commercialization of non-wood forest products.	Moderate–extensive media reports on the effectiveness of campaigns, rather weaker cause-effect evidence.	Strong but specific impact, and sometimes perverse: has caused the emergence of certification, some trade initiatives, and improvements in practices of some companies; has stimulated some policies that undermine local tenure security and benefits to poor communities from forests.	Enable public mobilization strengths of NGOs. Government action to sustain information flows and enable improvements in practices that public actions highlight.
Third-party voluntary forest certification	Market signals demanding improved and verified forestry practice.	Rapid spread since 1993. Occurs in all continents but most certified forests are in the North, managed by larger companies and exporting to Northern retailers.	Little incentive to adopt in contexts of tropical deforestation. Proliferation of certification programs, diluting credibility. Threat that competitiveness of small and medium-sized enterprises reduced where certification only used by larger companies.	Strong links to public and consumer action and plantation management. Moderate links to international forest policy processes and national governance initiatives. Weak links to natural forest management in the tropics.	Moderate. Certification has a short history; experience to date is much-analyzed, but few independent assessments.	Moderate. Has improved already good practice rather than tackling bad practice and has done so for larger rather than smaller operations. Key knock-on benefits in improving forest policy debates and provisions.	Development of step-wise approaches to certification, and approaches more appropriate for smaller and community operations. Integrate landscape-wide priorities better. Explore mutual recognition of schemes and support more education of consumers about sustainable forestry.

(continues)

Table 8.5. Continued

Response	Pre-conditions	Degree of Uptake	Constraints	Links and Trade-offs	Quality of Evidence	Assessment of Effectiveness	Key Policy Challenges
Title of activity	Key contextual factors required before response can be effected	Indication of spread and degree of adoption of response	Key obstacles preventing up-take	Relationship with other responses	Strength and credibility of information on the response and its impacts	Impact of response in improving ecosystem health and human well-being	Governance actions required to support response
Wood technology	Changing market demand. Research and development.	Technology developments have stimulated a wide range of new plantations and processing methods—the trend being toward locations in the tropics.	Dependent on high levels of capital outlay for research and development, and hence not available to smaller enterprises.	Strong link to plantation management and dendro power (see fuelwood management). Moderate link to national forest governance initiatives and carbon management.	Strong information on utility of technology in production, weaker on impacts of this on ecosystems and human well-being.	Moderate. Technology development leads to changes in locations of production (trend to fiber production in the tropics) and structure of the wood industry with winners and losers in terms of jobs and environments.	Enable private sector investment in technology that internalizes environmental and social costs and is accessible to a greater range of scales of enterprise.
Commercialization of non-wood forest products	High demand for NWFPs over time leads to over-exploitation of the naturally regenerating resource base first, and then specialized production if market access, secure tenure over the resource base, sufficient labor and capital to invest, and entrepreneurial skills are available.	Significant growth in some NWFP markets with extension of market system to more remote areas; growing interest in natural products such as herbal medicines, wild foods, hand-crafted utensils, and decorative items; and development projects focused on production, processing, and trade of NWFPs.	Few NWFPs have large and reliable markets, and those tend to be supplied by specialized producers using more intensive production systems. Many other NWFPs are vital to the livelihoods of the poor but have little scope for commercialization.	Strong links to national forest governance initiatives and collaborative forest management. Moderate on impacts of commercialization, weak on basic biophysical research for many valuable NWFPs, thus constraining efforts to improve management.	Moderate. Impacts for livelihoods through combinations of technical and capacity-building interventions to improve raw material production, processing, trade, and marketing, and through development of cooperatives and improved policy and institutional frameworks. Problems with stronger groups gaining control at the expense of weaker groups and over-exploitation of resources. Increased value does not automatically translate into effective incentives for conservation.	Improved understanding of the role of natural resources in rural livelihoods in poverty reduction strategies and related frameworks. Policy that more effectively gives incentives for sustainable management of NWFPs, including exploration of joint production of timber and non-wood forest products.	

<p>Natural forest management in the tropics</p>	<p>Needs to be focused on a range of forest goods and services, not just timber, to be economic.</p>	<p>Large investments since the early 1990s to promote improved management of natural forests, and an increasing area now under some form of management.</p>	<p>Low timber yields, complexity of system, high labor inputs. Uncertain financial viability of reduced impact logging.</p>	<p>Strong links to national governance initiatives and collaborative forest management. Moderate links to public and consumer action, company–community partnerships, and commercialization of NWFPs. Moderate trade-offs with plantation management.</p>	<p>Moderate to weak. Information often not readily available. Information being acquired on reduced impact logging</p>	<p>Moderate. Natural forest management implemented by some of the best transnational corporations and by some local enterprises has been successful in maintaining ecosystem health when it has also provided direct benefits to local communities. Poor management characterizes many of the operations in the spectrum between these two scales of enterprise.</p>	<p>Identification of long-term funding sources. Support for diverse, locally tailored solutions to securing both wood supplies and forest environmental services—giving greater weight to locally determined approaches that provide solutions to the trade-offs associated with the management of natural forests.</p>
<p>Tree plantation management</p>	<p>Surplus or marginal agricultural and degraded lands. Supportive policy and investment frameworks</p>	<p>Widespread—some 187 million hectares in 2000, constituting 5% of global forest cover but supplying about 35% of global roundwood.</p>	<p>Conversion of natural forest. Undermining customary ownership. Without good planning and management, forest plantations may be grown in the wrong sites, with the wrong species or provenances, by the wrong growers, for the wrong reasons.</p>	<p>Strong links to company–community partnerships, carbon management wood technology. Moderate links with trade liberalization and national governance initiatives.</p>	<p>Strong data on areas, species, and long-term trends. Weaker on social impacts.</p>	<p>Strong impacts as response to growing wood demand and as available natural forest areas decline through deforestation, designation for protection and economic inaccessibility. Most positive impacts where developed on degraded sites where rural investment most needed. Moderate increasing local returns from smallholder plantation management.</p>	<p>Development of policy and incentive structure to ensure environmental and social costs are internalized; development responds to both growing consumption and declining harvest from natural forest; and bio-safety is secured.</p>

(continues)

Table 8.5. Continued

Response	Pre-conditions	Degree of Uptake	Constraints	Links and Trade-offs	Quality of Evidence	Assessment of Effectiveness	Key Policy Challenges
Title of activity	Key contextual factors required before response can be effected	Indication of spread and degree of adoption of response	Key obstacles preventing up-take	Relationship with other responses	Strength and credibility of information on the response and its impacts	Impact of response in improving ecosystem health and human well-being	Governance actions required to support response
Fuelwood management	Market incentive and supportive policy.	Fuelwood is one of the larger outputs of the forest sector. Its consumption appears to have reached a global peak. It is rising in Africa and declining in developing Asia. Charcoal use continues to rise. Attempts to manage fuelwood are as widespread as its use. Power from wood-based materials (dendro power) spreading—still on a pilot scale.	Often faces competition from subsidized woodfuel supplies from government; taxes to generate government revenue from fuelwood trade; restrictions imposed in the name of conservation; and regulations governing private sale of and trading in woodfuels. Improved woodfuel stoves not valued for fuel economy by rural people. Dendro power requires huge quantities of wood.	Strong links to national forest governance initiatives and commercialization of NWFPs. Moderate links to collaborative forest management. Dendro power in the North strongly linked to plantation management.	Moderate. Information on impacts of attempts to manage fuelwood recently greatly improved. Strong information on dendro power—but unproven impact to date.	Weak: a general failure of control measures; initiatives to raise prices closer to replacement values unsuccessful; transaction costs of trying to differentiate in the marketplace between fuelwood from natural and planted sources are too high; uncertainty as to the extent and nature of the impacts of improved stoves. Dendro power likely to spread, mostly in the North.	Support studies that help map the location, nature, and causes of woodfuel problems, and interactions between woodfuel use, energy policies, and forestry and livelihood interventions. Development of policies that enable users to evolve new “tenurial niches” that give them some access to woodfuel resources in the new landscapes; remove distortions introduced by regulations on trade and markets; and balance dendro power with other energy sources.
Carbon management	Afforestation and reforestation activities allowed into the Clean Development Mechanism under the Kyoto Protocol for the first commitment period.	Pilot activities only—distribution of activities to date shows a developing country bias, with a particular focus in Central and South America.	Major uncertainties: technical (validity of land use activities as a carbon sink and the quantification of net greenhouse gas reduction benefits); policy (eligibility of forestry activities in mitigating climate change); and market (reflecting the ongoing technical and policy uncertainties).	Strong link to international policy processes and plantation forest management.	Moderate. Information base being rapidly developed.	Weak to date. The likely impact of Joint Implementation and the CDM is largely dependent on rules still being developed and response of carbon market to increased supply of forestry based carbon offsets. Project development has high transaction costs that act as a barrier to many projects, specifically small or development oriented projects.	Promote policy processes that install livelihood priorities as well as environmental safeguards in carbon management; integrate carbon benefits with other objectives at the landscape level; and foster collective approaches for small-scale projects to achieve viable scale.

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