



**A NEW AGENDA
FOR FOREST CONSERVATION AND POVERTY REDUCTION:**
Making Markets Work for Low-Income Producers



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A NEW AGENDA FOR FOREST CONSERVATION AND POVERTY REDUCTION:

MAKING MARKETS WORK FOR
LOW-INCOME PRODUCERS

by

Sara J. Scherr | Andy White | David Kaimowitz



<http://www.forest-trends.org>

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PREFACE

The future of the world's forests and the future of millions of the world's poorest people are inextricably linked. Rural poverty is concentrated in many areas where the world's biodiversity is most threatened. More than a billion people now live within the world's 19 forest biodiversity "hotspots" and population growth in the world's tropical wilderness areas is 3.1 percent, over twice the world's average rate of growth. Over 90 percent of those who live on less than a dollar a day depend fully or in part on forest products for their livelihoods. The dominant models of forest management and protection are increasingly inappropriate in the face of this reality. Large-scale logging in commercial forest concessions, industrial forest plantations and public protected areas all deprive poor communities of lands and forests they traditionally controlled and contribute little, if anything, to rural livelihoods. Even social forestry initiatives that do seek to restore these rights typically seek to sharply restrict commercial use by local people. A fundamental re-assessment of the role of forests in rural development, and the role of local people in forest conservation, is urgently needed.

Indeed, changes in forest resources, markets, and governance offer new opportunities for low-income producers. At least a quarter of the forests in developing countries are now officially owned or administered by indigenous and other communities. Millions of smallholder farmers, especially those in forest-scarce but agriculturally less favored regions, are growing trees not only to recover local ecosystem services, but also to meet rapidly growing domestic demand for forest products. In some areas, forest and farm tree resources are the principal assets of the poor and the most proximate opportunity for poverty alleviation.

Unfortunately, however, low-income producers presently benefit only marginally from commercial forestry activities. Forest markets pose formidable barriers to profitable participation by the rural poor. Current market trends, if unabated, will continue to deny these poor people opportunities to fully use their forest resources for their own development. Market policies that discriminate against community producers keep prices low and limit income opportunities. Policies being promoted by some environmental groups and industry lobbies would mean that in the near future most industrial wood could come from industrial plantations and an increasingly consolidated forest industry, effectively cutting off forest and farm communities from critical income opportunities. Local producers often do not have access to sufficient capital, market contacts and information, or technology to exploit new market opportunities. They lack support to compete

effectively in either export or domestic markets. Unless a major global effort is made to secure and develop community forest opportunities over the next decade, rural communities will not be able to capitalize on their forest assets—and will thus have little incentive to keep them.

This paper by Sara J. Scherr, Andy White and David Kaimowitz lays out a set of strategies to promote forest conservation in ways that positively contribute to local livelihoods and community development in low- and middle-income countries.¹ The authors fully recognize the critical importance of the “safety net” functions of forests for the poor. But they also identify specific market niches where large numbers of low-income producers have, or could develop, a competitive market advantage. They identify important commercial opportunities for private forest industry, forest enterprises and business service providers to partner with low-income forest producers. They also explore alternative strategies to recognize, encourage and reward forest conservation by local forest owners and users. Real world cases described in the paper illustrate their potential and feasibility, as well as the difficulties to be overcome.

Critical to achieving these benefits will be removing present policy barriers to local market participation, in particular securing forest use and ownership rights, reducing excessive regulatory burdens, “leveling the playing field” for local producers in forest markets, and involving local producers in forest policy negotiations. The authors identify key roles in the strategy for local people’s organizations and federations, for private forest industries and investors, for rural development and conservation institutions, and for policymakers. Readers from all these diverse perspectives will find it of value. We believe that with strategic action over the next generation, local producers can play a much larger role in the forest sector, benefiting much more from forest markets and contributing much more to forest conservation.

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¹ The paper elaborates on a Policy Brief by the same authors published by Forest Trends and CIFOR in 2002, entitled “Making Markets Work for Forest Communities.”

CONTENTS

PREFACE	ii
ACKNOWLEDGMENTS	viii
ACRONYMS	ix

PART I. WHY FOCUS ON FOREST MARKETS? THE CONTEXT

1. INTRODUCTION

Marginalization of the Rural Poor in Commercial Forestry	1
Re-thinking the Role of Markets in Poverty Reduction and Forest Conservation	3
Urgency of Taking Action Now	4
Organization of the Paper	5

2. THE ROLE OF FOREST MARKETS IN RURAL LIVELIHOODS

The Scale of Rural Poverty in Forested Regions	7
Roles of Forests in Rural Livelihoods	7
The Potential of Forest Market Development to Reduce Rural Poverty	13

3. FORESTS IN TRANSITION: IMPLICATIONS FOR RURAL COMMUNITIES

Increasing Community Ownership and Control of Natural Forests	16
Expansion of Agroforestry and Small-Scale Plantations	18
Increasing Demand for Forest Products	21
Increasing Demand for Ecosystem Services of Forests	22
Democratization of Forest Governance	23
Globalization and Forest Industry Concentration: Clouds with Silver Linings?	24

PART II. MARKET OPPORTUNITIES FOR POOR PRODUCERS

4. ASSESSING MARKET OPPORTUNITIES AND MANAGING RISKS

Market Opportunities for Small-Scale Forest Producers	27
Strategies to Manage Livelihood Risks	31
Strategies to Reconcile Commercial Use and Forest Conservation	35

5. COMMERCIAL NICHES FOR LOW-INCOME FOREST PRODUCERS	
Commodity Wood	53
High-value Wood	56
Certified Wood	59
Processed Wood Products	61
Industrial Pulpwood	63
Non-Timber Forest Products	65
Payments for Ecosystem Services	68
Summary of Market Opportunities	70

PART III. MAKING FOREST MARKETS WORK FOR LOW-INCOME PRODUCERS

6. DEVELOPING LOCAL FOREST ENTERPRISES	
Improve Market Position	78
Strengthen Producer Organizations	82
Forge Strategic Business Agreements	88
Pursue New Sources of Financing	92
Adapt Certification for Small-Scale and Indigenous Forestry	96
Encourage Business Service Providers for Low-Income Producers	97
Invest in Community Forest Enterprise Development	101
Target Research, Education and Training	102

7. REMOVING POLICY BARRIERS TO LOCAL MARKET PARTICIPATION	
Secure the Forest Ownership and Use Rights of Local People	106
Reduce the Regulatory Burden on Local Forest Producers	114
Level the Playing Field for Local Producers in Forest Markets	120
Involve Local Producers in Forest Governance and Policy Negotiation	123
Protect the Poorest in Forest Market Development	128

8. A FRAMEWORK FOR ACTION	
Towards a New Model of Forestry Development	131
Roles and Responsibilities	134
Conclusion	139

REFERENCES	140
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ABOUT THE AUTHORS	156
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LIST OF BOXES

1. Rough Estimates of the Number of Forest-Dependent Poor	8
2. Role of Woodlands in Rural Livelihoods in Communal Areas of Zimbabwe	9
3. Farm-Grown Timber Supply in Bangladesh	21
4. Distribution of Benefits from New Argan Oil Markets in Morocco	32
5. Boom and Bust Forestry and Impacts on Community Employment in the USA	33
6. Benefits to Local People from Sale of Commodity Wood from Public Forests in India	56
7. Smallholder Logging in the Amazon	59
8. Impact of International Market Integration on Community Enterprises in Michoacán, Mexico	72
9. Improving the Market Position of Forest Cooperatives in Honduras	79
10. Design Principles for Effective Management of Common Property Forests	84
11. Sovereignty as the Key Factor in Economic Success in U.S. Indigenous Forestry Enterprises	85
12. Strengthening Community Forest Producer Organizations in Mexico	87
13. South African Farmers Contract to Produce Industrial Pulpwood	89
14. First Nations of British Columbia Partner with Multinational Firm	90
15. Financing Community Forest Enterprises in Mexico	93
16. Venture Capital Firm Builds Sustainable Industry with Amazon Communities	96
17. Small-Scale Farmers in Mexico Partner with Environmental NGO to Produce Carbon Emission Offsets for Automobile Federation	100
18. Community Forest Development in Kentucky State, USA	101
19. Extending Forest Rights for Local People in State Forest Lands of Vietnam	109
20. Sustainable Management to Obtain Forest Rights in Sumatra, Indonesia	112
21. Procedures Required for Sale of Timber from Private Trees in West Bengal, India	115
22. Auditing “Best Management Practices:” A Low-Cost Alternative to Forest Regulation in the USA	119
23. Improving Local Governance of Woodfuel Markets in Niger	121
24. Increasing Local Participation in Timber Markets in Bolivia	123
25. Enhancing the Role of Local People in Forest Governance in Ghana	126

LIST OF MAPS

1. Human Population Density in the World's Forests *inside back cover*

LIST OF TABLES

1. Local Ownership and Control of Forest Resources in 18
Developing Countries with Most Extensive Forest Cover16
2. Agroforestry, Farm Forestry and Agroforests in Selected
Developing Countries19
3. Market Characteristics that Enable Small-Scale Producers to Compete ...30
4. Main Market Opportunities and Possible Business Models
for Low-Income Producers45
5. Price Premium for High-Value Lumber: Example from a
U.S. Retail Market57
6. Scale of Commercial Forestry Potentials for Low-Income Producers,
by Country Characteristics75
7. Technological Options to Improve Market Viability of
Small-Scale Forest Producers81
8. Principles for Successful Community-Company Partnerships91

LIST OF FIGURES

1. Potential Benefits of Forest Markets for the Poor, by Group14
2. Forest Market Development Strategy for Low-Income Producers14
3. Relative Prices of Grain and Timber, 1960-199720
4. Historical Cycle of Forest Production in the Amazon33
5. National Consumption as a Percentage of National Wood Production
in the 10 Most Forested Developing Countries54
6. Market Value Chain for Tropical Timber from Papua New Guinea80

LIST OF ANNEXES

1. Official Forest Ownership in 24 of 30 the Most Forested Countries153
2. Global Forest Area Available for Production154
3. Role of Developing Countries in Supply of Forest Products154
4. Trends in Real World Prices of Wood Products, 1962-2010155

- INDEX OF GEOGRAPHIC REFERENCES158

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ACRONYMS

ACICAFOC	Indigenous and Campesino Coordinating Association for Central American Community Agroforestry (Asociación Coordinadora Indígena y Campesina de Agroforestería Comunitaria Centroamericana)
ASB	Alternatives to Slash and Burn
CATIE	Center for Research and Education in Tropical Agriculture
CIFOR	Center for International Forestry Research
CITES	Convention on International Trade in Endangered Species
CPR	Common property resource
DFID	Department for International Development (United Kingdom)
FAO	Food and Agriculture Organization of the United Nations
FSC	Forest Stewardship Council
GDP	Gross domestic product
GEF	Global Environment Facility
GNP	Gross national product
GTZ	German Association for Technical Corporation
ICRAF	World Agroforestry Centre
IFRI	International Forestry Resources and Institutions
IFF	Intergovernmental Forum on Forestry
INFC	International Network of Forests and Communities
IPF	Intergovernmental Panel on Forestry
IIED	International Institute for Environment and Development
IRW	Industrial roundwood
ISO	International Standardization Organization
ITTO	International Tropical Timber Organization

IUFRO	International Union of Forestry Research Organizations
JFM	Joint Forest Management
MDF	Median density fiberboard
MIn	Million
NGO	Non-governmental organization
NTFP	Non-timber forest product
ODA	Overseas development assistance
OSB	Oriented strand board
PAI	Population Action International
PICOP	Paper Industries Corporation of the Philippines
PROCYMAF	Forest Conservation and Sustainable Management Project (Mexico)
RECOFTC	Regional Community Forestry Training Center (Thailand)
R&D	Research and development
SEAF	Small Enterprise Assistance Funds (Bolivia)
SFM	Sustainable forest management
UK	United Kingdom
UNOFOC	National Union of Community Forest Organizations (Mexico)
USA	United States of America
USAID	United States Agency for International Development
WRI	World Resources Institute (USA)
WWF	World-Wide Fund for Nature (or World Wildlife Fund in the United States)

PART I. WHY FOCUS ON FOREST MARKETS?

1. INTRODUCTION

The late 20th century saw a dramatic transformation in global forest resources, their use and management, and people's perception of their value. Since 1961 tropical countries lost over 500 million hectares of forest cover (FAO 2000) and consumption of forest products rose by 50 percent (Gardner-Outlaw and Engelman 1999). The role of forests in environmental protection and biodiversity became the focus of active international and local policy. At the same time, forests' critical role in the livelihoods of the poor became more widely recognized. Indeed, rural poverty is concentrated in many areas of the world's most threatened forest biodiversity (McNeely and Scherr 2003), and over 90 percent of the world's poorest people depend on forests for their livelihoods (World Bank 2001). More than a billion people live within the world's 19 forest biodiversity "hotspots"¹ and population growth in the world's tropical wilderness areas is 3.1 percent, over twice the world's average rate of growth (Cincotta and Engelman 2000). As we enter the 21st century, the debate is intensifying, especially in developing countries, over how to reconcile the seemingly incompatible goals of conserving forests, meeting market demand, and promoting broad-based sustainable development that reduces rural poverty.

MARGINALIZATION OF THE RURAL POOR IN COMMERCIAL FORESTRY

Some disenchanted observers have argued that forestry can contribute little to poverty reduction (Wunder 2000). Indeed, prevailing markets and government policies often hurt the poor. This situation has historical roots. During and following colonization, many countries promoted government-led industrialization, utilizing forests to fuel and finance public investments for national economic growth with little concern for private market development or local economic benefits. Large-scale industrial concessions and plantations were the main forestry models, and the approach was based on governments claiming ownership of forests, extensively depriving poor communities of traditionally held lands. This industrialization approach not only did not benefit the poor, but achieved neither conservation nor economic development goals. And, as is becoming widely recognized, where this approach remains in use, it often gives rise to illegal logging and widespread corruption.

The 1978 "Jakarta Declaration" of the Eighth World Forestry Congress projected serious forest product supply gaps and warned that these could be averted only by ensuring that the economic benefits from forest utilization reach the communities owning, living, or working in the forests (Chiong-Javier 2001). This inspired some international donors, non-governmental organizations (NGOs), and governments to promote small-scale commercial forestry. But this enthusiasm evaporated in the face of market and policy

constraints. More fundamentally, progress was constrained by the widespread perception that poor people could not manage the long-term rotations of forests, could not afford large-scale equipment, and could not supply the large volumes of wood required by pulp mills and giant sawmills. It was also widely assumed that forest enterprises needed to be vertically planned and integrated, even undertaking their own research.

A lack of political will to address commercial constraints and growing concern with poverty meant that by the 1980s most external support focused on subsistence-oriented forestry (Arnold 2001). These initiatives often helped to improve livelihood security, but they had only marginal impacts on reducing poverty. By the 1980s and 1990s, forestry projects began to include components intended to increase local cash income. But these were generally developed by public or non-profit agencies rather than the private business sector, and commonly ignored business and market realities, thus failing to achieve major income benefits (Angelsen and Wunder 2003). With growing concern for environment in the 1980s, overseas development assistance and development banks shifted focus dramatically from forest production to environment objectives and the establishment of protected areas became the global forestry priority.

For these many reasons, low-income forest producers presently supply a small share of industrial forest products in most developing countries. In Mexico, for example, communities own 80 percent of forests, but less than five percent of processing capacity (Molnar and White 2001). While millions globally are engaged in markets, they usually have low levels of output, profit and productivity. Local producers are at the bottom of a supply chain in which they lack bargaining power and technology. Local commercial forest producers are ignored by development investors, policymakers and program planners, if not actively discouraged, to protect politically allied forest industries or forest department revenues, or for fear of negative environmental impacts.

J.E.M Arnold notes that “for some time, the main thrusts of forestry development and aid strategies, while doing much to strengthen forestry’s role in providing a safety net for the poor, are doing much less to help the latter cope with the opportunities and pressures that confront them from increasing liberalization, privatization, and exposure to the market” (pers. comm. 2001). Yam Malla (2000) has decried the lost opportunities for poverty reduction in Nepal due to continued restrictions limiting community forest user groups’ market activities. Because few governments or industries monitor forest production from low-income producers (and because so much of that production is technically illegal), even vibrant local forest commerce is largely “invisible,” as are its local income and employment multiplier effects. Unless a more concerted and more ambitious effort is made, the poor will continue to lose out and the many fine efforts of so many actors in forest development will have relatively limited impact.

RE-THINKING THE ROLE OF MARKETS IN POVERTY REDUCTION AND FOREST CONSERVATION

Unquestionably, for a majority of poor rural people—especially the very poor—safeguarding the “safety net” role of forests will remain paramount. But we believe that forestry can also play a much more meaningful role in increasing rural incomes and in reaching the internationally agreed Millennium Development Goal to halve global poverty by the year 2015, while at the same time supporting the Goal of promoting environmental sustainability (United Nations 2000).

Neither large-scale logging nor large-scale forest plantations will contribute much to poverty reduction. Excluding or discouraging local producers from forest markets will not only deprive the poor of income opportunities, but also diminish the value of their forests, thus accelerating degradation and conversion for other uses. Making local commercial production illegal, despite active local demand, inadvertently leads to forest degradation, encourages corruption and undermines the rule of law. We need to re-think the potential contributions of small-scale forest producers to commercial production and conservation goals, and ensure that a much higher share of the profits needs goes to local people rather than central governments or large-scale industrial interests.

We argue in this report that fundamental changes underway in the forest sector offer new opportunities for commercial forestry to benefit local people and provide more sustainable pathways of economic development for local communities. At least a quarter of the forest estate in developing countries is now under community control (White and Martin 2002) and rights of legal access and the legitimate interests of local people are increasingly recognized. Millions of smallholder farmers are planting forest trees and managing forest remnants for local and national trade to substitute for the products of disappearing natural forests. Political democratization in diverse parts of the world is fostering reforms in forest governance that benefit local producers. Greater political openness is enabling people to speak out openly about abuses, corruption, environmental damage, negative social impacts, and other elements of irresponsible forestry. Demands by investors and consumers for socially responsible forestry are also driving improved social protections for local forest communities in some countries and establishing a “social license to operate.” In many parts of the world, the traditional industrial model of natural forest exploitation may no longer be viable economically or politically (Jenkins and Smith 1999).

Population and income growth in developing countries are leading to a burgeoning domestic demand for forest products that dwarfs projected import demand from developed countries, even as the latter offers increasingly lucrative and diverse niche markets. Changes in market structure, new market instruments, and new interest by forestry companies in business partnerships with local people are opening market niches for which local producers have, or could develop, a competitive advantage. In some of these mar-

ket niches, it makes good business sense for forest industry and investors to work with local producers. In today's economy, different producers can occupy different parts of the value chain. It is not necessary for one company to control hundreds of thousands of hectares, as is the case of many industrial concessions. Small-scale, high-productivity forest harvest and processing equipment is available. Demand has diversified; supply chains are more sophisticated. Shorter-cycle wood and wood by-products are in greater demand. Thus many new opportunities have arisen for commercial forestry enterprise by low-income producers.

It is critical to pursue these opportunities. For many millions of poor people in low- and middle-income countries, forest market development can positively contribute to local livelihoods and community development. From the agricultural sector we have learned over the past 50 years that promoting small-scale enterprises is one of the most effective ways to trigger broad-based, job-creating rural development. Commercial forestry offers one of the few economically viable options to reduce poverty for poor producers and indigenous peoples living in regions where crop production has a higher risk. In historically forested areas of low remaining forest cover, commercial forestry by smallholders and communities can offer a low-cost mechanism to stabilize ecological conditions by encouraging conservation and expansion of forest and tree cover. Even in forest-abundant areas, it is highly unlikely that large-scale forest conservation can be achieved without engaging local people in commercially viable forest enterprises. Many of these local forest producers will have greater incentives for sustainable resource management and conservation than outside logging companies and concessionaires had in the past. But to achieve positive conservation outcomes will require supportive governance and regulatory frameworks.

URGENCY OF TAKING ACTION NOW

Re-thinking the forestry agenda is especially urgent now for several reasons. First, forest resources in many parts of the developing world are being rapidly depleted—these important assets of the poor are either being high-graded by industry, or literally “going up in smoke.” Second, new markets for ecosystem services from forests are being established; if these are not designed to recognize community rights and interests, those communities will suffer further livelihood losses. Third, some members of the international forestry community are advocating policies to accelerate and even subsidize the further expansion of large-scale industrial plantations (for example, Victor and Ausubel 2000), which threatens both to deprive community forest owners of income opportunities from commercial logging and to undermine smallholder agroforestry. There is an urgent need to offer a broader vision to meet forest market demands and forest conservation in ways that also address the livelihood needs of the rural poor.

In a globalizing sector with extreme income inequality, markets tend to evolve (by policy and standard business practice) so that benefits are captured largely by higher-income,

urban consumers and by highly capitalized producers (Reed 2002). For many forest product and all ecosystem service markets, market institutions are still in the process of developing. Suppliers and consumers are not linked effectively, so prices do not necessarily give the right signals, as has been documented for India (Mott and Deren 1998). Proactive efforts will be needed to free small-scale entrepreneurs from discriminatory forestry policy and business practices and to provide the necessary business services to enable them to participate profitably in forest markets.

There international community has shown a renewed interest in the potentials of forestry to address poverty. Examples include the World Bank's (2002) and Asian Development Bank's (2002) new forestry strategies, new development frameworks adopted by the bilateral aid agencies of major donor countries such as the ones in the UK, the Netherlands, and the USA (Anderson et al. 2002), the European Union-UNDP initiative on poverty and environment, and new commitments of conservation organizations like the World Conservation Union and the World Wildlife Fund (Gutman 2002). Greater efforts are needed to make the private industrial sector as well as national leaders in the developing world aware of the potentials of local forest production for the market. Ways must be found to tap the financial resources of the private forestry sector, public agencies, and conservation organizations to support rural livelihoods through profitable local businesses. Forestry initiatives for rural development will be more successful if they work with—not against—market forces.

Forestry can learn lessons from successful experiences of other sectors in reducing poverty, especially the importance of jointly building physical, human and natural capital assets; attending to the distributive aspects of growth over time; and building the institutional framework for good governance (Thomas et al. 2000). Smallholder agricultural development has been a successful “engine of growth” in poor countries, supporting broad-based income growth in a dominant sector of the economy with high multiplier effects (Pinstrup-Andersen, Pandya-Lorch, and Rosegrant 1997). Community-based forestry has the potential to contribute much more to achieving sustainable development and poverty reduction than is the case today.

ORGANIZATION OF THE PAPER

This paper describes and analyzes these potentials and demonstrates their feasibility with real world cases of community forest businesses and innovative policies and business partnerships. This preliminary assessment is offered as a first step in a longer-term effort to understand existing forest product and service markets and to identify the most promising market opportunities for local community producers, focusing particularly on developing countries. Part I presents the broader context of forestry's changing relation to rural development and poverty reduction. Part II develops a framework for considering which market niches have potential for poor producers. Part III proposes strategies and targeted actions to realize that potential.

We draw a number of key conclusions:

- While the “safety net” roles of forest are critical in the livelihoods of hundreds of millions of the rural poor, a large part of this population is also involved in marketing forest products and there is a large, unrecognized potential for poverty reduction through more effective involvement in these markets (Chapter 2).
- Increasing community ownership and control of forest resources, increasing demand for forest products and environmental services, and democratization of forest governance are opening up new opportunities for low-income communities to benefit from forest markets (Chapter 3).
- Low-income producers have competitive advantages in certain forest markets and can pursue management strategies that reduce both livelihood and conservation risks (Chapter 4).
- A preliminary market assessment suggests significant income potentials for large numbers of low-income producers in selected market niches for commodity wood, high-value timber, certified wood, processed wood products, industrial pulpwood, non-timber forest products (NTFPs) and payments for ecosystem services (Chapter 5).
- For low-income producers to realize these potentials, they must improve their market position, strengthen producer organizations, forge strategic business partnerships, and pursue new sources of financing; market innovations are needed to adapt certification for small-scale forestry and to encourage the development of community forest enterprises and business service providers who meet their needs (Chapter 6).
- Policy reforms are essential to expanding these opportunities, particularly securing forest ownership and use rights, reducing the excessive regulatory burden, “leveling the playing field” for local producers, and involving them in forest policy negotiations, while protecting the poorest forest-dependent people from risks associated with forest market development (Chapter 7).
- Targeted action by national and international policymakers, local producer organizations, the forest business community, and civil society and donor organizations is required to harness market trends to the development of sustainable local livelihoods (Chapter 8).

NOTES

¹ The 25 biodiversity “hotspots” were defined by Conservation International as the areas with greatest species richness and endemism at greatest threat of habitat loss. 19 of these 25 hotspots are in forest ecosystems. The exceptions are the Brazilian Cerrado, Central Chile, California Floristic Province, Cape Floristic Province of South Africa, the Succulent Karoo and Southwestern Australia. Total population in these drier areas is under 55 million people.

2. THE ROLE OF FOREST MARKETS IN RURAL LIVELIHOODS

THE SCALE OF RURAL POVERTY IN FORESTED REGIONS

Rural populations living in the world's forested landscapes are large, very poor, and growing. Even with accelerating urbanization, the absolute number of rural people in developing countries rose 40 percent between the 1960s and 1990s, and by 2015 the world's rural population is projected to number over three billion (Scherr 1999). About 240 million people live in predominantly forested ecosystems (World Bank 2003). Although the Amazon and some parts of the Congo Basin have very low average population densities, in most of the developing world, densities in forest regions are moderate. In many locations, densities are over 50 people per square kilometer (Map 1; see inside back cover). About two thirds of rural people in developing countries live in so-called “marginal agricultural lands” (including upland watersheds)² where forestry, tree crops, and agroforestry are important land uses and ecologically more suitable than annual monocrops. Population growth in the world's remaining “tropical wilderness areas” is twice the global average (Cincotta and Engelman 2000).

Of the billion poorest people in the world—those living on less than US\$1 per day—75 percent live in rural areas (IFAD 2001). More than a third of all children in the warm humid and sub-humid tropics and sub-tropics, where most closed canopy tropical forests are found, are malnourished, as are more than half of children in the warm semi-arid tropics and sub-tropics, where dry forest and woodland savannahs predominate (Sharma et al. 1996). The World Bank estimates that roughly a quarter of the world's poor and 90 percent of the poorest depend substantially on forests for their livelihoods (World Bank 2001). Many of the “very poor” are found among indigenous hunting and gathering tribes, landless people living around forests, and landless forest workers. In China, most forests are found in officially designated “poor counties” (Lele et al. 2002). In India, two thirds of forests are in economically poorer tribal areas; some 100 million people are estimated to be forest dwellers, while another 275 million live in the vicinity of forests (Kumar and Saxena 2002).

ROLES OF FORESTS IN RURAL LIVELIHOODS

Forestry plays an important role in the livelihoods of hundreds of millions of rural people—principally as a subsistence safety net, but also as a source of cash income, a capital asset, and a source of employment (Sunderlin, Angelsen, and Wunder 2003).

Diverse groups of forest resource-dependent poor can be distinguished based on the nature of that dependence (Box 1). The numbers are all roughly estimated.³

BOX 1. Rough Estimates of Forest-Dependent Poor	
	ESTIMATED POPULATION
• Indigenous peoples who depend primarily on natural (usually closed canopy) forests for their livelihoods (hunting, gathering, shifting cultivation)	60 million
• Rural people who live in or at the margin of natural forests or woodlands, who rely on the forest as a safety net or for supplemental income	350 million
• Smallholder farmers who grow farm trees or manage remnant forests for subsistence and income	500-1000 million
• Artisans or employees in formal or informal forest-based enterprises	45 million
ESTIMATED TOTAL: 0.955 - 1.455 billion	
Sources: Calibre and SCC (2000); Krishnaswamy and Hanson (1999).	

Forests as Subsistence Safety Nets

The main contribution of forest resources to rural livelihoods is through providing subsistence products and services, and a *de facto* “safety net.” Millions of swidden cultivators utilize forests as fallow for food crop production. Both they and farmers who practice permanent cultivation use forest foods extensively to help meet dietary shortfalls during particular seasons of the year and during emergency periods such as floods, famines, droughts, and wars (Falconer and Arnold 1989; Scoones, Melnyk, and Pretty 1992). In dry ecosystems, open woodlands are especially critical sources of fodder for livestock herds which provide primary subsistence and income (Kerkhof 2000). In West Africa, 25 percent of people’s protein requirements are met by bush meat; for indigenous groups elsewhere, it is the principal source (Bennett 2000). Forests help farming communities to meet their needs for construction materials, household goods, fuel, animal fodder, crop nutrients, and medicines, as illustrated for Zimbabwe in Box 2. The poorest depend especially heavily on community forests.⁴ All local people rely on the environmental services of forests, particularly water quality and flow regulation (which impact health), provision of habitat for crop pollinators and predators of agricultural pests, and microclimate regulation. For many people, the forest also has highly significant spiritual and religious values (Arnold and Dewees 1995).

FAO estimates that 0.1 hectare per person of forest cover is needed in low-income countries to supply these essential goods. But deforestation and population growth are reducing those critical subsistence resources. About 1.8 billion people live in 40 countries with

BOX 2. Role of Woodlands in Rural Livelihoods in Communal Areas of Zimbabwe

A quarterly household economic survey was implemented with a panel of 197 households in 29 villages in southern Zimbabwe in 1993/94 and 1996/97 with particular emphasis on environmental resource use and values. At least 100 different resource uses were identified, most notably firewood use, consumption of wild foods, livestock browse and graze, and cash income from the sale of non-timber forest products (NTFPs), such as thatching grass and carpentry products. Most derived from rangelands, woodlands, and rivers held under communal ownership. Almost none of these uses and income sources would have been picked up in a standard household budget survey. For the poorest 20 percent of households, these NTFPs provided 24 percent of average total income (cash income from NTFP sales plus use values of subsistence production and collection of NTFP foods, firewood, housing inputs, fertilizer, etc.) per person in the two years. For the wealthiest 20 percent of households, these accounted for only 16 percent of average income, although the rich were the main users of NTFPs in quantity terms. Yet this heavy reliance of the poor on NTFPs is a function of the poverty and economic constraints of rural households. It is the economic characteristics of NTFPs that makes them attractive to poor households. NTFPs are usually derived from commons areas and collected and consumed rather than purchased with cash; they are low value goods; they are collected using unskilled labor; they help offset production risks; and they can fit easily into the diversified activity portfolio of the poor.

Source: Cavendish (1999).

critically low levels of forest cover;⁵ and by 2025 this number is projected to nearly triple to 4.6 billion. Women often bear the burden, literally and figuratively, walking farther for wood, carrying loads a longer distance and suffering ills associated with cooking when wood is scarce (Gardner-Outlaw and Engelman 1999).

Forests for Cash Income

Local producers in some areas are already actively managing their forests to produce outputs for sale (Messerschmidt 1993; Padoch and Piñedo-Vasquez 1996). However, there are no reliable data on the aggregate income earned by rural people, especially the poor, from sale of forest products and services, as such numbers are generally not included in national statistics. Almost certainly, though, the scale is far larger than is recognized by most economists and development experts.

NTFPs. Rural people may earn cash income from forest resources in a variety of ways, the most widespread of which is the sale of NTFPs. Smallholders living in forest margins in diverse parts of the world earn between 10 and 25 percent of their household income from non-timber forest products (Ndoye et al. 1999; Wunder 2000). NTFPs may account for as much as 16 percent of total income of households in India; in Orissa, Madhya Pradesh, Himachal Pradesh, and Bihar States, as much as 17 percent of the landless depend on NTFPs to secure daily wage work, and 39 percent are involved in NTFP collection as a subsidiary income source

(Mallik 2000).⁶ In parts of Nepal, up to a quarter of the total household income is derived from the sale of non-wood forest products (Malla 2000). In southern Ghana, 10 percent of the population generated some cash income from forest product activities in the early 1990s. Only a minority reported that it was a major source of income. But more than 70 percent stated that it was important in helping them meet particular needs, either because of its timing, or in absolute terms (Townson 1995).

NTFPs play a crucial role as a source of cash income during periods of unemployment or crop failure. An assessment of the impact of the East Asian economic crisis of the late 1990s found that forest assets helped to cushion poor communities by providing supplemental income through sales of forest products, as well as a reserve of cultivable land for food production (Pagiola 2001). Income from collection and processing of babaçu palm kernels in northeast Brazil has been shown to account for 39 percent of cash income and 34 percent of total household income during the seasonal slack period in agriculture. Many of the poorer farmers were dependent on this cash for purchasing seed and other inputs for the new season's planting (May et al. 1985, cited in Arnold and Ruiz Perez 1998).

For rural women, income from non-timber forest products is particularly important. In West Bengal, India, a study in the early 1990s reported that three times as many women as men were involved in gathering NTFPs. Processing was exclusive to women, and twice as many women as men were involved in marketing NTFPs. These accounted for 20 percent of household income (Ford Foundation 1998).

In situations where the population is growing faster than per capita incomes, people unable to obtain income, or sufficient income, from agriculture or wage employment often rely on NTFP collection for their livelihoods. This situation is likely to be characterized by labor-intensive, low-return, typically household-based activities such as fuelwood collecting and mat making. Where per capita incomes are rising, growth is more likely to be demand-driven, and low return, labor-intensive activities tend to give way to more productive and remunerative activities, such as retailing, trading, and activities to meet growing and diversifying rural and urban demands. At that stage, production and selling of forest products increasingly shifts from a part-time activity of very large numbers of people to more specialized year-round operations by a smaller share of the population. In Eastern and Southern Africa, for example, woodworking for urban and rural markets grew 10 times as fast as other products, many of which are "inferior" goods. In contrast, employment in grass, cane, bamboo is tied to agricultural demand and subject to high competition and thus much less economically attractive (Byron and Arnold 1999).

Timber and small-diameter wood products. In public forests and community forests subject to Forest Department regulations, sale of timber by local people is often heavily restricted. However, some co-management schemes share timber revenues with local communities. Communities owning natural forests earn income through

the sale of harvest rights (stumpage) to loggers or by selling harvested timber, as has been well documented in the Amazon (Padoch and Piñedo-Vasquez 1996), Mexico (Molnar and White 2001), and Cameroon (Auzel et al. 2001). Local people commonly use nearby forests as a “cash reserve” for hard times through clandestine logging (Jaffee 1997).

Production of small-diameter wood products for sale is important for many people, especially those living near towns or in densely populated rural areas. For example, in the Kelka woodland area in Mali, 48 percent of total village cash came from fuelwood sales (Kerkhof 2000). Sale of timber, construction poles, and fuelwood is one of the strongest incentives for farmers in western Kenya and eastern Zambia to practice agroforestry (Franzel and Scherr 2002). In Burkina Faso, farmers planted “live fences” generating supplies of fuelwood and fodder that increased household income by 11 to 16 percent. While poor people often find it uneconomic to manage large forest plots on long rotations, it is common to find farmers in forest-scarce regions who establish small “legacy” plots of long-rotation, high-value timber to provide an inheritance to their children or to fund important events such as weddings or funerals. In Kolar District of Karnataka State, India, 55 percent of small farmers used tree income for “lumpy” expenditure items, such as house and well construction, and 40 percent used such income for marriages and providing education. The contribution of tree income to the private and social investments of small farmers was significant: 34 to 86 percent of the costs of improving a house and 42 to 84 percent of social investments (Spears 2000).

Ecosystem services. In some cases, local people who own forest resources may earn income from selling the ecosystem services that flow from forest protection or good management. These may include payments for access rights (for hunting, fishing, ecotourism) or for environmental protection (watershed or biodiversity protection) (Pagiola et al. 2002; Rosa et al. 2002). Such payments are still not common, but are growing steadily, particularly in high-biodiversity value areas under threat, and in urban watersheds. Projects have been established in the past decade involving thousands of low-income rural farmers and communities in carbon sequestration activities in the emerging market for carbon emissions offsets and these are expected to increase in number once the rules for the Clean Development Mechanism of the Kyoto Protocols and other carbon trading mechanisms are finalized in 2004 (Smith and Scherr 2002).

Forests as Capital Assets

For poor households and communities who own or control forests and farm trees, these may represent a high share of their few capital assets. Forest resources are flexible, multiple-output assets that can produce diverse products in response to chang-

ing need or demand over time.⁷ The enhancement or establishment of forest resources represents an increase in natural capital, and the transfer of forest ownership rights to local household and communities thus constitutes the transfer of a capital asset.

As natural capital, forests can be sustainably used or harvested, or converted to produce other types of capital. Forest harvesting and conversion to agricultural land are both means of converting natural capital to financial, physical, human (education), or more valuable natural capital (e.g., tree crops). These strategies may make sense for local people, so long as they can also protect ecosystem stability and opportunities for future forest resource use by retaining critical forest elements in the landscape.

Employment in Forestry and Forest Processing

Statistics on forestry employment are quite poor. Poschen and Lougren (2001) report that globally, an estimated 17.4 million people (full-time equivalents) earn their living from formal sector forest-based employment (i.e., enterprises with over 20 employees) in forestry, wood industries, furniture, and pulp and paper. They “guesstimate” that another 30-35 million are employed in the informal and subsistence sectors. By far the most people are employed in China, although large numbers are also employed in Indonesia, Brazil, India, and Malaysia. Calibre and SCC (2000) estimate that employees in formal sector forest enterprises (logging, plantation, and processing activities) numbered about 3.6 million world-wide in the 1990s, while roughly 45 million people were employed in all forest-based enterprises.

Small-scale forest product processing is one of the largest sources of rural non-farm employment and, unlike formal sector employment, appears to be increasing. In Zimbabwe, for example, a national survey in 1991 found 237,000 persons working in small (1-2 person) woodworking, carving, wood fuel, cane, and grass product enterprises, as compared with only 16,000 employed in the formal forest sector industry (Arnold et al. 1994). Most of these jobs provide seasonal, supplemental income. Community-based forest processing enterprises often provide far greater employment than do highly capital-intensive modern mills. For example, in a typical Chilean lumber mill, one job is created for every US\$1.3 million invested, while in Nuevo San Juan (a community forest enterprise in Mexico), an additional job is created for only US\$12,000 (Jaffee 1997).

The economic benefits associated with large-scale logging operations in natural forests have largely bypassed local people. Migrant laborers in work gangs from other regions are often employed rather than local people, in some cases because

skilled labor is not found locally.⁸ In some countries, industrial logging has led to serious environmental, health, and safety problems which have affected logging camp residents and disrupted traditional social systems (Colchester 1999). Though the traditional “boom and bust” cycle of non-sustainable forestry could potentially contribute significantly to community economies, this requires organizations that will wisely invest a large share of the income in other more sustainable types of rural development. Real development benefits are thus the exception rather than the rule, especially in poor communities (Arnoldo Contreras-Hermosilla, pers. comm. 2001).

Large-scale forest plantations often generate high employment during tree establishment and harvest, with little in between. They may have positive employment benefits where forests replace degraded or unused land, where alternative agricultural employment demands little labor, or where rotation cycles require continuous re-planting, maintenance, and harvest labor. In Chile, for example, half a million rural people now depend on forestry activities largely stemming from plantations; job creation in forest plantations is higher on a per hectare basis than in traditional activities (Contreras-Hermosilla and Gregersen 2001). In China, the World Bank-funded plantation projects provided incomes and temporary employment for 2 million poor people, and a total of 12 million people were provided temporary employment through the National Afforestation Project (Rozelle et al. 2002).

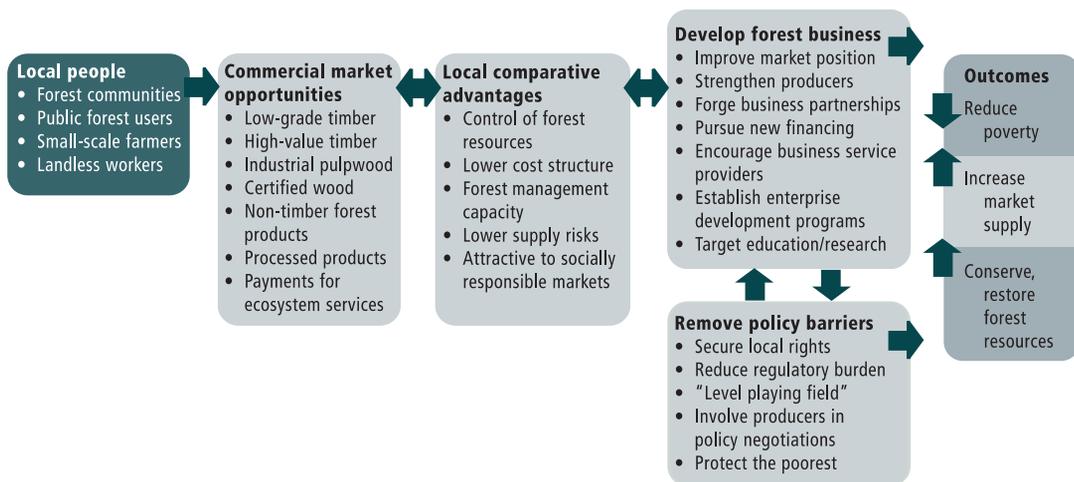
THE POTENTIAL OF FOREST MARKET DEVELOPMENT TO REDUCE RURAL POVERTY

Even where the economic value of local subsistence uses and of the environmental services of forests are very high, they may not be sufficient for farmers to justify keeping standing forests that do not also generate cash income. Forest markets can contribute to employment and cash income streams for all major groups of the rural poor and function as capital assets for forest owners, enabling them to utilize underutilized resources and leverage other types of capital (**Figure 1**). Through multiplier effects, commercial forestry can stimulate employment and economic growth. Economically valuable forests can provide incentives for local people to protect environmental services (Scherr 2000). All of these potentials enhance the economic value of standing forest resources and reduce the threat of forest clearing and extreme degradation.⁹ Forestry policies that explicitly empower poorer rural producers to participate effectively in more open forest markets could reduce their vulnerability, while building their natural, social, human, financial, and physical capital assets. **Figure 2** outlines the key elements in a proposed strategy for community-based forest market development, each of which is examined in the following chapters.

Figure 1. Potential Benefits of Forest Markets for Low-Income Producers, by Group

Benefits of Forest Markets	Small-Scale Farmers	Community Forest Owners	Public Forest Owner	Landless Workers
Earn returns to capital				
• Enhanced sale value of forested land	X			
• Capital accumulation (through natural growth of assets)	X	X		
• Assets for use as collateral for loans	X	X		
Enhance returns from joint production				
• Increased economic returns (reduced risks) from agricultural enterprises (through sale of agroforestry byproducts)	X	X		
• Increased economic returns from maintaining forested landscapes (e.g., for ecotourism)	X	X		
Convert income to capital				
• Investment capital (lump sum) for housing, business education, social investments	X	X	X	
• Working capital for farm and non-farm enterprises	X	X	X	
• Lump sum cash income for major consumption expenditures	X	X	X	
Earn income				
• Cash income—regular, off-season or supplementary	X	X	X	X
• Emergency cash reserve	X	X	X	X
• Employment in forest enterprise—regular, off-season, or supplementary	X	X	X	X
• Reduced income risk, through diversification	X	X	X	X

Figure 2. Forest Market Development Strategy for Low-Income Producers



NOTES

- 2 Remotely-sensed data show that 46 percent of the global agricultural extent is located on slopes greater than 8 percent; 26 percent has slopes over 16 percent (Wood, Sebastian, and Scherr 2000; Table 4). See footnote 12 for definition of "agricultural extent."
- 3 Two careful studies of the size of the forest-dependent population, by Byron and Arnold (1999) and by Calibre and SCC (2000), conclude that existing data do not permit an exact assessment.
- 4 Malla (2000) has shown this dependence in Nepal for fuelwood, animal fodder, and leaf litter used for cropland fertility. Research studies conducted in Orissa, Madhya Pradesh, Himachal Pradesh and Bihar, India indicate that over 80 percent of forest dwellers depend almost exclusively on NTFPs for their livelihoods (Mallik 2000).
- 5 Some of these countries historically had low forest cover and have developed alternative strategies to obtain fuel, construction materials, etc., that depended less on forests (Gardner-Outlaw and Engelman 2000).
- 6 For example, an assessment of non-timber forest products in Laos found that they accounted for 40 percent of the value of total family income, 55 percent for villages located near the forest (Fisher 2001).
- 7 Dewees and Saxena (1995) provide a detailed history through the 20th century of the changing roles of black wattle in the livelihoods of central Kenyan farmers, including wattle bark, charcoal, and timber for cash income; the provision of subsistence wood products; and as indicators of land rights claims.
- 8 Detailed documentation of employment patterns are available for the charcoal industry of Sudan (Dewees and Saxena 1995); the woodfuel industry of Senegal (Ribot 1998); and the formal industrial sector in many countries (Poschen and Lougren 2001).
- 9 The phenomenon of farmers clearing forest of high economic (but not financial) value in order to produce agricultural goods for cash income of lower economic value is documented in detail for the case of Tharaka, Kenya (Emerton 2001).

3. FORESTS IN TRANSITION: IMPLICATIONS FOR RURAL COMMUNITIES

The previous chapter outlined the potential benefits that could accrue to low-income people from greater participation in forest markets. But can forest markets that have historically excluded or marginalized local people actually provide these opportunities? In fact, forests and forestry are undergoing profound changes that are transforming the commercial opportunities for low-income forest producers in developing countries. These have arisen as the result of changes in patterns of ownership and control of forest resources, changes in demand for forest products and environmental services, and growing democratization of forest governance.

INCREASING COMMUNITY OWNERSHIP AND CONTROL OF NATURAL FORESTS

A few decades ago, colonial and post-colonial governments controlled the vast majority of natural forest resources in developing countries. Today, a fourth of the forest estate in the most forested developing countries is owned or controlled by indigenous and rural communities (White and Martin 2002; Table 1). As local people seek to re-claim forest resources from the state and new legislation recognizing local ownership is adopted and implemented around the world, that share is rising. It has more than doubled in the last 15 years and appears set to at least double in the next decade. Many countries have begun to formally grant long-term use rights to local households or communities under diverse models, although the process is slow and local people often receive only the more degraded forest resources. In China, for example, the new Rural Land Contracting Law passed by the Party Congress in August 2002 aims to strengthen the security of collective forest ownership, which now constitutes about 60 percent of all forests in China (Xu Jintao, pers. comm. 2003).

Table 1. Local Ownership and Control of Forest Resources in 18 Developing Countries with Most Extensive Forest Coverⁱ

Type of Tenure	Area (Total of 1395.6 million hectares)
Public ownership, administered by government	990.9 million hectares (71.0%)
Public ownership, reserved for community and indigenous groups	112.9 million hectares (8.1%)
Private community or indigenous ownership	192.8 million hectares (13.8%)
Private ownership by individuals or firms	99.0 million hectares (7.1%)
Land claimed by communities or indigenous groups recently legalized, or in process	Another 100 million+ hectares (4%)

ⁱ Brazil, China, Democratic Republic of Congo, Indonesia, Peru, India, Sudan, Mexico, Bolivia, Colombia, Tanzania, Argentina, Myanmar, Papua New Guinea, Cameroon, Central African Republic, Gabon, Guyana.

Source: White and Martin (2002), Table 1. Note: See **Annex 1** for detailed data on 30 countries.

In addition to recognizing the private property rights of forest communities, many governments are granting rights to collect and sell NTFPs from state forests or to co-manage and share income from timber production. A wide spectrum of community involvement in forest management is found—from long-term leases to concessions to co-management in publicly owned forests (White and Martin 2002).

The characteristics of this natural forest resource are changing. Roughly 30 percent of the tropical forest area is now estimated to be “secondary forest,” that is, “anthropogenic” forests that have regenerated after heavy influence by human intervention. De Jong and colleagues (2001) distinguish five common types to which we add a sixth:

- Forests regenerating after significant tree extraction;
- Forests regenerating after significant vegetative loss through human-induced fire;
- Swidden forest fallows allowed to regenerate after crop production for purposes of restoring the land for subsequent cultivation;
- Secondary forest gardens resulting from enriched swidden fallows, less-intensively-managed smallholder plantations or home gardens where substantial spontaneous regeneration is tolerated, maintained, or even encouraged;
- Rehabilitated forests regenerating on degraded lands, largely through natural processes or (where conditions of previous use inhibit or delay forest re-growth) aided by rehabilitation efforts or the facilitation of natural regeneration through measures, such as protection from chronic disturbance, site stabilization, water management, and planting.
- Forests regenerating naturally on farms after the abandonment of cropland or pastures as a result of agricultural intensification, rural depopulation or growth in non-farm employment (Mather 2001), or reduced incentives for extensive livestock grazing, mainly in Latin America (Kaimowitz 1995). Such spontaneous forest recovery has generally resulted under conditions where technological change in farming was labor-intensive, yet did not attract in-migration; or where there was ample employment outside the agricultural sector that drew people off the land (Angelsen and Kaimowitz 2001; Rudel 2001).¹⁰

These secondary forests typically have differences in forest structure and/or canopy species composition with respect to nearby primary forests on similar sites. Under human influence (through selective harvest, management and enrichment) they may have a higher proportion of “useful” or commercial species. Secondary forests often provide similar ecosystem services as primary forests, in terms of watershed protection, carbon sequestration, habitat for useful pollinators, and a high proportion of the biodiversity, although they do not provide the full complement of species and ecological communities.

Low-income rural communities control (and generate) a high proportion of these secondary forests. Depending upon their stage and intensity of use and recovery, they could become an increasingly important source of commercial forest products. Promotion of secondary forest regeneration also offers a much lower-cost option than plantations for reforesting degraded areas and for establishing forest cover for watershed conservation (De Jong et al. 2001).

EXPANSION OF AGROFORESTRY AND SMALL-SCALE PLANTATIONS

With increasing pressures on natural forests, wood and fiber supply is undergoing the same kind of transition from “gathering” to “cultivation” that began in the case of annual crops and high-value perennials 10,000 years ago (Leakey and Newton 1994; Mather 2001; Scherr and Dewees 1994). For communities, this trend is reflected in the expansion of agroforestry and the development of community forest plantations (Table 2). Relative to the sometimes remote community-owned natural forests, farming areas often have commercial advantages, including superior access to infrastructure and markets, clearer property rights, higher land quality, management and monitoring capacity, access to labor, and farmer experience in intensive production and marketing.

Agroforestry¹¹ systems have expanded on small farms throughout the tropics as an element of land use intensification. Historically, agroforestry developed most where rising population densities increased local subsistence and market demand for forest products and services, in areas with good growing conditions and depletion of natural forests (Templeton and Scherr 1999). In the past 30 years agroforestry has expanded in much of the developing world due to forest scarcity, an increase in the price of timber relative to grain (Figure 3), and expansion of farming into land more marginal for annual crop production. In some places this process has been accelerated by programs of tree domestication and improvement, and some government support programs or subsidies. Farm woodlots may be managed very intensively for high wood yields per hectare, while other types of agroforestry systems can be highly profitable at low yields because they utilize underused farm spaces and resources (Current, Lutz, and Scherr 1995). Community woodlots were widely promoted in the 1980s and 1990s to supply subsistence wood and NTFP products for rural people where natural forest resources were scarce. In most cases, commercial exploitation of products was prohibited. However, these resources have now reached a productive stage and where communities have been allowed to manage them, there often is an interest in exploiting market potentials.

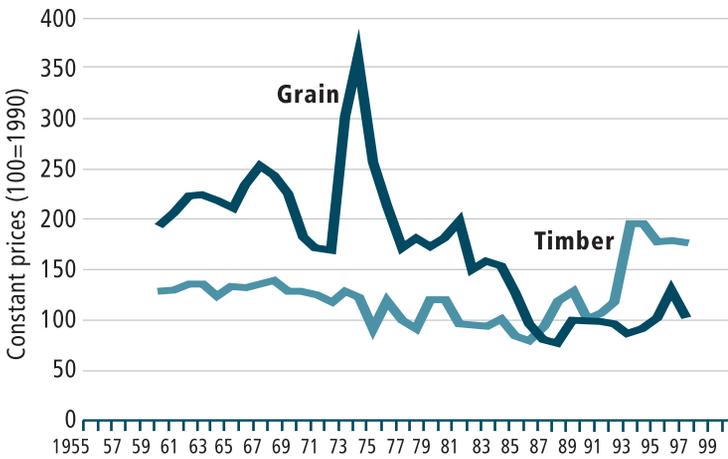
On roughly 10 million hectares of humid tropical lands, local farmers (mostly smallholders) have heavily modified natural forest cover on their own land or communal forests, or established polycultures on cleared land to promote production of high-

Table 1. Agroforestry, Farm Forestry and Agroforests in Selected Developing Countries

Region	Type of practice	Area extent (hectares)/# trees	Contributions to wood supply	Sources
Central America				
	Farm taungya	200,000 reforested farmland (w/incentives)	Potential for 2-6 million m ³ /yr timber	Beer, Ibrahim, and Schlonvoigt (2000)
	Silvopastoral systems	9.2 million	18.4 million m ³ /yr	Beer, Ibrahim, and Schlonvoigt (2000)
	Shaded coffee	857,000	Average 4 m ³ /ha/yr from shade trees, yielding 3.5 million m ³ /ha/yr supply	Beer, Ibrahim, and Schlonvoigt (2000)
South Asia				
Bangladesh	All homestead forest resources		360,000 m ³ /yr produced; 1980s: 60% total wood supply; 70% fuelwood supply	Vergara (1997)
India (Karnataka)	Various practices of trees, crops		Fuelwood, small timber production; 54% of supply is from non-forest sources	Vergara (1997)
	Nurse trees to perennial crops	Coffee-156,000, Cardamom-94,000; total 12.5 mln trees	If 1/10 is harvested each year, can produce 400,000 m ³ /yr of fuelwood and industrial wood	Vergara (1997)
	Mini-woodlots		25% of average smallholder farm area	Shepherd, Arnold and Bass 1999)
Nepal	Small tree plantations; other non-forest trees	56,000 672,000	Anticipate 2%/yr growth	Gilmour (1995), Vergara (1997)
Pakistan (Northwest Province)	Various	National	90.4% of fuelwood, 60% of timber is from farms	Dove (1995), Vergara (1997)
	Avenue tree plantations in farmlands	17,000	Various	Vergara (1997)
	Various	80 mln trees planted	67% in irrigated fields; 14 mln m ³ standing volume	Vergara (1997)
Sri Lanka	Nurse trees in perennial plantations	Tea-228,000; Coffee-8,000; Cacao 8,000; Cinnamon 8,000; Other 54,700	Tree density could be significantly increased	Vergara (1997)
Southeast Asia				
Indonesia	Tree crop-coffee, tea, cacao	3.18 million	Harvest from over-mature trees, nurse trees – 1.76 million m ³ /yr	Vergara (1997)
	Various agroforestry		1.7 million m ³ /yr wood harvest, mainly fuelwood, poles	Vergara (1997)
Laos	Various agroforestry	562,000	Potential for 3.37 million m ³ /yr, mainly fuelwood	Vergara (1997)
Malaysia	Tree crop estates (rubber, oil palm, cacao)	4 million	Harvest of over-mature wood, prunings, nurse trees	Vergara (1997)
Philippines	Upland community forestry program	100,000	Producing pulp, chipboard, constituted wood products	Vergara (1997)
	Commercial tree crops	Coffee- 148,000, Cacao –15,000	Various wood products	Vergara (1997)
	Farm plantations	N.A.	Major source of commercial pulpwood	Vergara (1997)
Thailand	Fruit orchards & village woodlots	3.1 million	Fuelwood, charcoal, poles to support fruit trees, scaffolding; 15 times more trees on farm than on plantations	Vergara (1997)
Vietnam	State-owned commercial tree crops; nurse trees	Tea-60,000 Coffee-60,000 (equivalent to 11,000 in blocks)	Various; 15 times more trees on farm than on plantations	Vergara (1997)
Africa				
Kenya (Siaya and S. Nyanza)	Homestead trees, in cropland, in pastures, woodlots	Principal forest resource	Principal local source of building poles, fuelwood	Scherr (1995)
Tanzania	Highland forest gardens	Principal forest resource outside protected areas	Diverse wood products	Leakey (1999)
Uganda (42 parishes)	Various	58% of all tree cover is in agricultural lands	Increased from 35% tree cover in 1960	Simons et al. (2000)
West Africa	Cacao agroforests	Most cacao-producing regions	Mostly local wood demand	Leakey (1999)

value commercial tree products together with subsistence products. These “forest gardens” or “agroforests” typically maintain many ecological features and functions of natural forests (Leakey 1999). In some swidden agricultural systems, bush or forest fallows are being used to produce timber and NTFPs for subsistence use and commercial sale (Cairns and Garrity 1999; Smith 2000).

Figure 3. Relative Prices of Grain and Timber, 1960-1997



Source: FAOSTAT (1998).

In forest-scarce countries, like Bangladesh (Box 3), farms often account for a dominant share of commercial forest production. In the China plains, farm trees used to supply 30 percent of industrial roundwood production. This proportion has recently declined due to heavy investment in forest plantations, but the Chief of the Department of Planting and Afforestation of the State Forestry Administration of China considers farm timber still to be the best investment financially due to better infrastructure, more secure tenure, and better market intelligence (Li Nu Yun, pers. comm. 2002). Globally, tree crop plantations account for about 10 percent of all agricultural land use (Wood, Sebastian, and Scherr 2000), and in many countries these and associated “nurse” and shade trees have become important sources of timber (Vergara 1999). In Thailand and Vietnam, there are 15 times more trees on farms than on forest plantations. In Latin America, Africa, South and Southeast Asia, the majority of agricultural lands have over 10 percent tree cover, and over a quarter of such lands have more than 30 percent tree cover (Wood, Sebastian, and Scherr 2000).¹² Suitably designed agroforestry systems can provide environmental benefits as well, such as watershed protection, wind protection, and soil improvement. In

China's northern plains, for example, large-scale planting of intercroops and shelterbelts may have raised agricultural productivity by 10 percent (Yin and Hyde 2000).

BOX 3. Farm-Grown Timber Supply in Bangladesh

Only a little over one million hectares, or just 8 percent, of the land area of Bangladesh is forested. These forests are very low-yielding and highly impacted by encroachment. Agroforestry production on small farms has become principally responsible for wood production. Traditional practitioners of agroforestry, Bangladeshi farmers have three main systems based on multipurpose timber trees that also provide fodder, fuelwood, fruits, and nitrogen-fixation: *Artocarpus heterophylla*, *Acacia nilotica*, *Dalbergia sissoo*. By the early 1990s, trees grown on small farms contributed 60 percent of total wood supply, 70 percent of fuelwood demand, and 80 percent of all the bamboo consumption of the country. Growth in agroforestry output during the 1970s and 1980s derived mainly from increasing the portion of farms in integrated tree-crop combinations, and the number of trees per hectare, rather than increases in land area devoted to trees.

Source: Vergara (1997).

INCREASING DEMAND FOR FOREST PRODUCTS

Global wood demand grew by over 50 percent from the 1960s to the mid-1990s, although consumption per capita was roughly stable (Gardner-Outlaw and Engelman 1999). Continued growth in world population, along with a slowdown in the global economy (and possibly increased recycling) caused average consumption of industrial roundwood to drop from about 0.4 cubic meters per person from 1970 to 1990 to just over 0.3 cubic meters per person by the late 1990s (Putz 2003).

Developed countries presently consume about 75 percent of industrial roundwood production (solid wood and panels), but demand in these countries grew by only 0.6 percent per year between 1961 and 1997. By contrast, consumption grew by 3.2 percent per year in developing countries during the same period (Victor and Ausubel 2000). Forest resources play an important role in economic development: to earn foreign currency, to build urban centers and infrastructure, and to provide fuel for industrial production, as was historically done in developed countries (Perlin 1989). Looking forward, domestic demand for forest products in developing countries is projected to continue rising dramatically in the next few decades, driven mainly by income and population growth. Non-industrial demand—for products such as fuelwood, construction materials, and rough furniture—is expected to be especially high in those countries in the early stages of economic growth.

Urbanization, income growth, and new preferences drawn from cross-cultural contact have greatly diversified forest product demand, creating major new markets that could potentially be supplied by local producers. For example, there is increasing

demand for small-diameter wood, which is financially more attractive and feasible for low-income producers to supply. Modern sawmills can utilize a much wider range of tree species than was historically the case. The development of new processing technologies now allows commercial use of small-diameter, “low-quality” wood for many higher-value products.

The natural forest assets of low-income forest owners could potentially rise in value with increasing scarcity of natural forests available for commercial wood and NTFP production. Between 1990 and 2000, a net 135 million hectares¹³ of tropical natural forests were cleared (FAO 2001). Many formerly rich natural tropical forests of the world, while still standing, have been depleted of their valuable timber species (such as mahogany in Belize and Guatemala). Around 311 million hectares of open and closed canopy forest—8 percent of global forests—have been legally set aside for biodiversity protection. Except in the Russian Far East, many large areas of undisturbed natural forest are not (yet) economically accessible. Still other forests are not available for logging due to violence or collapse of government.¹⁴ Where these trends are occurring, the economic value of higher quality products from natural forests owned by local people should rise.

INCREASING DEMAND FOR ECOSYSTEM SERVICES OF FORESTS

In some parts of the world, natural forests are coming to be valued less for their potential production of industrial roundwood than for their ecosystem services, such as watershed protection and biodiversity conservation (Daily 1997). Thus, there is growing pressure to protect primary forests from unsustainable logging and commercial exploitation and to manage other forest resources in ways that will protect or increase these services. Several countries, such as China and Thailand, have instituted widespread logging bans (Mayers and Bass 1999). In most countries, local communities’ use of forest resources (even on their own lands) is stringently regulated and in some cases (such as indigenous-owned forests of the Brazilian Amazon) even prohibited. Some industrialized countries, such as Austria, have sought to support this approach by instituting import restrictions on wood from natural tropical forests, and some conservation NGOs have supported strict controls on local use.

But a strategy of strict protection and tight regulation has not been successful in protecting environmental services in regions with large numbers of very poor people living in or near the forests, few alternative livelihood options, and weak government agencies. In many places the greatest challenge to maintaining natural forests is that strict protection does not generate income sufficient to compete with alternative land uses such as agriculture and urban and infrastructure development.

This reality is leading conservationists to explore alternative approaches. One is to

recognize that many rural communities do value the role of forests' in providing local ecosystem services. Ensuring the provision of these services may be important in negotiating with local people for forest management changes that also produce regional or global ecosystem benefits. For example, IUCN has established new protected area categories to recognize areas whose biodiversity depends upon continued interaction with the resident population (category V) as well as predominantly "natural" areas to be managed for both biodiversity and to meet community needs (category VI). Recent scientific advances demonstrate that the viability of protected reserves for biodiversity conservation requires compatible land uses in the working landscape matrixes around and upstream from the reserves. Thus, efforts to help local farmers and forest communities to better manage their productive activities for ecosystem services and to manage landscape mosaics mixing production and protective land uses are gaining support (McNeely and Scherr 2003).

Another major approach has been to develop new mechanisms to compensate forest owners financially for the ecosystem services produced by their forests and thus reduce the incentive for forest clearing or unsustainable exploitation. New markets have developed for forest products "certified" by independent third parties as meeting high standards of environmental management and in some cases also for having positive impacts on local communities and poverty reduction (Conroy 2001). There are also emerging systems of direct financial payments to natural resource managers if they can demonstrate management that meets ecosystem service objectives (Landell-Mills and Porras 2002; Pagiola, Bishop, and Landell-Mills 2002). While low-income producers are not yet widely involved, these new markets could provide another opportunity to capitalize the real economic value of rural communities' forest resources, so long as the new mechanisms are structured to enable their participation.

DEMOCRATIZATION OF FOREST GOVERNANCE

Over the past two decades, there has been a dramatic increase in the number of countries that have shifted from political autocracies to democracies or at least some sort of transitional form that is more responsive to local input into political decisions. Political democratization in many parts of the world is fostering reforms in forest governance that benefit local producers. Greater political openness is enabling more people to speak out openly about abuses, corruption, environmental damage, negative social impacts, and other elements of irresponsible forestry. Local people and others outside the forestry sector are slowly gaining a voice in the management of public forests as well as in forestry planning and policy. Legislative reforms are re-establishing local peoples' historical ownership rights of forest lands (Ford 1998; Lynch and Talbott 1995). Devolution of forest control and management from national agencies to local governments is creating conditions that are more con-

ductive to local input (Kaimowitz et al. 2000). International norms have been developed—particularly in the Convention for Biological Diversity, the International Labor Organization, and the Ramsar Convention—that protect indigenous peoples’ rights¹⁵ to manage their own resources (Tresierra 1999). Local people working to regain alienated lands or stop industrial forest concession development in community forests are finding new allies.

Demands by investors and consumers for socially responsible forestry are also driving improved social protections for local forest communities in some countries. Voluntary codes of conduct for private direct investment are being developed (Berge 2000), supported by the stockholders of multinational corporations (for example, investor adoption of Forest Stewardship Council certification as an investment screen). Due diligence in forestry investments is beginning to encompass issues around local tenure conditions and relationships with local communities (e.g., Barr 2001). Greater transparency has been encouraged by the development of independent forest monitoring capacity through remote sensing and grassroots networks such as Global Forest Watch, particularly in countries where NGO activity is legal. Such monitoring is making it easier to determine compliance of forest managers with social and legal protections as well as with environmental standards.

GLOBALIZATION AND FOREST INDUSTRY CONCENTRATION: CLOUDS WITH A SILVER LINING?

Recent trends in globalization of wood supply and demand, investment in capital-intensive forest plantations, and forest industry concentration mean that in many forest markets, low-income producers will become less and less able to compete with large-scale suppliers. But some silver linings may be seen, particularly if the potentials for community-company partnerships are recognized and supported.

The economics of large-scale global trade in industrial roundwood products have begun to favor intensive production in sites strategically situated for trade, and planted areas are expanding quickly, pushing product prices down. Such plantations often differ considerably from natural forests in structure and species composition, especially the highly diverse humid tropical forests. Industrial forest plantations now account for some 22 percent of industrially used forests and some 34 percent of industrial production. More than a fifth of the world’s wood is already produced from forests with average annual yields above 7 cubic meters per hectare, compared to the average yield of natural forests of 2 cubic meters per hectare. In the tropics, 18 million hectares of plantations were established between 1990 and 2000 (FAO 2001), although some have also been abandoned due to poor performance.

In many countries, these plantations are a major competitor of local producers of low-value wood products. In some countries, such sources will out-compete local

producers in major export, industrial, and urban markets because of the fundamental economics. But elsewhere their competitive advantage is artificial due to extensive subsidies for plantation establishment (Bazett, Bull and White 2004). While small-forest producers in developing countries presently play a small role in this new segment, their involvement is increasing rapidly as contract producers for mills facing raw material scarcity (Mayers and Vermeulen 2002).

Most industrial-scale plantations are owned and established by multinational companies and are vertically integrated with processing facilities to cut costs and capture profits from all stages of the value chain, increasing concentration and efficiency (Brown 2000). Concentration also reflects the increasing scale and capital costs of industrial pulp processing. Just forty international corporations own or administer about 115 million hectares of the world's forests, and industrial concessions administer about 300 million hectares of public land (Carrere and Lohmann 1996; White and Martin 2002), although this share is declining in some countries as companies shift to forest leases and contracts for plantations. While in the 1970s the top 20 firms processed about 20 percent of industrial roundwood, in 1997 the top 100 companies processed 50 percent of IRW, and the top 10 companies 20 percent of the total. Over 80 percent of international forest product trade is conducted by transnationals, which include major logging companies operating in Southeast Asia and the Congo Basin (Contreras-Hermosilla and Gregersen 2001). Nearly half of the total annual wood harvest is processed by the top 50 forest product companies, while the top 50 users of forest products consume 10 percent of the total (Howard and Stead 2001). The rise of giant retailing firms such as Home Depot and IKEA increases the importance of guaranteeing large-volume and reliable flows of wood of consistent quality.

These trends work against the interests of low-income producers in developing countries. In most developing countries, forest industry is characterized by small- and medium-sized, low-efficiency firms who are struggling to confront the challenges of international price competition, with inadequate financing, technology and management. In some markets, local wood producers must compete with low-cost producers from around the world. While the real world price of sawlogs and sawn wood has been stable over the past few decades, the price of pulp and paper and wood-based panels has declined. While all wood prices tended to increase during the period of high economic growth in the 1990s (**Annex 4**), prices of lower-grade wood, especially, are expected to decline or at best remain stable as plantation wood comes onto the market (Leslie 2002).

But there are some potential "silver linings" to this cloud. Globalization is opening opportunities to non-traditional suppliers, as buyers become more aggressive in seeking and securing reliable sources of supply and look to invest over a longer time period in new products and markets. While concentration increases the bargaining

power of companies *vis a vis* suppliers, it sometimes also increases their public profile and thus their sensitivity to consumer and investor pressures for social responsibility. Some large companies seeking to establish a reputation as environmentally- and socially-responsible suppliers are recognizing the need to invest long-term in building their capacity to partner with local producers. In some markets, local forest owners are their only source of supply, especially for high-value woods grown in natural forests. These could have high value-added for local producers. Partnership opportunities will depend on the capacity of companies to learn to work with low-income producers, the rise of competent intermediaries to permit operation at scale, the capacity of local people to work in these new markets, improved governance, investment to modernize forest industry, and supportive policies (see Part III).

NOTES

- 10 This has historical precedent. Early land expansion and industrialization led to massive deforestation in Europe, Japan, Puerto Rico, and South Korea, while the later phase of industrialization led to a trebling of forest cover (Perlin 1989). The development of high-input, technically advanced production on the best farmlands drove down land prices in some parts of Europe (Mather 2001) and the southern U.S. (Rudel 2001). Indeed, reconversion of farmland to secondary forest may lead to considerable natural forest recovery in some land-abundant, middle-income developing countries over the next 25-50 years. Unfortunately, the economic features that have been associated with natural forest recovery do not characterize rural dynamics in most densely populated, low-income developing countries today or in the foreseeable future.
- 11 We use the term “agroforestry” to refer to land use systems that combine woody perennials (trees, palms, etc.) with annual or perennial crops or livestock, either spatially or temporally. The term includes diverse systems, such as alley-cropping, woody fallow rotations, agroforests, windbreaks, and silvopastoral systems.
- 12 The “agricultural extent” measure used in Wood, Sebastian, and Scherr (2000) includes areas with greater than 30 percent agriculture, based on a reinterpretation of GLCCD 1998 and USGS EDC 1999a, plus additional irrigated areas based on Doell and Siebert (1999). Researchers from the University of Maryland defined forest as mature vegetation whose approximate height is over five meters. These two data sources were overlaid to obtain estimates of tree cover in the agricultural extent.
- 13 This represents a net annual loss of 14.2 million hectares in tropical forests. Outside the tropics, total forest area (including plantations) reportedly rose by 27 million hectares between 1990 and 2000 (FAO 2001).
- 14 An estimated 16-28 percent of forests are in countries that recently experienced violent conflicts with collapse of governance in forested areas (Kaimowitz 2000). While illegal logging often accelerates in such areas, businesses sensitive to public opinion avoid sourcing from them and long-term investments or contracts are risky and unenforceable.
- 15 The World Bank defines “indigenous people” as social groups who have a cultural identity distinct from the dominant society, which makes them vulnerable to being disadvantaged in the development process. Criteria include close attachment to ancestral territories and to natural resources there; self-identification and identification by others as members of a distinct group; an indigenous language, often different from that spoken nationally; and primarily subsistence orientation (Colchester 1999).

PART II. MARKET OPPORTUNITIES FOR LOW-INCOME PRODUCERS

4. ASSESSING MARKET OPPORTUNITIES AND MANAGING RISKS

Few voices are heard today promoting commercial forest activities by poor producers on a large scale, and indeed, many governments and environmental organizations are seeking to drastically reduce the present level of activity of these producers. This position reflects four widespread assumptions: that greater commercial use will promote forest degradation; that strict government regulations can effectively control such enterprises; that local enterprises cannot succeed as businesses; and that market participation poses unacceptable risks to the livelihoods of economically insecure people. Yet much field evidence challenges those assumptions, at least in the rather simplistic form in which they are widely held. This chapter reviews what we have learned about market conditions suitable (and unsuitable) for local producers, given their competitive advantages and vulnerabilities. The analysis highlights strategies to reduce the potential livelihood risks from forest commercialization, and strategies to limit potential conflicts between market activity by low-income producers and forest conservation.

MARKET OPPORTUNITIES FOR SMALL-SCALE FOREST PRODUCERS

Just because local forest enterprises can successfully supply subsistence needs or local markets does not necessarily mean that they can achieve more substantial commercial development. To be economically viable over the long term, development strategies must be based on comparative advantage relative to other economic enterprises. Many parts of the developing world with poor growing conditions for annual crops and limited non-farm employment opportunities do indeed have a long-term comparative advantage for commercial forestry. But other conditions must also be present for low-income local producers to benefit. Market niches are suitable for such producers only where they have a real competitive advantage in markets that offer them a “level playing field.”

Competitive Advantages of Low-Income Forest Producers

A number of factors characterizing global forest product markets limit commercial opportunities for low-income producers. A large share of forest product demand is for undifferentiated commodities; transport costs are usually high relative to value;

globalization is encouraging buyers to seek lowest-cost producers; prices are kept low by the availability of non-wood substitutes; and continued land-clearing and illegal extraction in many regions supply wood and NTFPs to the market at a lower cost than can sustainable forest management. Thus, even with considerable forest resources at their disposal, local producers can realistically compete only in a limited number of market niches.

To identify those niches requires an assessment of the real competitive advantages of local producers in each particular setting. Competitive advantages may include:

- ***Control of commercially valuable forest resources.*** Their growing ownership and control over natural forest and farm tree resources may give local communities and smallholders a competitive advantage. Ownership greatly improves their negotiating position with buyers of high-value wood and NTFPs. Producers who are located near centers of growing domestic consumer or industrial demand, particularly inland cities far from commercial ports, may be competitive with imports or distant suppliers of lower-value products due to the high cost of internal transport.
- ***Lower cost structure for some products.*** Some local producers may be able and willing to supply forest products at a lower cost than large-scale or corporate suppliers because of lower opportunity costs for land and labor or because they value collateral benefits such as local employment, environmental services, or local lifestyle. Small-scale farmers may also be able to produce tree products at a lower per unit cost than larger-scale producers by producing wood jointly with crops and livestock on the same land (agroforestry, silvopastoral systems). Small farm forests and woodlots can be grown on land that is otherwise unused or in low-productivity use and that can be managed and harvested during periods when labor demands for other activities are low. Some farm trees can increase agricultural productivity when grown as windbreaks, fodder banks, live fences, or nurse trees for perennial cash crops. Local producers may be able to gain advantage from their proximity to consumers and better knowledge of local markets. Forest and farm producers located near centers of growing demand may be competitive due to their familiarity with local product and processing preferences, flexibility to supply small quantities as needed to local traders or fresher supplies of perishable NTFPs.
- ***Greater incentives for sustainable forest management.*** Cultural communities with strong territorial attachment may be more committed to sustainable forest management than outside companies because of their longer planning horizons, their eagerness to avoid boom and bust cycles, and their desire to enhance community assets for their children.¹⁶ In areas where local people have been present

for generations and actively use the forest, they often have indigenous, site-specific knowledge that can enhance the quality or reduce the cost of forest management.¹⁷ Resident forest owners and managers may be able to undertake management-intensive operations at a lower cost than can hired labor. Small-scale logging techniques can be used effectively for low environmental impact.¹⁸

- ***Better monitoring and protection.*** Local people may have a greater ability than outside companies or agencies to protect forest resources from risks like encroachment, illegal harvest, fire and social unrest because of superior capacity for monitoring and community interest in forest protection. Insurance companies consider good local relations to be a critical factor in assessing forestry risk and insurability (ARM and Mundy 2000).
- ***Branding in socially responsible markets.*** Low-income local producers may be able to secure an advantage in marketing their products to consumers or investors in socially and environmentally responsible market niches and to companies that are sensitive to reputation.

Market Characteristics that Enable Small-Scale Producers to Compete

Whether producers are able to capitalize on potential market advantage is affected significantly by the characteristics of the market environment in which they must operate. In many cases, markets in remote forest regions are poorly developed and uncompetitive. Where new types of products are being marketed, key actors and functions in the “value chain” from producer to consumer may be missing.

Experience in both smallholder agriculture and community forestry suggests some of the characteristics of markets that are likely to favor low-income producers (Table 3). Local producers benefit where production and processing systems have low capital costs, no economies of scale, and where environmental services are compatible with economic activities. They benefit from more competitive and open markets, but not where they compete directly with very low-cost producers; where small-scale suppliers are preferred; where local people control valued species or environmental services; and where costs of market entry are low. Small-scale producers flourish best in regulatory environments with low fees for entry and operation, few burdensome regulations, few subsidies to large industry, and secure forest rights. The analysis in chapter 5 assesses which segments of existing and emerging markets generally meet these criteria and which do not.¹⁹

Table 3. Market Characteristics that Enable Small-Scale Producers to Compete

Enabling conditions	How conditions benefit small-scale forest producers	Comments
Supply Factors		
Low-cost processing technology exists	Can benefit from higher-value segment of market value chain	Economics of “value-added” are location-specific
Production technologies locally known	Reduces adoption risks, maintenance costs	Training and extension programs needed
Neutral or declining returns to scale for production	No economic advantage for large-scale producers	Especially where management is labor-intensive
Limited direct competition from very low-cost producers	Greater potentials distant from ports, distant for agricultural land-clearing	
Ecosystem services can be produced together with forest or agricultural production	Environmental service payments supplement, rather than replace, production income	May require change in landscape design, location of production, management
Demand Factors		
Large number of buyers (transporters, wholesalers, processors, service users)	More competitive prices and terms of sale for sellers; more interest by buyers in negotiating long-term relationships	Monopsony currently characterizes a majority of forest product and environmental service markets
Products with growing demand	Greater opportunity for new entrants	
Niche market buyers interested in supporting rural development	Potential to “brand” product or access higher-paying consumers or investors	Limited scale of market
Demand for natural species that are difficult to domesticate, replace	Creates asset value for natural forests, “volunteer” farm trees	Most species have domesticated or synthetic substitutes
Flexible quality standards	Can use greater variety and quality of wood species	Difficult to reliably supply raw materials for international markets
Long-term supply contracts offered	Provides more stable income source, reducing livelihood risks	Usually offered by high capital-cost processing firms (e.g., pulpwood) requiring steady supply of raw material
Low capital costs of market entry	Existing or low-cost capital equipment for production or processing; low costs to find buyers (e.g., advertising)	Often low-value products; many low-cost technologies exist but not known locally
Small and variable volumes are purchased	Producers can move in and out of the market easily; cases where no economic advantage for large-volume producers	For example, in direct retailing of medicinal plants, local fuelwood markets
Open, transparent and unrestricted bidding processes	Avoids discrimination against small-scale suppliers or raw material purchasers	
Marketing intermediary established for small-scale producers	Provides “bundling”, technical support, financing; achieves economies of scale in marketing, production	Established by producer cooperatives, NGOs, parastatals, buyer company
Market Regulation		
Low regulatory costs of market entry	No registration fees; competitive bidding for small timber volumes; low-cost management plans; no bribes required	
No producer/consumer subsidies	Greater competitiveness for small-scale producers	Large producers or buyers most benefit from subsidies
Low-cost regulatory environment	Few harvest, transport, sales permits required; reduced risk and corruption	
Secure local rights for forest products, environmental services	Reduces risk of “forest grab” by more powerful actors	Especially for long-term product, service contracts

STRATEGIES TO MANAGE LIVELIHOOD RISKS

Even in situations where real commercial market opportunities exist, low-income forest producers must consider carefully the risks. Risk assessment may lead to a decision not to pursue the enterprise. Where the potential benefits are substantial, however, various strategies can be used to manage risk.

Limits to Commercialization

Markets are not for everyone. For many rural communities and farmers, rapidly changing commercial forest markets will pose too great a risk or too low a prospect of reasonable returns to play an important role in livelihoods. Competitive advantage is not solely a function of forest resources, production and market characteristics. To have successful enterprises, producers must have the business and marketing capacity, access to capital, and—for communities and cooperative ventures—good organization. Market-oriented forestry strategies may be unsuitable for indigenous communities where market incentives are culturally incompatible with traditional institutions, where the resource base does not lend itself easily to sustainable management, or where there is a high level of conflict involving powerful vested interests (Richards 1997).

The disappointing experience of small-scale forest owners in argan oil markets in Morocco is instructive (**Box 4**). Despite having control over the tree resource and prior experience in processing and marketing, poor producers were unable to compete in more sophisticated processing and market development. In many cases, even where there are good local opportunities, these favor the “less poor”—those with greater access to resources, skills, or organizational support. In such cases, the poorest may benefit primarily through employment generated.

Where local returns to farming are relatively higher than returns to forestry, it generally makes more sense for local people to concentrate their scarce resources on agricultural investments,²⁰ confining commercial forestry to small niches within agricultural landscape mosaics and activities that also directly support agricultural productivity (for example, agroforestry for mulch or animal fodder) or local ecosystem conservation (for example, revegetation of riverbanks). Even where commercial prospects are not attractive there may nonetheless be considerable scope to increase the direct use values and local environmental values of forests through improved management, and communities would be advised to concentrate their efforts there.

BOX 4. Distribution of Benefits from New Argan Oil Markets in Morocco

The argan tree (*Argania spinosa* (L) Skeels) is endemic to Morocco, where it covers nearly 900,000 hectares. The Berber peoples of the Argan Forest Region use the argan tree for firewood and charcoal, carpentry and construction wood, fodder for animals, shade and soil stability for their crops, and oil for culinary, cosmetic and medicinal purposes. It is estimated that 90 percent of the rural economy of the region depends on argan-based agroforestry systems. Traditional argan oil extraction is quite labor-intensive. Although the market for argan oil has been fairly well developed, only a small fraction of total oil production was marketed traditionally. During the 1990s, however, validation of traditional claims of argan oil's virtuous properties as a moisturizer and for acne and wrinkle reduction by western-trained chemists sparked rapid growth in demand. It was hoped that poorer local producers, who controlled most of the argan tree resources and were already experienced in argan oil production and marketing, would benefit greatly from this increased demand. However, increased demand also led to the evolution of mechanized extraction and marketing processes for argan fruit and oil. Because of the sunk cost of acquiring machinery and local residents' limited liquidity and access to electricity to operate mechanical presses, traditional argan producers largely failed to enter the new, higher-return niches of the argan oil market. So the direct benefits of expanded commercialization accrued primarily to non-local, wealthier recent entrants into these markets. The only exceptions were two small local cooperatives formed with external assistance that sell final products directly to European markets. Even though fruit prices rose significantly in response to higher demand, wealthier local households in lower forest density areas—located closer to new centers of demand, and with better road infrastructure—benefited most from the price increases.

Source: Lybbert, Barrett, and Narjisse (2001).

Market Strategies to Manage Livelihood Risk

Forest markets present two major types of risk to producers. First, prices are often highly erratic—as with many commodities—as a result of cycles of seasonal and year-to-year changes in global supply and demand. Second, the forest processing industry has tended to follow a “boom and bust” cycle: overexploiting cheap forest resources and then moving on. This traditional business model has been exacerbated by global market systems which seek out least-cost production and demand high rates of return in the short-term. The experiences of fluctuating logging employment in the U.S. (Box 5) and ebb and flow of NTFP markets in the Amazon (Figure 4) are illustrative.

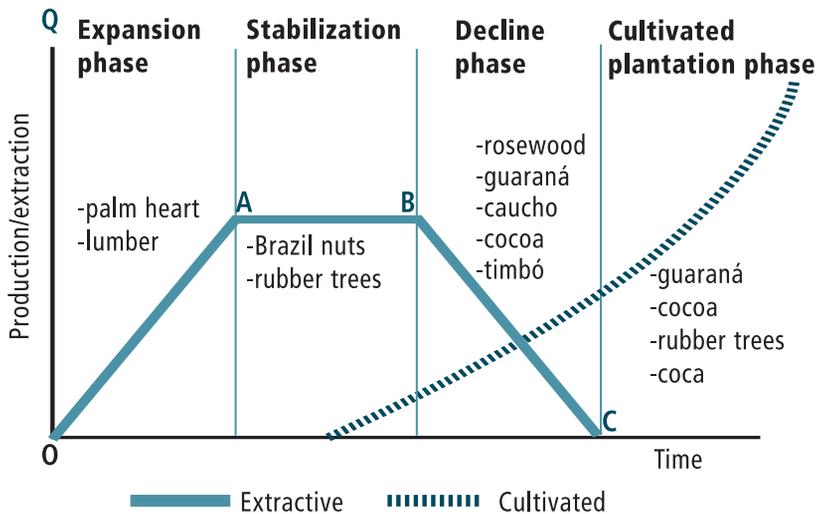
A strategy of intensely exploiting forests during periods of good prices, and then abandoning them to move on to other resources, may make sense for large-scale industrial product buyers or short-term concessionaries. But for local community producers who rely almost exclusively on their own forest resources it makes more sense to build those forests as a long-term productive asset. Business strategies can be developed that ensure subsistence security and sustainable production in the face of market risks and uncertainties by focusing on higher-quality products and retaining a nimble capacity to switch products as markets change. Producers can conceive

BOX 5. Boom and Bust Forestry and Impacts on Community Employment in the USA

In the mid-nineteenth century, the American timber industry began leapfrogging from one temporary center of logging activity to another, into the Great Lake states in the second half of the century, on to the South next, and by the mid-twentieth century, to the Pacific Northwest. As the century drew to a close, the industry was shifting back to the South, leaving distressed lumber towns throughout the Pacific Northwest. In the U.S., timber booms appear to have a life span between 30 and 40 years due to early over-harvesting. In the Pacific Northwest in the 1980s, “excess” inventory of trees on the stump was “liquidated” in little more than a decade. Harvests moved to non-sustainable levels. This coincided with a cyclical deterioration in the market for wood products. Employment in wood products fluctuated considerably. From 1979 to 1982, 55,000 jobs—a third of all wood products employment in the Pacific Northwest—were lost. After some rebound in the 1980s, employment in the early 1990s was as low as in the early 1980s. High levels of commodity production are typically viewed by local, state, and federal politicians and agency managers as politically desirable because of short-term employment spikes. However, the economist Thomas Power argues, based on extensive data from U.S. forest communities, that community economies benefit in the long run much more from maintaining lower, sustainable timber harvests, and protecting local environmental services than by succumbing to the temptation of short-term timber booms. Employment and income levels and growth (as well as quality of life) in timber-producing communities that have diversified economies are significantly higher than in communities where timber jobs dominate.

Source: Power (1996).

Figure 4. The Historical Cycle of Forest Production in the Amazon



Source: Homma (1996); in Neumann and Hirsch (2000) p. 58.

* As measured by the total area of forest lost from 1990-95.

Source: Data are from FAOSTAT Statistics Database on CD-ROM, 1996.

of their forest or farm trees as a capital asset—composed of particular tree species mix and spatial pattern—capable of producing multiple streams of income. Those streams may derive from harvesting different products from a multi-purpose tree at different ages or harvesting from a different mix of species. Evidence from studies of reduced-impact logging demonstrates that more careful sustainable management can be more profitable than quick liquidation over the long-term, at least where competitors are not swamping the market with illegal, over-exploited wood supplies (Bull 2003).

Other studies concur that sustainable forest management can be economically more profitable if multiple income streams are produced from high-value timber, commodity wood, NTFPs, and ecosystem service payments (Brand 2000). Low-income producers need a “portfolio” of products in different income/risk categories, including agricultural and non-farm enterprises. That portfolio will reflect cultural, social, and aesthetic values important to local people. Finding at least one product that provides a reliable source of annual income is essential, if such income is not provided by non-forestry activities like farming or off-farm employment.

For example, to manage risk forest communities may need to develop a strategy to sell part of their wood at small diameters in lower-value markets for short-term income at known prices while managing the rest of their forest to produce potentially far higher-value timber 10-15 years ahead. Small-scale farmers may choose to plant only a portion of their farm in promising market species, in agroforestry configurations wherever possible, and to manage their resources in such a way that a variety of different products could potentially be marketed in response to changing market conditions. Tree-planting for small-scale plantations or agroforestry can be done gradually over time, using farm or unemployed community labor, rather than in large parcels all at once, which would require credit to hire labor.

Many of the strategies required to reduce livelihood risks are compatible with more sustainable forest management systems. Cash-poor producers need to develop enterprises that require low cash investment, at least initially. Thus they may prefer to assist regeneration of natural forests, rather than planting expensive seedlings. It is important for external advisors and business service providers to understand that *ex-ante* analyses based on models from large-scale commercial production may not be suitable for community production systems. Communities or farmers may focus on a more diverse set of products with more outputs of short rotation, may use assisted natural regeneration more than seedlings, or may use household labor at times when its opportunity cost is lower than the wage rate (Scherr 1995).

The need for diversity and flexibility also can be addressed by growing either diverse, specialized tree species or multi-purpose trees. Growers can plant trees for small-diameter wood products that also serve for food in a lean year (for example, fruit tree prunings can supply fuelwood and stakes). Such strategies are more likely than

industrial enterprises to result in landscape patterns and management practices that protect non-commercial environmental services. In some cases, forest production within land use mosaics may also provide forest business benefits, such as reduced disease incidence (McNeely and Scherr 2003), lower monitoring costs, or higher densities of valued “edge” NTFP species. Where planning of commercial forestry activities can be done at a landscape scale, certain areas can be retained in natural forest or can be reserved to protect safety net functions for the poorest. A multi-product strategy, however, relies upon the existence of functioning markets for the diverse products.

STRATEGIES TO RECONCILE COMMERCIAL USE AND FOREST CONSERVATION

Many forestry agencies and conservation organizations are highly resistant to the development of local commercial forest enterprises for fear that commercialization will accelerate forest depletion (c.f. Contreras-Hermosilla 2002). Some environmentalists argue against all forestry, even low-impact forestry, in tropical natural forests because of the mixed success of sustainable forest management in some areas (Rice et al. 2001). International initiatives are promoting aggressive policies to accelerate a shift in commercial supply to a small area of intensively-managed industrial forest plantations in the North and places like Chile with the justification that this will relieve commercial pressure on natural tropical forests (Sedjo and Botkin 1997; Victor and Ausubel 2000).

While well-intentioned, the analysis underlying this strategy of forest protection is fundamentally flawed for several reasons. To begin, at least 20 percent of all plantations have been established by clearing natural forests (Cossalter and Pye-Smith 2003). Secondly, the analysis is drawn from experience in temperate countries like Canada and New Zealand where most remaining natural forests are in regions with low population density, the role of law is strong, and centers of demand are in distant cities and export markets. A strategy to encourage wood supply only from fast-wood plantations to achieve conservation objectives is highly problematic in parts of the world that have large and growing rural populations living in and around the natural forest resource and where most of the commercial demand is domestic.

Already about 12 percent of all forests are officially protected for conservation values—about 7 percent in IUCN categories I to IV, and 4 percent in categories V and VI (Bull 2003). But nearly half of these legally Protected Areas are heavily used (usually illegally) for agriculture and forest product extraction (McNeely and Scherr 2003). Subsistence and commercial use of forests outside protected areas is high and is growing in much of the low-income developing world. In such areas, environmental threats to forests must be addressed through legal and institutional frame-

works that provide incentives to local people to manage natural forests in ways that enhance conservation (Bazett, Bull and White 2004). Where trade-offs are large and unavoidable and the environmental values concerned are particularly important to outside stakeholders, low-income local people can be compensated financially for relinquishing their right to exploit one of their few productive assets. But even with the development of environmental service payment schemes, only a small share of the total forest estate is likely to receive such payments.

Commercial Use of Natural Forests is Inevitable

Contrary to what is commonly heard in public dialogues, natural forests will continue to be important sources of commercial wood and NTFPs for the foreseeable future, *even with* rapid expansion of intensive plantations. In the mid-1990s, 66 percent of global industrial wood was still being harvested from natural forests—30 percent from old growth, 14 percent from secondary growth that was minimally managed, and 22 percent from indigenous secondary growth under management (Sedjo and Botkin 1997, Table 1). Even under optimistic assumptions of plantation wood supply, 40 to 50 percent of the volume of industrial round wood is still projected to come from management of natural forests in 2020, a third of which would be from low-growth-rate forests (Bull 2003). To these projections must be added major components of domestic non-industrial wood demand for fuel, local construction, and rough wood-based consumer products.

Industrial plantations will be located mostly in places that have excellent transport infrastructure for export, for moving supplies to major industrial processing plants and to major cities. Thus, they will reduce pressure on natural forests only in places where there is no significant domestic non-industrial demand for wood from those forests; where natural forests are quite scarce and where there is thus strong political constituency and enforcement capacity to protect them; or where local agreements can be negotiated to allow landowners to establish intensive plantations in specified parcels if they conserve biodiversity on the rest (Bazett, Bull and White 2004). In poor, populous countries, protecting extensive areas of forest from commercial use—especially outside of well-managed reserves—cannot realistically be achieved by “fencing out” local people or by imposing national or international trade restrictions on timber and NTFPs from natural forests. Domestic demand is too strong; local income needs are too compelling; and public enforcement capacity is too weak.²¹ Thus large-scale illegal harvesting is already taking place in these forests, and can be predicted to increase.

This reality is graphically illustrated in the Purépecha Region of Mexico. This area of nearly half a million hectares has a population over 650,000, about two thirds of whom are urban. An in-depth market study found that regional demand for wood

was 4.5 to 7 times the volume of authorized cut from the local forests that provided most of the region's wood supply. The government-collected industry statistics included only the 10 percent of wood buyer and processing industries that were large-scale enterprises. As a result, policies ignored the 9000 small-scale enterprises that accounted for 41 percent of total timber demand and generated 40,000 local jobs in addition to those in forest communities (Masera, Masera and Navia 1998).

Even in Costa Rica, a country with strong governance and active conservation programs, it is estimated that 28 to 41 percent of the timber sold is illegal (Campos 2001). In Honduras, it is estimated that 80 percent is illegal. The largest volume of harvest and greatest economic benefits from illegal logging go to large companies with no commitment to long-term conservation goals. While low-income people are actively involved in this illegal trade, their participation is characterized by a variable mixture of sustainable and unsustainable harvest practices.

The Perverse Impacts of Criminalizing Local Forest Enterprise

Given the continued high demand for forest products in forests that are heavily populated or located near urban growth centers, criminalizing local people's forest enterprises is not only ineffective. It also has perverse outcomes: harming the poor, undermining local initiative for forest conservation, and diverting public resources away from effective control of large-scale threats to forests.

Harming the poor. Strict forest conservation strategies deny poor people the right to harvest and commercialize one of their few commercially valuable assets. Policies that restrict local income-earning opportunities carry a huge cost to local people's livelihoods and to economic growth, while making illegal millions of small forest and agroforestry-based enterprises that are, in fact, sustainable or could be made so over time (Chapela 2000). The logging ban in public forests of China instituted in 1990 is estimated to have harmed the livelihoods of over one million poor people (Lele 2002). If governments were to strictly apply existing forest and conservation laws restricting poor rural households' access to forest resources, the livelihood impacts would be dramatic (Kaimowitz 2003). Furthermore, illegal status makes local people prey to excessive fines, threat of jail, and other oppressive behavior by those in authority, while putting them in a weak position to negotiate price or terms of deals with buyers and suppliers; it also makes them ineligible for technical assistance or credit.

Tropical countries around the world have laws prohibiting shifting cultivation and other types of agriculture in hillside and mountainous area. Governments have forcibly resettled millions of people engaged in these activities, while millions more have been forced to move to depopulate official forest protected areas.²² Although

such laws have generally been established and defended on environmental grounds, they are commonly motivated more by a desire to keep villagers from competing with logging companies for forest resources, by cultural prejudices against indigenous peoples, or by the desire to concentrate rural populations to make it easier to exercise political control (Clay, Alcorn and Butler 2000). There is little evidence that such prohibitions have led to less deforestation or more sustainable forest management, although there is evidence that they have lowered incomes, threatened their physical security, limited their access to forest resources, destroyed their cultures, and undermined their social capital (Kaimowitz 2003).

Undermining local initiative for forest conservation and establishment. Criminalization of local commercial forest activity or excessive regulatory controls can deter protection, promote irresponsible felling, and exacerbate forest depletion. Lowering profits (due to increased costs to avoid officials, pay bribes or spent time seeking permits) may increase pressure on forests from community forest enterprises that need to cut more timber to compensate for lower prices and maintain local jobs. For communities with high fixed costs of milling operations, declining profits may wipe out the financial margin that community forest enterprises have used to cover (or internalize) some of the extra costs of long-term forest management, forcing them to choose between sustainability and survival in some cases. Producers may switch to lower-cost, unsustainable logging practices, and illegal logging to bypass the high costs of legal operation, as documented in Michoacán, Mexico (Masera, Masera and Navia 1998). High-cost rules undermine local incentives to conserve land in forest and make it impossible to enforce even sensible rules and guidelines. In Mexico, the highest levels of illegal harvest are found in regions that historically experienced extended logging bans, as these pushed forestry activities “underground” and disrupted previous community forest governance systems (Merino 2002).

Blanket rules put in place for forest production and marketing (usually devised for industrial operations) commonly have negative impacts on the production of wood grown sustainably in community-based farms and plantations (Tomich et al. 2001). In India, Forest Department intervention for the sandalwood species, even for trees on private farms, is so oppressive that farmers choose to cut down any sandalwood that grows wild in their fields (Kumar and Saxena 2002). Farmers in Brazil regularly kill mahogany seedlings that sprout on their farms in order to avoid complications related to CITES regulations (Richards et al. 2003).

Diverting public resources for forest protection. There is little evidence that heavy regulation of small-scale enterprises has much reduced overall deforestation. A large portion of forestry legislation focuses on administrative requirements, fees, taxes, and property rights that do not relate at all to the sustainability of forest management (Kaimowitz 2003). Most deforestation results from other factors: corruption and lack of public resources for effective monitoring of publicly-owned forests (cre-

ating *de facto* open access resources); illegal logging by large-scale companies or government agencies, including the military; and—perhaps most important—government-endorsed legal forest clearing.²³ Indeed, while fear of further deforestation is the public rationale for hindering local involvement in forest markets, this rationale often serves simply to justify maintaining government political control and revenues, or to reserve timber resources for friends of the politically powerful. The greatest deforestation and forest degradation in many countries is state-sponsored on behalf of special interests, particularly for agricultural conversion. Official controls on smallholders and small forest producers in these places are merely a sideshow.

Moreover, diverting forest monitoring and enforcement to many small actors dilutes the resources of public agencies and diminishes their capacity to target truly destructive “bad actors.” Their resources are already critically inadequate. A recent study showed that 123 conservation agencies in 108 countries are now managing 3.7 million square kilometers (28 percent of global protected areas) with a budget average just US\$893 per km²; in 32 countries finances allow only \$100 per km² and in 13 countries less than \$10 (Molnar 2003).

Can Local People Manage Forest Biodiversity Effectively?

There is a considerable body of evidence that local people can be quite effective in managing biodiversity and other environmental values (Clay et al. 2000). Many examples of local willingness to protect specific forest resources have been documented, especially where other parts of the resource remain open to commercial and subsistence exploitation. In documenting the devolution process in Tanzania, IUCN found that over 500 villages had declared new forest reserves (Alden Wily and Mbaya 2001). In India, the Joint Forest Protection Party (JFPP) successfully organized 70 villages in Orissa, India to protect 50 hectares of community forest for regeneration that would increase production of marketed NTFPs (Poffenberger 2000). Farming communities in Central America have successfully organized to reduce uncontrolled forest fires (Melnyk 2000).

Even in Papua New Guinea, where community management of large-scale commercial logging has been problematic, a number of conservation-minded indigenous groups have successfully forced concessionaires to practice sustainable management (Filer and Sekhran 1998). Indigenous forest managers commonly harvest much less than the legal allowable cut. In Oaxaca, Mexico, for example, communities harvest 50 percent of their officially sanctioned annual allowable cut (Molnar and White 2001). In part this is due to more limited capacity to utilize the wood in indigenous-owned mills, but in part it is because land is held for other reasons than maximum economic utilization. Iisaak Forest Resources, a majority-owned indige-

nous forestry company in British Columbia, Canada (described in Box 14 in Chapter 6) has also consistently logged well below the legal allowable cut (Baird and Coady 2000).

Indeed, local capacity can be as good, if not often better, than governments in controlling deforestation. The world's remaining natural forests are remarkably concentrated in areas occupied by indigenous peoples (Colchester 2001) for whom non-market values often provide a strong conservation incentive (Richards 1997). In Latin America, remaining natural forests are found principally in the lands of indigenous peoples who lacked the colonial "livestock culture." A recent study found that there was no difference in the quality of forest protection in official protected areas and indigenous-owned forests in Brazil, even though the latter were subject to more intense development pressures (Bojorquez 1999). In Nepal, there is more biodiversity in community forests than in the national parks (Malla 2001).

While colonial rules often sought to cut the cultural relationship between forests and local people, this process was not complete. When governments in Uganda, Tanzania and India began to return community rights that had been taken away during colonial rule, strong pre-existing cultural relationships between forest and local people began to re-emerge (Ribot 1996). This may explain the remarkable growth in the number of Forest User Groups in India from 1000 in 1970 to over 63,000 in 2000 (for 19 percent of the country's forest cover), once community rights were re-established (Baalu 2003). In the woodlands of the Sahel, the formal registration of forests to local communities has led them to develop and enforce their own management systems (Kerkhof 2000).

Of course, local or indigenous control does not guarantee forest conservation.²⁴ The intensification of natural forest production that often accompanies commercialization may conflict with global or national biodiversity values, although the latter may in other cases improve with well-designed farm plantations or forest enrichment plantings (Arnold and Ruiz Perez 1998; Belcher 1998). There are many examples of NTFP depletion through over-exploitation.²⁵ Even where local producers are diligent about developing and enforcing conservation controls on harvest and management of commercialized species, it can be difficult to determine sustainable harvest levels of plant populations (Anderson 1998).

It is difficult to argue, however, that entrusting greater responsibility for conservation to local hands (so long as local governance does exist) will result in substantially worse outcomes than present systems allocating forest to government or large industry. Moreover, a fundamental question increasingly debated is: who should be empowered to decide what aspects of biodiversity are of priority importance for conservation? Ecological science has revealed the difficulty of setting objectives, and even "science-based" protected area management has revealed the importance of cultural val-

ues in setting priorities (Cunningham, Scherr and McNeely 2002). Indigenous groups are beginning to claim a leading role in setting priorities, at least in the forests they control, informed by their own understanding of the local ecology and their own cultural values. This position was formalized in the Saanich Statement of 1998 (<http://www.forestsandcommunities>). Debate has already begun over whether indigenous management values, rather than those developed by outside “experts,” might eventually be used to establish local standards for forest certification.

Alternative Conservation Strategies that Engage and Benefit Local People

To date, most conservation strategies have focused on establishing and extending publicly owned protected areas. While these are critical cornerstones of biodiversity conservation, even under the most optimistic scenario the area under effective public protection is unlikely to increase sufficiently to achieve conservation objectives. This is due to rising costs of land acquisition and compensation, the greater legitimacy of local land claims, and the costs of public management. Alternative, complementary approaches need to be developed that effectively engage local people and the private sector in long-term forest conservation.

As the ecosystem approach is more widely applied for bioregional conservation planning, diverse landscape mosaics could result, including patches of forest under diverse ownership and management regimes, including commercial uses (Ecott 2002). Different modalities can be used, including: conservation as a co-benefit of commercial activity, protected forest reserves established by communities, payments for ecosystem services from community forests, low-impact local commercial use of public protected areas, and regeneration or re-establishment of community forest resources. These can enable public resources for purchase and management of protected areas, as well as payments for conservation concessions, to concentrate on sites that are most strategically important for biodiversity conservation within these ecosystems.

Conservation as a co-benefit of commercial activity. In many parts of the developing world, conservation of forests outside public protected reserves—and in some cases even within the reserves—will only be achieved if local people derive financial benefits from the forest resource that are attractive relative to forest clearing. As Fisher (2001) argues, biodiversity benefits and interest in conservation often *follow* economic benefits. In forests with a long history of human occupation, human management may be critical to maintain the existing species mix. Decriminalizing the behavior of small forest enterprise owners vastly increases the likelihood of involving them in educational, investment, and other initiatives for more sustainable forest management.

Many cases of sustainable forest use have been documented, and the conditions where sustainable use is likely are becoming better understood (Molnar 2003). Certification has been one strategy, but in its current form it is too restrictive for many low-income communities. Conservationists can play a critical role in supporting sustainable commercial forest enterprises by working with local people for biological monitoring (de Jong and Utama 1998). For example, in Costa Rica, conservationists negotiated an agreement with local communities to provide funds equivalent to the value of timber sales in natural forest gaps, if the communities would comply with conservation guidelines (Watson et al. 1998).

Protected forest reserves established by communities. Protection of ecosystem services has been used to justify outsiders carving out huge areas of local people's forests to create parks and protected areas. In many cases these have become "paper parks" (in land that is "illegally occupied") that cannot be defended at reasonable economic or social cost. Alternatives could be promoted to support communities in managing forest areas they themselves wish to protect. For example, the Mexican National Commission for Biodiversity project, with financial assistance from the Global Environment Facility, is supporting forest conservation proposals developed and presented by several hundred communities, who then contract their own technical support providers (World Bank 2000a). Indigenous conservation strategies are being actively developed as part of the strategy for the Mesoamerican Biological Corridor (Castejón and Gulliver 2000). In Australia, government returned lands historically claimed by indigenous groups in Ayers Rock and leased them back as part of the National Park (White and Martin 2002). If communities that own or control their forests can call on government, when needed, to support those rights, they will be able to reduce illegal logging by outside groups. In indigenous community forests, non-market incentives—such as territorial rights, effective defense against encroachment, and other legal, scientific, or financial support—may be offered by conservation agencies in exchange for a commitment to biodiversity conservation (Richards 1997).

Payments for ecosystem services from community forests. To protect globally unique types of habitat and wild species where such protection is incompatible with economic use of the forest, conservationists can pay directly for environmental management and protection by local people. As forest groups are typically among the poorest segments of the population, such transfers make both ethical and economic sense. Municipalities, irrigation user groups and others may be willing to pay for locally important ecosystem services provided by locally-managed protected areas. International markets for carbon emission offsets may be able to help finance forest ecosystem restoration and protection. As markets for ecosystem services develop, strong steps must be taken to ensure that small-scale forest owners and managers participate fully and fairly in those markets.

Low-impact local commercial use of public protected areas. Where population densities are very low, there is scope for low-impact types of commercial activity, even in protected forests and nature reserves. Local people can be encouraged and supported to develop economic uses of protected areas that are compatible with biodiversity conservation objectives. Strategies could include: managed NTFP harvest or hunting, land use mosaics mixing productive and protected areas, extractive reserves, and ecotourism (Allegretti 1990; Bennett and Robinson 2000; Primack et al. 1998; Snook 2000; Tattenbach et al. 2000).

Regeneration and re-establishment of community forest resources. In forest-scarce areas, commercial incentives to increase forest cover can encourage ecosystem restoration, integrating environment, income and poverty reduction goals. Small-scale agroforestry and forest establishment may involve mixtures of species that can contribute to local livelihoods—exotic and native, commercial and non-commercial—in land use mosaics. Except where large areas of natural habitat are replaced by exotic monocrop plantations, these mixtures will generally represent an improvement in ecosystem stability and enhance habitat for wild biodiversity. Marketing the products of shelterbelts, improved fallows and live fences, and riparian woods can make all of these ecosystem- and productivity-enhancing practices more feasible for poor farmers to adopt.

Forests that are established by local governments for ecosystem services can also be utilized by the poor for supplemental income and subsistence products. Spatial patterns of new “working” forest resources on private and public lands (including “agroforests,” shade coffee, shelterbelts, or even dispersed trees on farms) can be designed to enhance the effectiveness of nearby protected areas, for example, by functioning as biological corridors (McNeely and Scherr 2003; Miller, Chang, and Johnson 2001). Initiatives of forest restoration for wildlife conservation have found that active community co-design and co-management has been a key element in successful restoration (Elliott et al. 2000). The design and management of such “landscape mosaics” is increasingly recognized as a priority for forest biodiversity research and conservation (Cunningham, Scherr and McNeely 2002).

NOTES

16 For example, the Menominee Tribe of the U.S., with a business strategy to maximize local employment and increase long-term assets for the tribe, developed a successful business of sustainable forest production and processing on their 95,000 hectare reservation (Jenkins and Smith 1999; Poffenberger and Selin 1998).

17 Five tribal case studies in Canada found that use of Aboriginal forest-based ecological knowledge contributes to biodiversity conservation and documented successful experiences of Aboriginal-company collaboration for more sustainable forest management (Bombay 1996).

18 For example, small-scale logging as developed in the Amazon forest involves: careful selection of trees to be felled, avoiding immature trees; directional felling to reduce the impact on remaining trees; sawing of logs into planks in situ in the forest; manual transportation of planks to a central area so as to avoid opening up secondary tracks and using heavy machinery; small-scale logging (one plot per year, according to a rotation); and a sustainable rate of extraction (Auzel 2001).

- 19 There is little rigorous data documenting small-scale forest producers' experience in these markets in aggregate or the impacts on their livelihoods. Our analysis is based largely on case study evidence of "successes" and "failures," personal observation of the structure and function of existing and emerging forestry markets, and extension of some of the lessons learned from promotion of smallholder agriculture in developing countries, which is much better documented than forestry.
- 20 For example, in the Sahel, agriculture often outcompetes commercial fuelwood production. Kerkhof (2000) reports that in Bankass, Mali, the conversion of large commercially-utilized woodlands to rice produced six times the total income of marketed woodfuels. In Maradi, Niger, the estimated value of livestock production was about three times the annual revenue from the 22 rural firewood markets then operating in the same area.
- 21 But even in rich countries the problem arises. In the United States, many public forests restrict collection of ginseng despite growing markets for ginseng products. The result is massive illegal harvesting (McLean 2001).
- 22 For example, in India plans are currently underway to relocate a million forest residents each in the states of Madhya Pradesh, Orissa, Andhra Pradesh, and Karnataka in order to implement the law on forest protected areas (<http://www.RECOFTC.org>). In the United States, large-scale forced relocation was used to create national parks in the Smoky Mountains, the Shenandoah and elsewhere (Power 1996).
- 23 Millions of hectares of forest are intentionally cleared every year by governments or with government subsidies for agriculture and pasture establishment, physical infrastructure, national security, urban expansion, tourism, and disease control, often without any consultation with forest agencies.
- 24 In Papua New Guinea, where indigenous ownership predominates, many tribes have agreed to highly exploitative timber harvesting systems (Filer and Sekhran 1998). The Dayak and Punan tribes of Kalimantan, Indonesia sold off large areas of their forest during the recent logging booms there (Brian Belcher, pers. comm. 2001) In both these cases, it may be argued that local control was actually weak or insecure or that the indigenous leaders recognized by government authorities did not represent their tribes.
- 25 For example, in Botswana, the securing of lucrative overseas craft markets by a development NGO led to rapid depletion of raw materials used in baskets (J.E.M. Arnold, pers. comm. 2001). The failure of both local and national conservation rules to govern the woodcraft trade in Zimbabwe led to the extinction of several important species (Braedt and Standa Gunda 2000; Belcher et al. 2002).

5. COMMERCIAL NICHES FOR LOW-INCOME FOREST PRODUCERS

Low-income forest and farm producers already supply the vast majority of fuelwood, which constitutes some 50 percent of total global wood product demand. In addition, they supply a modest (likely underestimated) part of total industrial wood and NTFP demand. That share could increase substantially in some market niches in response to supply and demand changes (chapter 3) as well as the removal of historical barriers to local producer participation in markets (chapters 6 and 7). This chapter examines the potential opportunities for each type of product: commodity-grade timber, appearance-grade timber, certified wood, processed wood products, pulpwood, and other chemically treated wood products, non-timber forest products, and ecosystem services. The analysis considers market dynamics for particular commodities, the competitive advantages and disadvantages of local producers, and documented local producer experience in those markets.

Promising business models and examples are noted in **Tables 4a-4g**. The potential scale of local market participation, in terms of numbers of producers, is roughly projected in light of the overall size of markets and their competitive advantage, assuming a more level playing field. The potential contribution to local incomes is projected by considering feasible productivity increases, local capacity for market negotiations, market value of the products and the potential share of profits for local people. The final sub-section summarizes the main opportunities by type of demand, type of forest resource, geographic characteristics, and national-scale market characteristics. This assessment is only preliminary; its aim is to present the evidence now at hand and stimulate efforts to produce more rigorous analyses of markets for low-income producers.

Table 4. Main Market Opportunities and Possible Business Models for Low-Income Forest Producers

The tables below present the authors' preliminary assessment of the forest market potentials for low-income producers, assuming major policy barriers to market participation are removed. The "main opportunities" indicate the conditions that need to exist or need to be developed, so that business risks are more acceptable and the probability of business success greater.

*We assess the potential scale of enhanced market participation by poor producers in developing countries, by the year 2025, as: *** High (tens of millions); ** Moderate (millions); * Low (fewer than a million). The potential increase in household income for producers is categorized as: * Small, a minor income source; ** Moderate increase in income; *** Large increase in income (potential to move out of poverty).*

Table 4a. Commodity Wood

Low-income group	Main opportunities will be found where:	Scale of market opportunity for poor	Business models	Potential to raise incomes	Examples
Community Forest Owners	Countries where public forest area for commercial use is limited and producers face low transport costs to major inland markets; humid, sub-humid areas, closed canopy forest, some woodlands	**	Direct local sale of stumpage, logs, poles, fuel by community to national or international traders or loggers Contracts or agreements for wood-using companies to harvest wood from community forests	*	Ejidos in northern Mexico's Chihuahua and Durango states
Public Forest Users	Countries with large public forests and weak public management capacity, or devolution to local governments; diverse forest types	**	Local people produce wood in public forests, under co-management agreements, to sell to local traders or public agency	**	Export of construction wood from Papua New Guinea (Filer and Sekhran 1998) Most public forest co-management programs in India and Nepal
Small-Scale Farmers	Forest-scarce inland regions with rapid income or population growth; humid/sub-humid areas	***	Farm forestry products sold to local traders Farm forestry or outgrower schemes that directly link producers with large-scale sawmills, commodity wholesalers or final users	**	Eucalyptus farming in India (Deweese and Saxena 1995) Match company farm forestry scheme with 30,000 farmers on 40,000 hectares in Uttar Pradesh, India; Kolombangara Forest Products, Ltd. informal sawlog grower scheme with 100 growers (Desmond and Race 2000)
			Farm forestry with cooperative wood marketing organization	***	Widespread in India, Philippines, Bangladesh, Nepal

Table 4b. High-Value Wood

Low-income group	Main opportunities will be found where:	Scale of market opportunity for poor	Business models	Potential to raise incomes	Examples
Community Forest Owners	More secure tenure rights over forests with high quality timber, accessible at market prices and strong community organization, with marketing and management skills, mainly for export markets, mostly closed canopy forest in humid/sub-humid areas	**	Communities sell stumpage or logged wood locally to traders (national or international) Communities actively market to international buyers	*	Community forests in Oaxaca, Mexico (PROCYMAF 2000)
			Forest communities manage timber in partnership with private company	***	Ecoforestry operations in Papua New Guinea (Filer and Sekhrum 1998, 297)
			Forest communities lease concessions to industry or government	**	Ilsaak Forest Resources, Ltd. (Baird and Coady 2000) Community forests in Bolivia (Pacheco 2001); government loggers pay royalties to Pakistan community forests (Ahmed and Mahmood 1998)
Public Forest Users	Co-management of public forests for high-value timber, promoted by local government or end users; mainly closed canopy forest in sub-humid areas	*	Producer organizations manage public forest concessions	**	National Council for Protected Areas in Guatemala, multiple-use zone of the Mayan Biosphere Reserve (Ortiz 2001)
Small-Scale Farmers	Mainly in forest-scarce regions with growing incomes and demand for high-value products; good market access; areas with secure tenure; mainly in humid/sub-humid areas	**	Small farms or communities participate in outgrower or crop-share schemes with private companies to establish plantations of improved high-value timber Farmers grow timber at low densities in agroforestry systems and remnant forest to sell cooperatively	**	Prima Woods project for teak production in Ghana (Mayers and Vermeulen 2002) Philippines Agroforestry Cooperatives (ICRAF 2001)

Table 4c. Certified Wood

Low-income group	Main opportunities will be found where:	Scale of market opportunity for poor	Business models	Potential to raise incomes	Examples
Community Forest Owners	Forest communities with high capacity for natural forest management and marketing that can achieve low certification costs	*	Forest communities selling stumpage or logs who have established contracts or agreements with certified wood users or market intermediaries	**	Certification of 53,000 hectares in the indigenous community of Lomerío, Bolivia (Contreras-Hermosilla and Vargas 2001)
Public Forest Users	Forest use groups with high capacity for natural forest management, mainly where forests have high biodiversity or carbon value and supportive public forest institutions	*	Long-term community concessions in public forests or co-management agreements involving established contracts or agreements with certified wood users of market intermediaries	**	National Council for Protected Areas in Guatemala, multiple-use zone of the Mayan Biosphere Reserve (Ortiz 2001)
Small-Scale Farmers	Farmer groups, mainly in humid/sub-humid regions, with high capacity for natural forest management and marketing, that can achieve low certification costs	*	Farm producer groups with established contracts or agreements with certified wood users or market intermediaries	**	Klabir pulp and paper company of Brazil assists outgrowers to obtain certification and to supply local furniture company demand (Mayers and Vermeulen 2002)

Table 4d. Processed Wood Products

Low-income group	Main opportunities will be found where:	Scale of market opportunity for poor	Business models	Potential to raise incomes	Examples
All Groups	Simple pre-processing to increase income/access markets by reducing waste, increasing quality or reducing transport costs	**	Community or group enterprise	**	Drying forest fruits to improve product quality, reduce pest loss or allow storage; chemically treat rattan to prevent fungal damage and staining (Hyman 1996)
	Simple tools, furniture, other basic commodities for poor consumers in growing rural or urban areas	**	Community or group enterprise	**	Small-scale processing firms in Africa (Arnold et al. 1994)
	Sawmilling in markets where large-scale, high efficiency mills do not compete (humid/sub-humid forest regions)	*	Cooperative community, farmer or group sawmill enterprise with identified buyers	**	Small-scale logging in the Amazon (Padoch and Pinedo-Vasquez 1996)
	Finished processing where commercial links can be forged with businesses serving higher-income consumers; groups with capacity for standardized quality production	*	Forest community or farmer cooperative for sale direct to wholesalers/retailers	***	Community producers in Oaxaca, Mexico, selling finished wood products to the Puertas Finas Company (Fernandez 2001)

Table 4e. Industrial Pulpwood

Low-income group	Main opportunities will be found where:	Scale of market opportunity for poor	Business models	Potential to raise incomes	Examples
Community Forest Owners	Countries with most large forest areas under secure community ownership and with large pulp and paper or engineered wood industry; communities located near mills; humid/sub-humid areas	*	Joint ventures and leases with shared equity between industries and communities for pulpwood production	**	Mondi pulp and paper company in South Africa's Eastern Cape provides technical assistance and start-up capital to communities organized in Common Property Associations (Mayers and Vermeulen 2002)
			Lease community forest land to private companies for pulpwood production	**	Tasman Forest Industries in New Zealand leases land from 27 Maori groups on 11,000 hectares; landholders retain hunting/grazing rights (Mayers and Vermeulen 2002)
Small-Scale Farmers	Densely settled, forest-scarce countries with large pulp and paper or engineered wood industry and limited foreign exchange; farmers located near pulp mills; humid/sub-humid areas	**	Outgrower arrangements: industry assists farmers to establish and manage pulpwood plantations in guaranteed supply contracts Farm forestry: farmers establish plantations with technical support from industry; sell output without purchase contracts	***	Atacruz Cellulose "timber partner program" in Brazil (Desmond and Race 2000; Saigal, Atora and Rizvi 2002)
			Land leasing by farmers to private companies for pulpwood production	**	ITC Bhadrachalam Paperboards, Ltd., integrated pulp and paper mill in Andhra Pradesh State, India (Lal 2000; Saigal et al. 2002)
				**	Jant Limited wood chipping operation in Madang, Papua New Guinea (Mayers and Vermeulen 2002)

Table 4f. Non-Timber Forest Products

Low-income group	Main opportunities will be found where:	Scale of market opportunity for poor	Business models	Potential to raise incomes	Examples
Community Forest Owners	NTFPs (from all types of forest) with high national or international demand that do not have domesticated substitutes available; strong community organization, including a sustainable management or conservation plan for wild resources	***	Forest communities collect/grow, process and sell NTFPs to local processors or traders	*	Most NTFP producers
			Forest communities collect and sell NTFPs to processing and marketing collective or parastatal enterprises	*	Brazil nut product organizations supported by the Rainforest Alliance (Clay 1996)
			Forest communities contract to collect, process and sell NTFPs to private industrial processor or retailer	**	Indigenous producers in Marajo Pará, Brazil who collect heart of palm for local processing plant (Moles 2000)
			Bioprospecting agreement between forest community and private company	*	Bioprospecting agreements with communities in Latin America rainforests (Reid et al. 1993)
Public Forest Users	Community with biodiverse forests and capacity to negotiate deals with private firms	**	Groups collect, process and sell NTFPs to local processors or traders	*	Bamboo producers and artisan cooperatives in Andhra Pradesh, India (Kumar et al. 2000)
	Producer groups can obtain exclusive or guaranteed access to raw materials; NTFPs have high value; mainly national demand	**	Groups collect NTFPs and sell to parastatal or collective enterprises	**	Tribal Development Cooperative Corporation of Orissa, Ltd. in India (Neumann and Hirsch 2000)
			Groups contract to supply processor or retailer	**	Rattan producers belonging to the Manipur Crafts Society in India (Belcher 1998)
Small-Scale Farmers	NTFPs have large, deep national or international markets with growth; no major economies of scale in production	***	Small farmers grow, process and sell NTFPs to local processors or traders	**	Most small-farm NTFP producers
			Small-scale farmers grow and sell NTFPs to processing and marketing collective enterprises	**	Many nationally and internationally traded spices, dyes, seeds, oilseeds, leaf for fodder, ornamentals
			Small-scale farmers grow and sell NTFPs through outgrower schemes or contracts with private industry	**	Same as above

Table 4g. Payments for Ecosystem Services

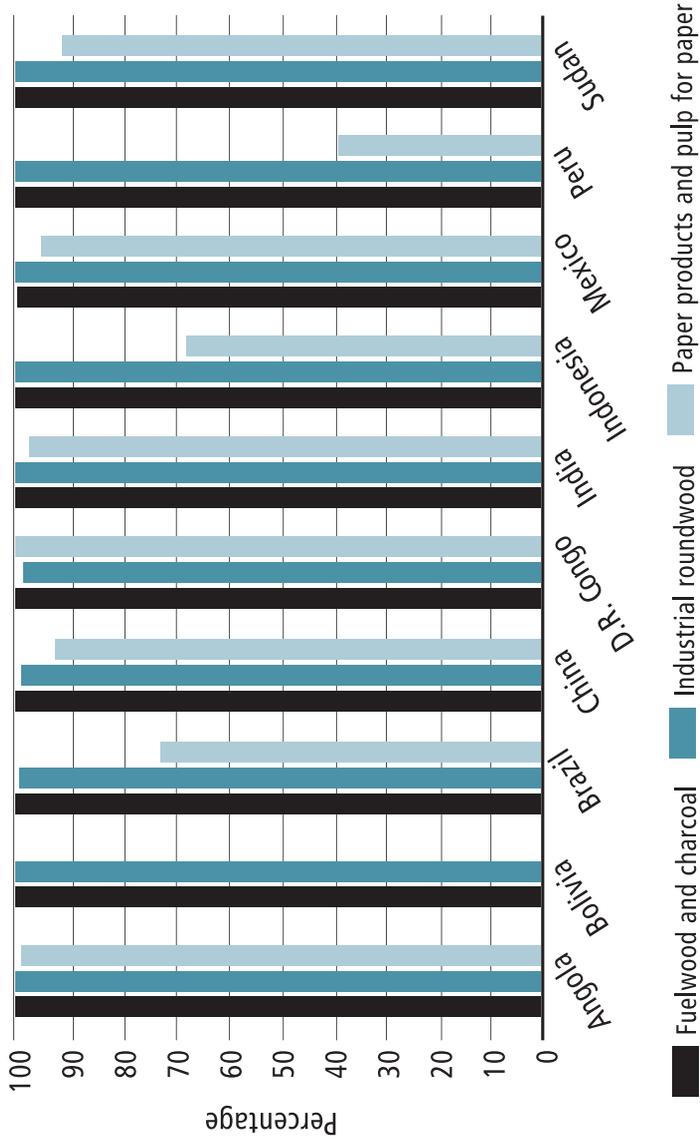
Low-income group	Main opportunities will be found where:	Scale of market opportunity for poor	Business models	Potential to raise incomes	Examples
Community Forest Owners	In forest-rich regions with resources of very high environmental value (for biodiversity, tourism)	*	Business partnerships for nature tourism between forest communities and private companies or public agencies	**	Agreement between the community of Zancudo and Transturi, a major ecotourism operator in Ecuador (Wunder 2000)
	In regions where forest ecosystem services are needed to reduce economically important types of degradation (esp. watershed protection)	**	Direct payments to communities by governments, farmer groups, conservation agencies	*	New York City water; Perrier-Viettel (Johnson, White and Perrot-Maître 2001); Costa Rica farm payments (Chomitz, Brenes and Constantino 1999)
	In forest-scarce regions with potential for rapid forest growth, or forest-rich regions threatened by rapid deforestation (carbon)	*	Direct or indirect payments to forest communities to sequester carbon within a framework of emissions trading	*	Noel Kempff project, Bolivia (Smith and Scherr 2002)
Public Forest Users	In forest-scarce regions where agencies' capacity to manage public forests for ecosystem services is weak or high-cost	*	Public forest dwellers or uses compensated for managing or protecting public forest for ecosystem services	*	Financial payments to forest community households for forest protection in Vietnam (FAO 2001)
Small-Scale Farmers	In forest-scarce regions, for ecosystem services and sites of high value to buyers (e.g., biodiversity corridors)	*	Private deals to provide highly valued ecosystem services	*	Payments to upstream forest landowners by Irrigator Associations in Cauca River, Colombia (FAO 2001)
	In areas where forest ecosystem services are needed to reduce economically important types of degradation (e.g., forest buffers to reduce agricultural nutrient pollution)	**	Direct payments to farmers by municipalities, farmer groups, or conservation agencies	*	Payments to control salinity in New South Wales, Australia (Brand 2000)
	In regions with low forest cover and existing institutions to reduce transaction costs	**	Direct or indirect payments to farmers to sequester carbon within a framework of emissions trading	**	Scolec-Té, Mexico forest carbon project (De Jong et al. 2000)

COMMODITY WOOD

Low-income producers are unlikely to be competitive in export markets for commodity-grade timber, as these require large volumes and high product consistency. Overall, international trade in tropical timber from natural forests has declined by almost 40 percent since 1990, from US\$13 to US\$8 billion; 80 percent of this trade is concentrated in just five countries—Indonesia, Malaysia, Brazil, Gabon, and Cameroon (ITTO 2003). Those managing natural forest resources for commodity wood for construction, infrastructure, or fuel will find it difficult to compete in international markets with low-cost wood supplies from industrial plantations, agricultural land clearing, or illegal logging. Market liberalization, by exposing domestic producers to competition from cheaper imports, can undermine even successful small-scale forestry.²⁶ When the first wave of new industrial plantation-grown wood (mainly general-purpose utility timber and pulpwood) comes into the market beginning in 2005, it will have a major impact in the Pacific Rim markets where the addition to supply amounts to 10-15 percent of regional demand; ten years later a second much larger wave of plantation-grown wood will come that will likely have global impacts. Downward pressure on prices is predicted unless natural forest sources decline dramatically or demand increases at a rate of 15-20 percent per year after 2000—neither of which is likely (Leslie 2002).

By contrast, there is a large potential market for low-income producers of commodity-grade products in segments of domestic markets that do not trade in very large volumes. In most developing countries, domestic consumption of wood accounts for more than 95 percent of total production (Figure 5).²⁷ Timber imports are projected to triple or quadruple in India, China, and other forest-scarce developing countries (FAO 2001). Many forest products have high income-elasticities of demand at low income levels. Urbanization, rural housing, and infrastructure construction all demand large quantities of commodity-grade wood; intensification of agriculture demands wood for fencing, storage structures, crop and tree supports, and packing crates. Iron and steel production depends heavily on wood energy. To illustrate the scale of this demand: Brazil's domestic consumption of tropical timber, estimated at 34 million cubic meters of logs in 1997, exceeded timber consumption in all of the Western European countries combined.

Figure 5. National Consumption as a Percentage of National Wood Production in the 10 Most Forested Developing Countries



Source: Area data from FAO (2001); production + export data from FAO (2003).

The total quantity of woodfuels being consumed in developing countries is huge, with an estimated 2.4 billion people currently using wood and other forms of biomass. Annual global consumption of fuelwood appears to have peaked in the mid-1990s, at about 1600 million m³ and is now believed to be slowly declining—but not yet in low-income countries. More than half the total roundwood harvested in developing countries is burned directly as fuel, and woodfuel demand rises in the early stages of economic growth, even as growth in use of substitute fuels accelerates. Global charcoal consumption continues to grow rapidly and at the turn of the century, was estimated to be using roughly 270 million m³ of wood per year (Arnold et al. 2003). As countries seek alternatives to petroleum-based fuels for industry, transport, and other sectors, new biomass markets may arise in many countries.

These markets could benefit millions of community forest owners (especially in secondary forests) and tens of millions of small farmers near rapidly growing inland population centers (Table 4a). Forest producers can compete in these markets due to lower transport costs and greater supply flexibility, especially in countries or regions with poor port and transport facilities linking them to international markets. Commodity wood production may be especially profitable and lower risk for small-scale farmers if integrated with other components of livelihood strategies, as from agroforestry, by-products from managing timber or tree crop stands, or wood from fallow stands.²⁸ Much of total supply has been, and will continue to be, generated as a by-product of the agricultural cycle, e.g., production of woodfuels where land clearance is taking place. Forest owners may simply sell stumpage to outside loggers, or sell logs themselves if they can acquire the necessary equipment. Mechanisms for bundling products from small-volume producers will often be essential to negotiate reasonable prices from buyers, as will be grading and sorting.²⁹

Examples of successful commodity timber production are already widespread. Low-impact artisanal logging operations have grown rapidly in Cameroon to meet increasing demand in local urban markets for small-scale timber. In 1998-99 this chain-sawn lumber represented the equivalent of 27 to 36 percent of the amount produced by modern sawmills (Auzel et al. 2001). Even partial sharing of timber benefits through public forest co-management has generated significant real benefits in some countries (Shepherd, Arnold, and Bass 1999) as illustrated for India in **Box 6**. Successful smallholder farm forestry for commodity-grade wood has been established in Kolar, Karnataka in India; KwaZulu, South Africa; and eastern Mindanao, Philippines (J.E.M. Arnold, pers. comm. 2001).

BOX 6. Benefits to Local People from Sale of Commodity Wood from Public Forests in India

In remote areas of Madhya Pradesh, the state forest agency, local communities, and the World Bank jointly undertook a project from 1995-1999 to support Joint Forest Management. The project financed technical assistance, improved planting materials, training and village eco-development projects in 2,269 forest fringe villages and served as a catalyst for funding an additional 9,603 villages by other sources. About 1.2 million households, mostly tribal people, were involved in managing over 221,000 hectares of dense forests as well as 419,300 hectares of degraded forests.

Some local people may have lost *de facto* forest rights held earlier, but overall the project resulted in a major increase in local capital assets, as some rights to final timber harvest were transferred from the state monopoly to joint management. Of an estimated US\$19 billion total present value of forest assets, the community share is worth more than US\$2 billion. In addition, local people now obtain 100 percent of the value of intermediate products and NTFPs, estimated to be worth US\$125 million per year. Reportedly, this amounts to about US\$280 per household per year. Payments for forest production by community members have capitalized community funds and other investments that increased agricultural productivity and opened up new income-earning opportunities. The landless benefited from wage employment in forestry operations, amounting to about 42 million person days over the project's duration. The World Bank's internal calculations conclude that the economic rate of return on the project was 19 percent, very high by any standard and especially impressive given the associated impacts on poverty. Environmental co-benefits of the new commercial management system have been very positive. More than 5.5 million hectares of forests are being protected from unsustainable grazing and forest product extraction. Forest floor vegetation is returning, natural regeneration is taking place, and there is a significant and positive impact on the diversity and abundance of indigenous flora and fauna. Rehabilitation of severely degraded forests with indigenous vegetation was reported by villagers to reduce soil erosion, raise water tables, and increase wildlife populations and biodiversity.

Source: World Bank (2000b).

HIGH-VALUE WOOD

Wood demand in high- and middle-income countries and urban centers is diversifying into higher-value and specialty products such as finished furniture and home improvement products. Appearance-grade wood for solidwood and veneer may retail for a price three to four times higher than low-quality construction grade timber and much higher than for low-value products such as fuelwood. In the U.S., for example, the highest-value cherry hardwood is three times the price of the cheapest softwood and over twice the price of lower-value hardwoods (Table 5). Long-term wood price increases are projected only for these higher-end segments of the market as a result of the scarcity of large-diameter timber and the greater opportunity to differentiate products (FAO 2001). For example, retail prices for mahogany (*Swietenia spp.*) are 25 percent higher today than a decade ago, and buyers are relying more on substitute species like African mahogany (*Khaya spp.*) and Philippine mahogany (*Shorea spp.*). Like some other high-value species, big-leafed mahogany is considered

threatened due to overexploitation combined with habitat loss. Some mahogany is now grown in plantations (largely outside its native habitat, where the species is susceptible to more pests), but the wood quality is considered inferior (Robbins 2000).

Table 5. Price Premium for High-Value Lumber, Example from U.S. Retail Market

Species	Description	Price (US\$ per board-foot)
Yellow poplar	4/4	1.95
Yellow pine	4/4	2.00
Yellow poplar	4/4, 10" and wider	2.15
Aromatic eastern red cedar	4/4	2.30
Soft maple	4/4, wormy	2.30
Basswood	4/4	2.40
Hickory	4/4	2.70
Ash	4.4	2.75
Yellow birch	4/4, FSC certified	2.80
Cypress	4/4, select	2.80
Soft maple	4/4, FSC certified	2.80
Red oak	4/4, wormy	2.85
White oak	4/4	2.85
Red oak	4/4	2.95
Beech	4/4, FSC certified	3.05
Eastern white pine	4/4, Dsel & Btr	3.05
Red oak	4/4, 10" and wider	3.50
Santa Maria	4/4	3.50
Hard maple	4/4, FSC certified	3.85
Sycamore	4/4, quarter-sawn	3.90
Red oak	4/4, curly	3.95
Red birch	4/4	4.00
Red oak	4/4	4.00
Walnut	4/4	4.10
White oak	4/4, quarter-sawn	4.20
Cherry	4/4, 4-6 foot long	4.25
Cherry	4/4	5.25
Honduras mahogany	4/4, FSC certified	5.50
Cherry	4/4, 10" and wider	5.85
Yellow birch	4/4, curly	6.00
Hard maple	4/4, birds-eye	6.15
Soft maple	4/4, curly	6.15
Cherry	4/4, 12" & wider	6.55
Cherry	4/4, curly	6.65

Source: Boards in a Virginia, USA retail lumber yard, 2001.

Data from www.northlandforest.com/retailmanassas.html

The most valued woods are grown primarily in natural forests—such as mahogany, red cedar, and rosewood—and have been over-exploited in the past. The low density per hectare of valuable species in many tropical forests raises average harvest costs, although operations are still quite profitable in many places. Harvesting practices can be used that are consistent with managing forests for other environmental values as well. Demand is also rising for non-traditional appearance-grade wood species, as knowledge on their processing and use characteristics develops (e.g., Vlosky and Aguirre 2001). A few appearance-grade timbers, such as teak, have been domesticated, and fast-growing cultivars can be grown in plantations and on farms. Research and development on production systems for small-scale producers working with diverse species has been weak in the past, so there may be significant potential for increasing productivity and marketability of products (Leslie 2002).

The global decline of primary forest, together with an increasing share of it coming under local control, means that forest industry must increasingly purchase supplies from local producers or contract with them to extract the resource. In some countries, even where public and private forest is still available, it is becoming politically unacceptable for large forest areas to be purchased or leased over the long-term to private foreign firms. Gray (2002) argues that growth rates of high-value tropical wood from natural forests are too slow to make sustainable forest management profitable for large private firms. By contrast, indigenous and community territorial attachments create incentives to develop their forests as a long-term income source, combining high-value timber with NTFPs. Small-scale logging can also be a complementary adjunct, rather than an alternative, to large-scale forestry and logging; for example, the ecoforestry enterprises in PNG utilize wood left behind by industrial loggers (Mayers and Bass 1999). With many industrial concessionaires abandoning their concessions after the first, most lucrative, cut local communities may be able to claim rights to the second cut. Local community and farm producers may also have an advantage in addressing social and environmental risks, so that private firms may find it attractive to contract with them to supply raw materials.

Only a minority of low-income producers will have the necessary land resources, stand quality, or market contacts to supply higher-value appearance-grade wood markets. But this still means that millions of community forest owners and small-scale farmers could benefit, as could a smaller number of public forest users (Table 4b).³⁰ Local communities will benefit most economically where they develop long-term partnerships with buyers to produce higher-value products or where there is active competition among buyers. Possible models include community forests selling timber to local traders or industrial partners, community concessions in public forests, outgrower schemes with private companies, and timber grown in agroforestry systems.

CERTIFIED WOOD

To encourage sustainable production, new markets have developed for forest products “certified” by independent third parties as meeting high standards of environmental management. Approved products can use a special logo and follow procedures to ensure chain of custody. Numerous certification systems have developed, including recent developing country initiatives (Nysenkyiere and Simula 2000). The leading international certification schemes are the Forest Stewardship Council (FSC) and the Pan-European Forest Council (PEFC). In addition, there are national schemes in a number of countries, including Canada, Malaysia and the United States.

BOX 7. Smallholder Logging in the Amazon

Analyses of timber exploitation in Amazonia conclude that a variety of socioeconomic and ecological factors in the region make a stable and profitable logging industry based on large-scale industry and a small number of high-value timbers virtually impossible. By contrast, a seven-year field study with 140 households in the estuarine floodplain areas in Amapá State, Brazil found Amazonian smallholders can earn significant income from producing sawtimber, poles, and firewood in a management system that combines forestry and agriculture. New family-run sawmills are helping to create a market for many more tree species, especially faster-growing secondary-growth species, making timber management more economically attractive for rural families. Sawn lumber is sold in regional urban markets, local markets, and some international markets. Incorporating timber management into an existing swidden-fallow agricultural system enhances the value of household labor and inputs while increasing revenue and option value. Farmers actively managed timber trees in forests, fallows, and home gardens. The highest value (previously over-exploited) timber species were maintained in home gardens as seed producers or are kept as sources of emergency cash. The efficiency of timber management was increased through the production of firewood, poles, and other products. Timber management is a substantial source of household income for poor families.

Source: Piñedo et al. (2001).

Buyers’ groups, industrial customers and professionals such as architects have begun to cajole the forest industry to supply certified products. Some multinational furniture and retail building materials companies, like IKEA and Home Depot, and large national firms, like Tok and Stok in Brazil, have made commitments to purchase certified wood products. More than half of the demand is created by the WWF Global Forest and Trade Network, which operates in more than 20 countries. Available data do not allow accurate quantitative estimates of demand and supply of certified forest products. Demand is driven mainly by marketing factors: competitive advantage, image risk aversion, and offering options for consumers. Demand appears to exceed supply in some major markets (the U.K., the Netherlands, Germany, and Belgium), encouraging buyers to support their suppliers to achieve certification status. However, the potential timber supply from the world’s certified forests is significant, estimated at about 234 million cubic meters on an annual

basis; most of this is marketed without reference to certification status and only a small share is labeled (Atyi and Simula 2002).

Commercial forest producers are interested in certified wood markets for a variety of reasons: to reflect their core business values and strategies, to take advantage of business opportunities, to increase market share, to improve image, to access donor funding, or to encourage more lenient treatment by regulators. In some countries, such as Bolivia, third party certification enables forest producers to waive government regulation. For local people, certification of industrial forest operations can be beneficial because it often addresses social impacts as well as local rights and employment and because it can empower the poor in commercial partnerships. More efficient management practices put in place to meet certification standards can lead to significant cost savings. Producers are willing to incur the expense of certification mainly for higher-value products.

In January 2002, the area of certified forest was estimated at 109 million hectares—four times higher than two years earlier. Of these, 30 million hectares are FSC-certified, and the other 79 million are certified by other organizations which are not all widely recognized as sufficiently rigorous by environmental organizations. More than half of the present area is located in Europe and almost 40 percent in North America; most of it is temperate or boreal forest. Developing countries account for no more than eight percent of the total certified area, even though in 1996 their share was 70 percent (Atyi and Simula 2002). A few developing countries in Latin America and Africa, such as Bolivia and South Africa, have made national commitments to certification. Only one percent of Asian forests are certified.

FSC certification, the scheme that has catalyzed the development of other schemes, was developed with explicit social standards. FSC Principles and Criteria address socioeconomic impacts on local communities: Principle #2 protects local tenure and use rights; Principle #3 protects the legal and customary rights of indigenous peoples; Principle #4 requires positive impacts on the social and economic well-being of forest workers and local communities; and Principle #5 encourages protection of locally important forest services and resources (Forest Stewardship Council 2000).

Forest communities with extensive indigenous knowledge of their forests and who already practice sustainable forest management would seem to have a competitive advantage in certified wood markets. However, without major changes in certification processes, few forest communities will directly participate in these markets—a fraction of those potentially benefiting from non-certified timber markets (Table 4c). Only 50 community-owned forests have been certified worldwide (Molnar et al. 2003), less than one percent of the world's total certified area and less than 10 percent of all entities certified by FSC.³¹ This is largely because of the very high economies of scale in certification processes, lack of access to certified chain of cus-

tody processes, dependence on external professional technicians, the need to identify special buyers, and the limited price premium for certified wood.³² The additional costs associated with certification make it difficult for certified producers to compete in commodity markets that are also served by unsustainable or illegal logging operations. With many supporters of certification promoting the establishment of certified wood as a global market standard (for example, through government procurement policies), certification is inadvertently serving to erect an additional market barrier for low-income producers.

For forest communities to participate in certified wood markets, the costs of achieving certification must be low, meaning that forests must already be well managed. Community members must have considerable capacity to manage natural forests and to develop management and marketing plans. Forest location, cost of access, and quality must meet market criteria. Communities must have direct links to wholesale or retail buyers to establish chain of custody and ensure access to higher-value markets to justify costs. Communities will need partners who are willing to underwrite certification costs and facilitate the process (Rametsteiner and Simula 2001). Efforts now being made to facilitate certification by communities in developing countries could greatly expand the potential for low-income producers to benefit. These are discussed in the next chapter.

PROCESSED WOOD PRODUCTS

Because the cost of raw material is such a small proportion of the final value of many forest products, local producers often seek to find ways to add value to their product through processing. Forest community investment in processing facilities may be motivated by the desire to increase local employment options, to reap a greater percentage of final product value, or to assert greater control and certainty over the market. Policymakers also promote processing industries, since most secondary manufacturing is employment-intensive per cubic meter of roundwood and in most cases additional to primary processing. In British Columbia, Canada for example, furniture and cabinets provide, on average, eight to ten jobs for each job in the forestry sector.

International trade in furniture, mouldings, builders' woodwork, and other processed tropical wood products grew by more than 250 percent since 1990, from US\$1.8 to US\$6.5 billion. Currently, nearly all tropical exports of these processed products are based on plantation-grown wood from Indonesia, Malaysia, Thailand, Brazil, and the Philippines, although many other countries are pursuing value-added wood processing for export (ITTO 2003).³³ But European furniture markets are largely saturated, and among the 15 largest furniture exporters only four are developing countries: Brazil, China, Mexico, and Malaysia. Yet subcontracting to

low-wage countries of labor-intensive operations, such as upholstering, as well as production of low-value furniture and wood products, is accelerating (Poschen and Lougren 2001). Thus modest opportunities exist for low-income producers to supply export markets, especially labor-intensive components.

But by far the largest market for processed wood products of developing country producers will be domestic consumers. Evidence shows that demand for processed wood products rises significantly as incomes rise. In newly industrialized and developing countries, levels of per capita consumption of furniture are typically low and demand is growing rapidly. Developing countries already account for 10 out of the world's 15 largest net importers (Poschen and Lougren 2001).

Much of this demand will be met by large-scale manufacturing facilities, often in vertically integrated industries and imports. But there is significant scope for communities and small-scale producers to manufacture low-end products for local and domestic urban markets, and to supply niche markets which cannot be efficiently served by industrial-scale processors. Millions of small-scale producers could participate profitably in value-added wood processing enterprises, particularly through pre-processing, milling for local markets, contracts for selected operations in vertically integrated industries, high-value artisanal production near urban centers or exports for specialty markets (Table 4d). Production of handicrafts that have economies of small scale and no mechanically-produced substitutes may be a low-cost strategy to add value, as may those types of woodworking without pronounced economies of scale.³⁴ Small-scale manufacturing enterprises may be able to subcontract with large-scale companies. As noted in chapter 3, small-scale forest product processing is already one of the largest and fast-growing sources of rural non-farm employment. In Eastern and Southern Africa, woodworking for urban and rural markets grew 10 times as fast as other forest products.

Wood costs represent 40 to 60 percent of operating costs in sawnwood (Bazett 2000). Thus vertical integration of processing enterprises can benefit community producers, especially those operating where markets for labor, capital, and public goods are weak. Such integration can provide some control over supply, reduce the costs associated with bargaining and enforcing contract commitments, and exploit economies of scope. In Mexico, communities are more likely to integrate forward into timber processing activities once they achieve critical levels of human and social capital, and once they increase labor productivity by improving forest resource quality (Antinori and Rausser 2000).

Still, caution is warranted. Widespread experience in both forestry and agriculture shows that processing involves additional management complexity and investment requirements. If producers face markets where low cost and high and consistent quality is at a premium, larger-scale operations will be more competitive. Even where markets are promising, most community and local enterprises are not

presently competitive. In Mexico, for example, while some 9000 communities own 80 percent of the nation's forest estate, only 847 rural communities are involved in processing activities and these supply only 5 percent of industrial production (Segura 2000). These operations are, by and large, inefficient, with low volume, and add little value, usually not even grading their wood products. Small community sawmills with old equipment often exceed 50 percent wastage (Enters 2001).

Thus, for both conservation and economic reasons, investment to improve milling efficiency is essential for success in processing enterprises. Fortunately, new technologies have been developed over the past decade that can increase the efficiency of small-scale enterprises.³⁵ For example, small portable sawmills have been very cost-effective for local producers in Papua New Guinea (Filer and Sekhran 1998) and pose little environmental threat if managed well. Advantages of on- or near-site processing include returning residues such as bark, sawdust and trimmings back to the forest, flexibility in meeting market demands (i.e., being able to supply as the opportunity arises); reduction of transport costs by reducing logs to commercially recoverable timber on-site; and the ability to harvest and mill the timber in both small and inaccessible areas. From construction-grade wood, lumber of various diameters and grades can be produced; from appearance-grade and certified wood furniture, flooring and decorative wood products. Kilns for effective drying can significantly increase the quality, and thus price, of wood products.

INDUSTRIAL PULPWOOD

Demand for industrial pulpwood (defined here to include all production destined for pulp or panels) has grown faster than any other market segment in recent decades. Over the past 30 years, demand for paper tripled (Matthews et al. 2000), so that industrial pulpwood now accounts for more than a quarter of industrial wood consumption. Although technological improvements and recycling have greatly reduced the volume of pulp required in production,³⁶ pulp consumption in developing countries is rising by five percent annually. Continued growth of demand is expected, as average paper consumption is only 15 kg per capita per year, as compared to 200 kg in the EU and 300 in the U.S.. International trade in tropical production of reconstituted panels, pulp and paper grew by more than 200 percent 1990-2002, from US\$1.5 to US\$5 billion. Most is based on wood produced in plantations, with only four countries—Indonesia, Brazil, Thailand, and Malaysia—accounting for 94 percent of tropical export production (ITTO 2003). Developing countries now account for half of the world supply of panels, and pulp for paper, and 90 percent of paper and paperboard (Annex 3).

Pulp production is highly capital-intensive. Though the raw material represents a small share of total costs, it is essential to have a reliable supply to ensure continuous use of

equipment. A single plant may require 1-2 million m³ raw material each year (Bazett 2000). In parts of the world with increasing wood scarcity, this inelastic demand generates strong pressure for illegal harvest and leads to the wasteful pulping of high-value wood. This demand for fiber has led to the development of new processing technologies that can use wood chips to produce particleboard, oriented strand board (OSB) or median density fiberboard (MDF).³⁷ In the fast-growing ready-to-assemble furniture market, these have become substitutes for plywood, which was traditionally produced by peeling timber into sheets and gluing them together. Other technologies being developed can alter the characteristics of wood, allowing lower-value species to be used in higher-value products. Engineered products consumed 9 percent of industrial roundwood in 1995; demand for MDF is expected to grow at 8 percent per year over the next 15 years (Jenkins and Smith 1999).

All of these innovations have increased demand for small-diameter wood that can be grown in shorter rotations and for lower quality wood, both of which can be readily supplied by farm forestry and community-owned natural forests. But due to improved industrial efficiency, increased availability of low-cost wood, and entry of plantation-grown wood, prices for pulpwood have generally been declining despite the rapid growth in demand for paper. Low-income local producers will not be able to compete with large-scale industrial plantations in most international pulpwood markets on price, scale, or reliability. However, in countries with large domestic markets for pulp and limited scope for large-scale harvest from natural forests, millions of farmers may find commercial opportunities as out-growers, as may a smaller number of community forest owners with lands available for afforestation (Table 4e). Already, 60 percent of firms producing wood pulp source at least some of their supply from farmers.³⁸ In coastal Andhra Pradesh, India, for example, over 40,000 hectares of farmland are estimated to be under tree crops and the district is supplying 700,000 metric tons of pulpwood annually to different wood-based industries (Mayers and Vermeulen 2002). Opportunities are geographically limited to areas in close proximity to major pulp mills (within 100 kilometers), with good transportation infrastructure, good growing conditions, and uncompetitive agricultural alternatives.

There are four main business models in this sub-sector: outgrower arrangements; farm forestry; joint ventures between industry and communities; and land leasing to private companies. While these partnerships pose significant challenges, many practical lessons have been learned from both industry and smallholder perspectives (chapter 6). Factors that are especially important for low-income producers to participate in this market are secure land tenure, choice of species to be planted, clear tree rights, financial support while trees mature, good prices, adequate returns on investment, and diversified markets (IIED 1996). To safeguard local livelihoods and environment, pulpwood plantations need to be developed in ways that respect conservation guidelines, planting in mosaic patterns that retain areas for natural forest and farming.

NON-TIMBER FOREST PRODUCTS

Non-timber forest products are already big business in many developing countries. Bamboo production is a major economic sector in parts of rural China (Ruiz-Perez et al. 2000). In Brazil, tree fruits are a leading market sector. In India, an estimated 70 percent of forest-based exports and 70 percent of forest sector employment derive from NTFPs (Iqbal 1993). A high proportion of all NTFPs in international trade come from the forests of Southeast Asia, especially fruits, resins, fungi, wild honey, medicines, aphrodisiacs, sandalwood, bamboo, and rattan ware. China processes and trades in more products from wild sources than probably any other country and now dominates world NTFP trade. Other major suppliers to world markets include India, Indonesia, Malaysia, Thailand, and Brazil. Of all forest market segments, NTFPs involve the largest number of low-income producers. In Cameroon, for example, a fifth of the population—three million people—is estimated to earn income from NTFPs. Demand and markets for NTFPs are rapidly evolving, creating new opportunities and risks (FAO 1995).

Demand for NTFPs

Global demand for many non-timber forest products has grown with rising incomes, urbanization, and industrialization.³⁹ For example, global trade in major tropical tree fruits is growing rapidly, especially with demand from middle-income countries, while trade within the Asia region has expanded greatly for many semi-domesticated species, such as durian and jackfruit (Poulton and Poole 2001). There are developed international commercial markets for at least 116 NTFPs and global international trade is valued at US\$7.5-9 billion per year, with another US\$108 billion in processed medicines and medicinal plants (Simula 1999). New opportunities are arising for exports to high-income countries, as large numbers of migrants from the developing world purchase ethnic foods and botanicals. Some NTFPs that many expected to be replaced by industrial synthetics have experienced a revival (such as oleoresins), while new uses have been found for others (e.g., shellac, cinchona bark, and neem) (Iqbal 1993). International markets are also growing for environmentally- and socially-certified NTFPs. The Rainforest Alliance predicts that certification will be most viable for relatively plentiful products with international markets, such as wild-gathered rattan, heart of palm, babassu vegetable oil or greenery associated with the international flower and gift trade, or high-value items like medicinals, essential oils, herbs, or spices (Shanley et al. 2002).

Nonetheless, domestic consumption within the developing countries will almost certainly dominate market demand. Domestic consumption accounted for more than 94 percent of the global output of fresh tropical fruits from 1995-2000 (FAO 2000), and nearly all tree and shrub fodder. As the population urbanizes, new mar-

kets are arising for products such as foods, medicines, and furnishings that are associated with ethnic identity, so that demand is growing as incomes increase. For example, the demand for ayurvedic medicines is rising rapidly in Asia (Saigal, Arora, and Rizvi 2002).

Market Characteristics

The most critical aspect of the market for participation by poor producers is the existence of well-organized market intermediaries to assemble their small and irregular surpluses at reasonable cost. However, national NTFP marketing systems in most poor countries are still largely informal and most suppliers operate on a modest scale. There is little development of sophisticated marketing chains (such as cold storage). There is significant price volatility due to limited information flows, high perishability, high seasonality, trade fluctuations, and climatic variability.⁴⁰ There is limited added value through small-scale processing. Profit margins are low due to high marketing costs (poor transport, roads, and communications infrastructure). While there are price premia for good quality and supplies out of the main seasons, there is still relatively little emphasis on quality overall, since many consumers are poor. Volumes traded in many NTFPs, such as medicinals and botanicals, are small and producers rely heavily on direct market linkages with buyers (Poulton and Poole 2001).

Different types of NTFPs have very different market characteristics and prospects for growth. In many cases, NTFP supply is shaped by the agricultural situation, with activities reflecting the pattern of resources on-farm, the availability of labor and the alternatives to which available labor can be deployed (Arnold et al. 1994). Most NTFPs have low value, a low cost of market entry, and low income elasticity, thus offering only marginal economic benefits. But Arnold and Ruiz (1998) note that future demand for NTFPs will tend to be concentrated on a declining number of products of higher commercial value and control may be increasingly concentrated in the hands of local elites and outsiders.

NTFPs extracted from common pool natural forest resource stocks pose challenges for sustainable production. Growth in market size and prices can result in the overharvesting of NTFPs, particularly since the growth cycles for many species are still unknown. Greater efforts are needed to domesticate NTFPs with large and expanding markets, especially using technologies accessible to low-income farmers, although this may eventually undermine commercial income from natural forest collectors.

Opportunities for Low-Income Producers

Commercial production, processing, and marketing of NTFPs offer some promising opportunities for low-income producers (Table 4f),⁴¹ probably involving far more people than timber production, potentially tens of millions or more. Moreover, integration of commercial NTFPs can enhance the profitability and reduce livelihood risks of sustainable timber management.

Export markets. Large-scale export market opportunities for local producers are probably limited to well-established global commodity markets for high-value, domesticated NTFPs produced on farms, where there are few economies of scale in production,⁴² and for NTFPs that are difficult to domesticate⁴³ and produced in community forests. Both require effective, efficient, and accountable intermediary trading organizations to handle transaction costs (quality standards, volume requirements, permit and record systems) and technical support to achieve global quality standards. Barriers to export growth include increasing demands for documentation and traceability (to meet anti-terrorism as well as certified market standards); greater processing requirements (for storability), and demands for regular delivery (Tabuna 2000).

There are numerous potential “niche” export markets for spices, aromatics, oils, baskets and mats, and woodcarvings for specialty outlets. For example, Bali, Indonesia exports US\$100 million of woodcarvings per year; in Kenya woodcarving involves over 60,000 commercial woodcarvers, and in South Africa woodcarving provides around 80 percent of woodcarver household cash (Belcher et al. 2002). Production of certified NTFPs may be promising (on a modest scale) for some high-yielding species of nuts, fruits, resins, or other food items, if they occur in sufficiently dense natural stands or are cultivated in agroforestry systems or plantations and if issues such as chain of custody and product mixing can be adequately addressed. Special NTFP market relationships have been established between African producers and European buyers (Tabuna 2000). “Fair” trade or “ethical trade” retailers earn a retail premium by guaranteeing that poor or indigenous suppliers were paid well and well treated (Clay 2002).

The potential to earn income from selling bioprospecting rights in natural tropical forests to pharmaceutical and other companies has been discussed (Reid et al. 1993). To date, there have been few such arrangements in community forests and no income has yet been earned by local people apart from paratechnicians, although evolving institutional arrangements may provide new opportunities.⁴⁴

Domestic markets. NTFPs with high and income-elastic consumer demand (or derived demand for industrial goods using NTFPs) offer opportunities to the largest number of local forest producers.⁴⁵ Volume and quality standards are low, as are barriers to entry. For many poor forest-based people, who lack knowledge, skills,

inputs, capital, and connections, local NTFP markets will continue to be important, and a good place to build local entrepreneurial capacity.⁴⁶ Considerable investment in market development (e.g., storage facilities, grading standards, consumer advertising) and improvements in production as well as process and marketing efficiency will often be needed to develop large-scale markets offering good income to suppliers. Large markets will accelerate domestication of NTFPs, and special efforts are needed to ensure that small-scale producers benefit. Promoting low-value, NTFPs with slow-growing demand may still be worthwhile in areas of endemic poverty to enhance subsistence security, as there is considerable “self-targeting” of the poor in such markets.

Cavendish (1999) concludes that the most promising avenues of growth for commercial NTFPs that will also contribute to forest conservation are those that have: a market among high-income consumers to surmount the low income-elasticities of rural households for these products; prices high enough to overcome the transactions costs of collection and trading, but which are not high enough to trigger investment in technical substitutes where these could feasibly be developed; reasonable durability as a product, so that storage is not a binding constraint; a fairly low production-risk profile; harvesting that is non-destructive to the resource stock; returns per hectare that make it economically rational to conserve forests and woodlands, but which are not high enough to trigger resource privatization; and a species ecology that rules out domestication of the resource.

PAYMENTS FOR ECOSYSTEM SERVICES

Environmental managers concerned with watershed protection, biodiversity protection, and flood control increasingly recognize that lands officially designated as “protection forest” or “protected areas” are, in fact, often populated and actively used for farming. Ignoring this reality, hundreds of millions of dollars have been spent world-wide on public reforestation investments where few trees survive the agricultural burning, clearing of crop fields, and livestock grazing associated with local livelihoods. It has become clear that forest conservation, in the face of competing land uses, will require that local people obtain some direct or indirect financial benefit from forest resources. Advances in ecology and agroecology have demonstrated a wide range of productive land uses that are compatible with protecting ecosystem services within a well-designed landscape. With democratization, policies are shifting away from de-legalization, forced resettlement, and punitive policing to expel farmers or sharply restrict their economic use of environmentally important lands, to strategies that support farmers to adopt these more sustainable practices and to participate actively in landscape planning and monitoring efforts (Scherr et al. 2001).

Various categories of financial instruments are being promoted as incentives for landholders to protect or enhance ecosystem services from forests, such as carbon storage, watershed protection, and biodiversity conservations (Landell-Mills and Porras 2002). In hundreds of cases, municipal governments, watershed agencies, conservation organizations, and private companies have been willing to pay forest owners to maintain important local and regional environmental services, especially water quality, biodiversity, and landscape amenity (Johnson, White and Perrot-Maître 2001; Perrot-Maître and Davis 2001; Tognetti 2001). True markets for ecosystem services are beginning to develop with multiple buyers and sellers negotiating to provide services within a government “cap” or “floor” establishing regional standards (e.g., Brand 2002; Chomitz 2000). Few schemes have been operating long enough to assess their efficacy.

The extent to which forest communities or small-scale farmers will benefit from these instruments depends upon a number of factors: their control of valued resources, the strength of their property rights relative to the beneficiaries of ecosystem services, lack of economies of scale, mechanisms to reduce transaction costs, and capacity to market their services (Scherr 2002). Payments will mainly be available for communities with forest services of high value to urban or other higher-income resource users, or those with globally or nationally significant biodiversity resources. In the short- to medium-term, ecosystem service markets probably have potential to improve the livelihoods for tens or hundreds of thousands of locally based forest producers (Table 4g). Outside of protected areas, they are most usefully considered as supplemental payments to encourage improved management of resources with other commercial uses.

As international or even national agreements are put in place for carbon emission offset trading through forestry or land use change, there is a potential for millions of local producers in some of the poorest forested and deforested regions to benefit economically. This assumes that implementation guidelines are designed with local forest producers in mind and that new mechanisms to reduce transaction and monitoring costs are developed (Smith and Scherr 2002). Significant livelihood benefits have been reported from a few pilot forest carbon projects (an example from Mexico is described in Box 16), but in others they have been disappointing (Asquith, Vargas Rios and Smith 2002).

Nature-based tourism has expanded rapidly over the past decades, in some cases creating financial incentives for landscape or biodiversity conservation. Most of the benefits of forest-based tourism accrue to tourism companies. However, there is evidence that even small absolute cash transfers per tourist from nature-based tourism can benefit local people significantly (Honey 1999). Examples include the CAMP-FIRE project in Zimbabwe, the Annapurna Conservation Area Project in Nepal,

international ecotourism operations in Ecuador, and nationally-dominated tourism to forest areas in Brazil (Sunderlin, Angelsen, and Wunder 2003).

Opportunities for poverty reduction through nature tourism will be limited to areas of particular scenic beauty or biodiversity value. Relative to other types of tourism, nature tourism offers several advantages for the poor: it takes place in less developed regions, often involves smaller operators with more local commitment, has a higher proportion of independent travelers, and if marketed as “ecotourism” may stimulate consumer pressure to generate socioeconomic benefits (Ashley, Boyd, and Goodwin 2000).

SUMMARY OF MARKET OPPORTUNITIES

The main market opportunities for low-income producers are summarized below, by type of demand, geographic features, the type of forest resource and national market conditions. As they rely on rudimentary data about local forest producers, their market participation, costs and income, these assessments are quite preliminary. They identify considerations for targeting interventions to realize market opportunities, and suggest directions and hypotheses for future market research.⁴⁷

Market Opportunities by Type of Demand

Forest products and services fall into four broad categories with very different long-term economic potentials:

- products in demand mainly in local markets with limited prospects for long-term growth;
- commodities (relatively undifferentiated products) sold in stagnant markets that are likely to shrink as consumers’ incomes grow;
- commodities with large and growing national or international demand; and
- products or services in high-value niche markets that could offer high income-earning potential for a limited number of producers.

Each category presents a distinct type of challenge for successful market participation by low-income producers.

Locally marketed, lower-value products: Local demand for fuelwood, construction wood, rough furniture, and industrial raw materials is income-elastic, but geographically limited, thus sales are characterized by small volume. Prices are typically low—lower than comparable products in national markets. Products are less differentiated and are adapted to local preferences. New demand may be quickly saturated by an over-responsive local supply, as there are low barriers to entry, and mar-

kets are poorly integrated with national markets.⁴⁸ Most producers supply markets from the surpluses available over subsistence needs. Entering these markets can provide valuable opportunities for local producers to develop commercial business skills and expand their scale of operation. These will remain very important to the safety net of the poor, but long-term income growth will depend upon successful transition to national growth commodity or high-value specialty markets.

Stagnant market commodities: Demand is characterized by large volume, but products have low income-elasticity or are inferior goods. Consumers are mainly the poor, and markets are often poorly integrated. Examples include utility baskets and mats, rough-finished furniture, and roofing thatch. Prices are low and quite competitive because of low-cost market entry, low incomes, and low-cost substitutes. Profits and business risks are generally low. Product marketing costs are quite low, as there is almost no product differentiation. These commodities do not offer long-term opportunities for producer income growth, although they may play an important role in livelihood security for low-income people.

Growth commodities: Demand for these products is characterized by large volume and rapid growth due to high income-elasticity, in the context of high growth in population and incomes. Buyers are primarily working and middle class consumers, industry, and government (for infrastructure construction). Markets are well established and becoming more integrated. Examples include: construction-grade timber, inexpensive furniture, charcoal, medicinal plants, many forest fruits and spices. Planted trees (using selected species and improved provenances) can sometimes produce these commodities more cheaply than sustainably managed natural forests. Prices are low and competitive due to competition with low-cost sources of supply and low-cost substitutes. Product marketing costs—as distinct from transport, storage or other costs in the value chain—are relatively low as there is little product differentiation. Profits and market risks are modest. Local producers cannot generally compete in export markets. But large regional or national markets offer the greatest potential—by far—for local forest enterprises so long as they do not face major competition from unsustainable logging (e.g., land-clearing), industrial plantations, or low-cost imports (**Box 8**). Thus, the greatest opportunities seem likely to be in forest-scarce countries with large populations, especially around urban areas distant from major ports.⁴⁹ The major challenge in promoting supplies from local producers is to establish new supply networks that link them to markets and to increase their production efficiency.

BOX 8. Impact of International Market Integration on Community Enterprises in Michoacán, Mexico

Michoacán state is one of the six forest-rich states in Mexico. There are a large number of community forest enterprises (CFEs) in the Meseta Purepeche, a region where indigenous communities and ejidos have between 5,000 and 20,000 hectares of land in their territories. These enterprises were significantly impacted by Mexican trade liberalization. Beginning in 1986 and accelerating in the early 1990s, Mexico reduced protected tariffs on imported timber and cheap wood products from high-efficiency automatic mills in the U.S. and Canada began to flood the Mexican market. Prices declined by 35 to 40 percent. CFEs with different patterns of market integration responded differently:

San Juan Nuevo de Parangaricutiro has a highly integrated CFE with sawmills, custom resin refining, a furniture industry, and eco-tourism. With 10,000 hectares of forest, it had an authorized timber cut of over 100,000 cubic meters in 1994. The CFE generated 800 jobs paying above Mexican minimum wage and produced US\$5 million in annual sales. There was virtually no clandestine or illegal logging. In 1990, profits represented 17 percent of sales. After market liberalization, Nuevo San Juan was forced to cut its work force by a quarter, temporarily cut pay, accelerate work rhythms and embark on an aggressive plant modernization. The community had never cut more than 80,000 cubic meters of pine in any one year, but in 1994-95 pushed its cut to the allowed maximum of 104,000 cubic meters. Profits declined to only 5 percent of sales in 1994 to nearly zero in 1995, and then recovered somewhat with the peso devaluation of 1994, when imports doubled in price.

Cherán is a community with 11,000 hectares of forest that logs a tenth of the annual volume of San Juan Nuevo with 40 permanent sawmill employees plus resin-tapping families. A comparable level of timber was illegally logged for family enterprises in the same community due to the limited organizational capacity, generating about 100 additional jobs. When prices for lumber and resin dropped, many residents switched from resin tapping to small-scale illegal logging. The price squeeze has reduced, at least temporarily, community investment in long-term sustainable forest management. However, because many people make inexpensive artisanal furniture that sells in the region—items no foreign producer makes—they were less directly affected.

Angahuan has 4000 hectares of forest that produces packing crates for the regional avocado export trade and low-quality furniture for the local market. There are only 4 permanent employees and 350 families engaged in illegal informal logging and processing enterprises within the community, most earning below minimum wage and increasingly dependent on raw materials from outside their own community because of local forest exploitation and degradation. Here liberalization had little impact, as the rough pine fruit crates they produced (largely from illegal sources) would not be cost-effective to import into Mexico.

Source: Jaffee (1997).

High-value niche products and services: Demand is characterized by low volume of highly differentiated products. The principal buyers are upper-middle and upper-class consumers who are less price-sensitive. Most are located in developed countries and in cities of middle-income developing countries. Markets rely heavily on branding, market differentiation, direct linkages with buyers, and often export trade, so product marketing costs are high. Natural forests can produce the widest variety of products for this market, but once new markets are established, some species can be

domesticated for lower-cost production on farms or industrial plantations (although brands from the natural forest may be preferred). Profits are potentially high but often limited to early entrants in these markets, and risks are high as well. While many products are “launched,” only a few become highly successful. At this time, most payments for ecosystem services fall into this category, as only well-off municipalities, companies, and conservation organizations have sufficient capacity to pay, and payments are for quite specialized services.⁵⁰ There are countless opportunities for small numbers of local producers to produce for these markets. But they face major challenges in product design, promotion and marketing, and in the improvement of product quality.

Market Opportunities by Type of Forest Resource

The scope and level of market benefits for low-income producers will differ for those managing their own natural forests, those using public forests, and those growing trees in smallholder plantation or agroforestry systems.

Managing their own natural forests: The greatest scale and impact of commercial markets for natural forest owners is likely to be with high-value timber, especially if producers can contract favorably with buyers or concessionaires, or add value through processing. NTFPs could be a major income earner, especially if supply contracts can be negotiated. Ecosystem service markets may offer promising opportunities in sites of high-value biodiversity and where economically significant degradation is occurring. The greatest potential for communities with lower-value natural forests is likely to be in regions where forest resources are scarce and producers are located near to inland markets and especially where they can establish contracts with specified buyers. Elsewhere, NTFPs will offer greater promise. Producers in strategically located areas may benefit from watershed service payments.

Using public forests: Community producers who can gain reliable access to public forests in forest-scarce regions can benefit from co-managed timber. Production of NTFPs with already-established and growing demand may be highly profitable.

Growing trees in smallholder agroforestry and small-scale plantations: Farm-grown trees and small-scale plantations offer the widest range of economic opportunities. Major benefits may come for smallholders who can become outgrowers for high-value timber production, or who grow high-value trees in low densities in agroforestry systems. Farmers located in forest-scarce regions near pulp mills, with environments conducive to fast tree growth, may benefit from outgrower arrangements for pulpwood. Farmers located near inland urban markets may be able to compete in commodity wood markets and for domesticated NTFPs with large national or international markets and no major economies of scale in production. Ecosystem

service markets could be of interest in areas where there is economically important degradation, or opportunities for carbon sequestration. However, policymakers, project developers and producers must find ways to reduce transaction costs.

National Market Conditions

Table 6 describes how forest market opportunities for low-income producers may be shaped by national income, the presence of a large middle-class, and the scarcity of natural forest resources. Income levels and the size of the middle class will affect the types of forest products demanded, the general level of market development and business expertise (and hence capacity to manage more complex commercial enterprises and export trade), and the availability of investment capital. The extent of the natural forest resource will affect pressures for certification, the supply of high-value timber, the potential competitiveness of farm-grown wood, and demand for ecosystem rehabilitation.

This very preliminary assessment suggests that industrial and export market potentials in forest-scarce countries with predominantly slow-growing forests and tree resources are fairly limited. But there may be high demand for subsistence use and for local or national markets, especially in countries with scarce foreign exchange for imports. Forest-abundant countries and forest-scarce countries with a large domestic middle-class market have much greater market potential for diverse market niches.

All of these projections depend on the important caveat that essential policy reforms are in place to level the playing field for low-income producers. There is an urgent need for data based on rigorous dynamic market analyses. Especially important are data on demand and market conditions for housing, household goods and services which are likely to grow most dramatically with income growth in poor countries. Large-scale forest market development will call for significant institutional-building, including investment in public education. Major gains from forest market participation are most likely to be realized by regions and communities that are better endowed with public services (Arnold 2001). In regions of weak governance, insecurity will largely eliminate potentials for sustainably grown wood and ecosystem services, and exploitation of wood and NTFPs is likely to continue on a non-sustainable basis. Investment in transportation and communication infrastructure is also a critical factor. Remote areas with poor transport will have limited commercial potentials other than for non-perishable NTFPs.

Table 6. Scale of Commercial Forestry Potentials for Low-Income Producers, by Country Characteristics (assuming forest land and market policy reforms)

National income per capita ⁱ	Middle-income	Middle-income	Low-income but large middle class	Low-income but large middle class	Low-income	Low-income
% Forest Cover ⁱⁱ	Forest-abundant (>20%)	Forest-scarce (< 20%)	Forest-abundant (> 20%)	Forest-scarce (< 20 %)	Forest-abundant (> 20%)	Forest scarce (<20%)
Country examples	Brazil Malaysia	Chile Costa Rica Mexico South Africa	Indonesia	China India Pakistan	Bolivia Honduras Vietnam	El Salvador Haiti Mali Nepal
Commodity timber						
- domestic	**	***	***	**	**	*
- export	*	0	*	0	0	0
High-value timber						
- domestic	**	*	**	*	*	0
- export	***	0	***	0	**	0
Industrial pulpwood						
- domestic	*	*	*	*	0	0
- export	0	0	0	0	0	0
Certified wood						
- domestic	*	*	*	*	0	0
- export	**	**	**	0	*	0
NTFPs						
- domestic	***	**	***	**	***	*
- export	**	**	***	**	*	0
Processed products						
- domestic	***	***	***	***	**	*
- export	**	**	**	**	*	*
Ecosystem services						
- domestic	**	***	*	*	*	**
- global	**	*	**	*	**	0

ⁱ Data from World Bank (2002); ⁱⁱ Data from FAO (2000).

- 0 Little or no market potential for low-income producers
- * Limited market potential
- ** Moderate market potential
- *** Considerable market potential

NOTES

- 26 A good example of this is the effect of liberalization on local logging and forest processing in Quintana Roo, Mexico (J.E.M. Arnold, pers. comm. 2001).
- 27 Among large-scale wood producers, only in Indonesia, Malaysia, and Myanmar does domestic consumption account for less than 70 percent of national production (Figure 5). Exploitation of the Amazon is largely for domestic timber consumption; the cities of South and Southeast Brazil, for example, consume more wood than twice the total imports of the European Union (Smeraldi and Verissimo 1999).
- 28 Field analysis of 56 agroforestry systems in 8 countries of Central America and the Caribbean found that the payback period for most systems other than woodlots was 1-6 years. The ratio of benefits to costs was over one in most cases, and over two in eight cases. The most profitable systems for farmers were taungya, various types of intercropping, and home-gardens (Current, Lutz, and Scherr 1995).

- 29 A study in Brazil by Imaflora found that the most serious constraint to small-scale producers was the lack of contractors (“incorporadores”) (www.imaflora.org).
- 30 Where high-value commercial timber is found in public forests the bulk of revenues is likely to accrue to other actors.
- 31 Many other forest communities have been brought into the decision-making process as stakeholders in the certification of public and private forests.
- 32 For example, a study by the First Nations Development Institute found that many Native communities encounter major obstacles in pursuing independent forest certification, including a lack of financing, an absence of forest planning, and complexities in the decision-making process. They found, however, that the intangible benefits of certification could satisfy diverse community goals (Jansens and Harrington 2002).
- 33 The transition in Indonesia is an important case. During the 1980s Indonesia moved from exporting almost solely tropical timber to becoming one of the world’s largest exporter of plywood, and then in the 1990s wooden components, furniture and pulp and paper became the primary forest product exports.
- 34 For example, an assessment of value-added opportunities for aboriginal forest producers in North America identified: joinery stock, door and window frames, cabinets, flooring, housing components for specialty markets, edge-glued panels for shelving and furniture, finger-jointed products; moldings, garden furniture; canoe paddles, chopsticks, and log homes.
- 35 Diverse types of small-scale mills are now available, including chainsaw mills, horizontal band saws, single and double circular saws, and one-person bench sawmills. These have different features of portability, cost, labor intensity, conversion percentage, log size capacity, accuracy of sizing, and potential volume (FFAQI 2000).
- 36 The worldwide shift from chemical to mechanical pulping has cut the wood required for a ton of pulp by half (Imhoff 1999). Consumers now recycle a global average of 40 percent of their paper. Some 30 percent of global wood fiber for paper now comes from manufacturing residues.
- 37 OSB allows millers to glue wood flakes in perpendicular layers. Particleboard panels are made by bonding together small flakes of wood fiber (often sawdust or plywood shavings) with an adhesive under heat. MDF panels are produced by reducing individual wood fibers, then forming them into boards with pressure, heat, and urea formaldehyde.
- 38 Two dozen examples were documented in a review of community-industry forestry partnerships (Mayers and Vermeulen 2002).
- 39 Major NTFPs include: food products (Brazil nuts, pine nuts, jujube fruits, walnut, chestnut, ginkgo, mushrooms, bamboo shoots, sago, oil seeds, and birds’ nests); spices and condiments (such as nutmeg, mace, cinnamon, cassia, cardamom, galanga); plant gums for food uses (gum arabic, gum tragacanth, gum karaya, carob gum); industrial grade gums (gum talha, gum combretum); natural pigments (e.g., annatto); pine oleoresins; fibres (rattan, bamboos, cork); insect products (lac, natural honey, beeswax, silk, cochineal, insect galls); essential oils (e.g., sandal oil, eucalyptus oil); medicinal plants; and others (bidi leaves, cola nut, chewing sticks, lacquer) (Iqbal 1993).
- 40 For example, the matsutake mushroom market in Northwest Yunnan Province in China has major positive income and development impacts but experienced enormous fluctuation in the wake of the Asian financial crisis (Changin Sun pers. comm. 2000).
- 41 Very useful comparative analyses of the economic benefits and potentials for low-income producers of different types of NTFP markets include: Belcher (1998), Belcher and Ruiz Perez (2003), Dewees and Scherr (1996); Homma (1996); Wilkie and Godoy (1996); Ruiz Perez and Byron (1999); and Neumann and Hirsch (2000).
- 42 Examples include: cacao, coffee, and semi-domesticate tropical fruits like durian, guava, lychee, mangosteen and rambutan. Most tropical fruits exported internationally—mainly mangos, avocados, and papayas—are supplied by large-scale producers (Poulton and Poole 2001). Some NTFPs used as industrial raw materials (for example, the seed of the *Jatropha* tree) have market characteristics similar to pulpwood.
- 43 Examples include: Brazil nuts, jungle rubber, rattan, gum arabic, cork, pine resin, bamboo, bush meat, live animals for export, ivory, acai, and heart of palm.

- 44 In Latin America, indigenous communities have begun efforts to develop a “cartel” to strengthen their control over intellectual property rights in regard to indigenous plants and to strengthen community position in bioprospecting deals (Vogel 2001).
- 45 National and regional markets have developed in Africa for indigenous tree fruits such as *Dacryodes edulis*, *Irvingia gabonensis*, *Cola acuminata* and *Ricinodendron heudeloti* in Cameroon. Urbanization in Asia has spurred high growth in traditional local fruits such as durian, longan, lychee, pitahaya, pomelo, rambutan, carambola, coconut, custard apple, and jackfruit (Poulton and Poole 2001).
- 46 An assessment of market opportunities for aboriginal forest producers in North America highlighted major opportunities for decorative floral products, mushrooms and berries, medicinals and seed (Brubacher and Associates 1999).
- 47 Much more basic market research is needed, such as that undertaken by Ruiz Perez et al. (2000) in the humid zone of Cameroon that distinguishes national, provincial, local, and frontier markets; urban-rural trading relationships; product diversification and specialization; market size; product storage; distance of consumers from the source of products; and transport systems.
- 48 For example, a Costa Rica market for 3-5 year old thinnings from agroforestry plots was quickly saturated, leaving farmers with no outlet for their wood products (Current 1995). In La Máquina, Guatemala, a local market for roundwood for construction was saturated when local producers began to expand sales, but a growing fuel market for drying tobacco picked up the slack (Samoyoa 1995).
- 49 The first wave of farm forestry in India inspired high farmer participation, but led to market saturation and much lower prices than anticipated. During the second wave of farm forestry, market dynamics were widely recognized and incomes have been more reliable (Saigal, Arora, and Rizvi 2002).
- 50 Costa Rica’s program of payments for forest ecosystem services, and the U.S. Conservation Reserve Program payments for agricultural land conversion may be exceptions, as governments were paying a large number of producers for a fairly undifferentiated service.

PART III. MAKING FOREST MARKETS WORK FOR LOW-INCOME PRODUCERS

6. DEVELOPING LOCAL FOREST ENTERPRISES

Forest markets are evolving rapidly. The question faced by those concerned with conservation and development is: Will they evolve in ways that encourage broad participation by low-income producers or in ways that further exclude them? Strong commercial forest enterprises owned by forest communities, public forest user groups, or small-scale farmers in developing countries are still relatively few. In remote forest areas, markets in general are underdeveloped, and even in more-developed regions, monopoly buyers and sellers are well established and discourage the emergence of small-scale enterprises. To become more profitable and more stable sources of income and employment, local enterprises will need to improve their market position, strengthen producer organizations, forge strategic business agreements, and pursue new sources of financing. For many local forest businesses, success will also require building new market institutions tailored to the needs of low-income producers—what Ensminger (1996) calls “making a market.” To contribute to this agenda, governments, environmental groups, and industry leaders will need to adapt certification to meet the needs of small-scale and indigenous forestry, encourage business service providers with relevant skills, invest in community forest enterprise development, and develop targeted research, education and training services.

IMPROVE MARKET POSITION

The majority of small-scale forest owners earn income from their resources by selling stumpage or collecting NTFPs for sale as raw material, with minimal post-harvest activity. But raw material in the forest usually accounts for a small fraction of final domestic or export retail price, as illustrated by the commodity “value chain”⁵¹ developed for tropical timber from Papua New Guinea (Figure 6 on page 80). To take advantage of market opportunities and raise incomes significantly, business plans of local producers must target the right markets and the right place in the value chain to benefit from their special business advantages and offset their limitations (Box 9). Several strategies can be used to increase economic returns:⁵²

- **Vertical integration.** Enterprises can integrate vertically by adding activities such as seed or seedling production, logging operations, intermediation, transport, pre-processing, processing, fabrication, wastage, packaging, or financing.
- **Improved quality and efficiency.** Production, processing or marketing activities can be made more efficient and higher-value by reducing raw material cost (improving productivity or product quality), adapting the product to meet particular consumer preferences, or increasing the reliability of supply. This will often

involve improved production and marketing technology (Table 7 on page 77), development of quality standards and of ways to reduce unit costs (for example, through reduced transport and transaction costs), and bulk purchase of inputs.

- **Horizontal integration.** Enterprises may use horizontal integration (or cooperation) with similar small-scale businesses to enhance returns through economies of scale in production, processing, or marketing.⁵³
- **Targeted marketing.** Producers must “market” their product, not just “sell.” This means identifying potentially interested buyers and adapting the product to meet their needs. Marketing for export or high-end urban domestic markets will usually require a market-savvy partner.

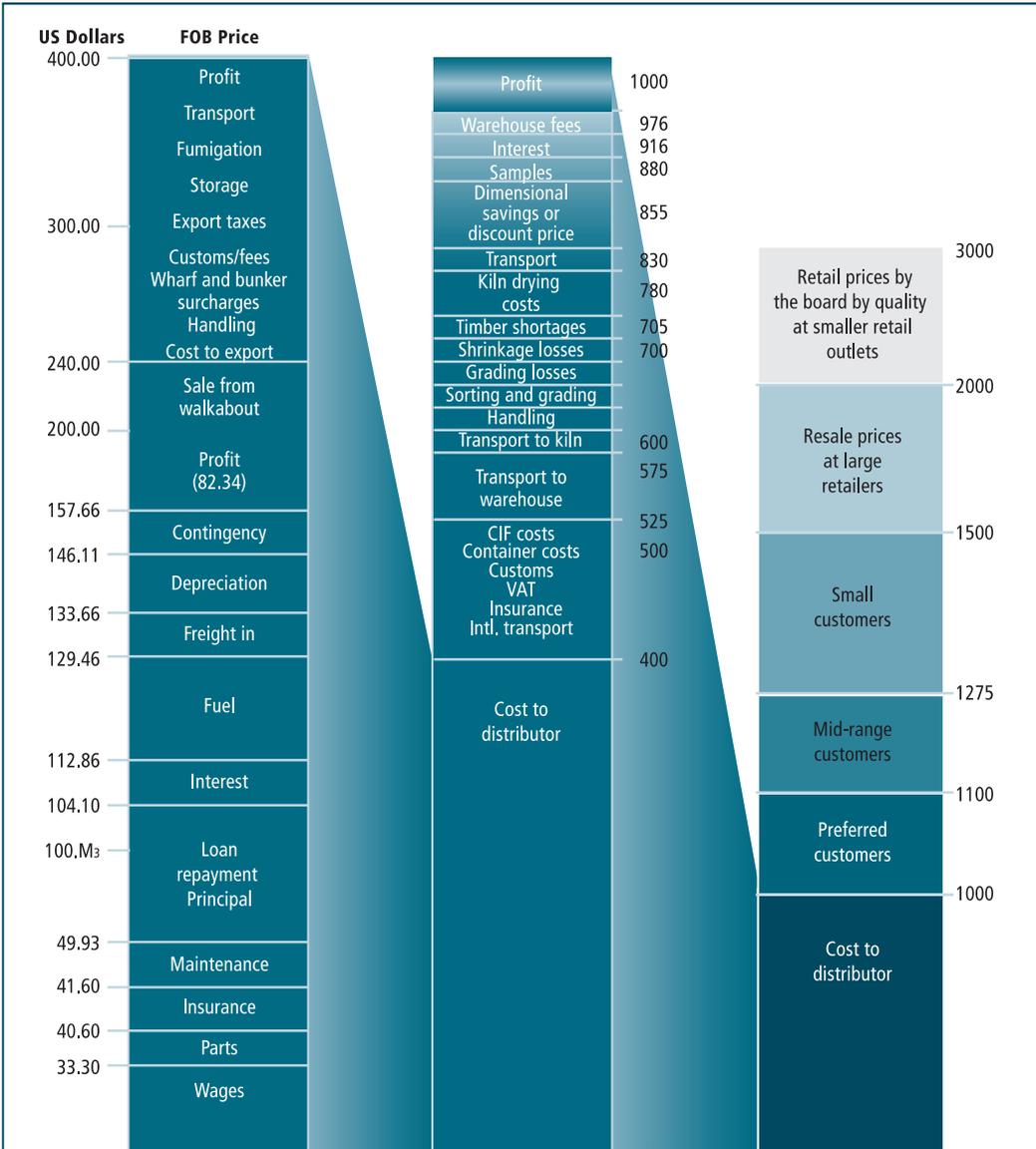
BOX 9. Improving the Market Position of Forest Cooperatives in Honduras

Central Honduras is a mountainous region with extensive pine forests and high levels of poverty. Rural population density is only moderately high (25 per km² in 1988) but rising rapidly (2.3 percent per year). Historically, most commercial logging rights in the region were granted to large companies. Forests were highly degraded by the 1970s and by the late 1970s, large-scale industrial logging had been banned in most forests partly as a result of complaints from local communities. Local cooperatives developed in the 1970s and 1980s for resin tapping, but poor resin-tapping practices damaged the timber value of the trees and resin prices were declining. A project, MAFOR, began in 1992 to support the development of forest enterprises in 30 communities with limited cropland but extensive municipally-owned forest resources. In an area of 585,000 hectares, 153,000 were pine forest. The total population in communities served by the project was 65,000, 11,500 of whom were already organized in communal groups, mainly for resin-tapping. Activities were based on participatory development of easily understood forest management plans which were implemented by local people and municipalities. Agreements were negotiated establishing local rights for the communities to use and retain income from the entire forest resource. Low-interest credit was provided to install small forest enterprises by creating a rotating fund and a fund for direct support in acquiring forest equipment.

The first phase of the project focused on building organizational and business capacity, developing leadership, and establishing sawmill micro-enterprises. By 1995, 13 micro-enterprises were functioning as well as a rotating fund for financing forest activities. Management plans were formulated for four demonstration areas and 25 individual management plans. A local forest industrial enterprise had 231 community members. An institution for secondary forest education and a center for local forestry training were established to support the business initiatives. In 1996, 24 new micro-sawmills were established, generating significant income and employment and propelling the creation of two savings and credit cooperatives. By 1999, 900 families were benefiting from these enterprises which generated US\$1.1 million in income. 75 percent of this amount went to the groups through direct sales. The national forest agency, COHDEFOR, and the local municipalities received the remainder in tax revenues. Monthly income per person from forestry activities, including resin-tapping, fuelwood, and hired labor in forest management, grew from US\$50 in 1993 to US\$300 in 2001. Meanwhile, the price of sawn wood, sold to the capital city of Tegucigalpa, rose from US\$15 to US\$35 per cubic meter at the sawmill door. Cash income earned from forestry activities was used to purchase fertilizer and inputs for the limited area of cropland, which greatly increased food crop yields and community food security.

Sources: Lazo (2001); Scherr (2000).

Figure 6. Market Value Chain for Tropical Timber from Papua New Guinea



Source: Clay, Butler, and Alcorn (2000).
 Note: FOB - free on board
 CIF - cargo, insurance and freight
 VAT - value added tax

Table 7. Technological Options to Improve Market Viability of Small-Scale Forest Producers

A. Increases in productivity

1. Faster production to increase sales volume
2. Savings in labor time
 - a. Cost savings
 - b. Freeing up unpaid household labor for other purposes
 - c. Shifting of labor to higher-valued uses of time
3. Substitution of lower-cost materials
4. Increased process efficiency to extract more product from a given amount of raw material or allow use of lower-cost raw materials
5. Reduced fuel costs
6. Lower working capital requirements to reduce interest costs and debt burden
7. Lower fixed capital requirements
8. Increased output to open up bulk markets
9. Lower product prices for consumers

B. Improvements in product quality

1. Improved product consistency and reliability
2. Higher sales prices for producers due to better grade goods
3. Allow a switch to higher-valued products
4. Better packaging for bulk markets
5. Generation of marketable by-products
6. Greater durability of products for consumers

C. Increases in local self-sufficiency

1. Use of locally available materials
2. Increased marketing independence
 - a. Greater farm-level processing of perishable products to reduce the need for immediate sale at peak harvest periods when prices are low
 - b. Better organization of marketing channels to expand information and reduce transaction costs
3. Greater capacity for local repair and maintenance of equipment
4. Decentralization of power or fuel supplies for greater reliability
5. Better availability of products for consumers

D. Development of local skills

1. Increased capacity for further innovation
2. Enhanced ability to enter new product lines or markets
3. Creation of new possibilities for local manufacturing

Source: Hyman (1996).

Good market research⁵⁴ and cost, risk, and feasibility analysis⁵⁵ are needed to identify a portfolio of products and strategies that make sense for a particular group of producers.⁵⁶ Low-income producers must be careful not to convert to production systems that are too complex, investment-intensive, or costly. Business planning for sustainable forest management by local producers needs to take into account ecological, socioeconomic, and enterprise criteria (De Jong and Utama 1998). Analyses need to be realistic, and include calculation of informal fines and transaction costs. Business plans should use conservative estimates of risks and returns, including risks of product appropriation by outsiders or the state as well as natural and market risks. Producing for the market exposes local producers to competition and price variability transmitted from the rest of the national and international economy. Because even domestic markets can be so volatile, producers need to be ready for constant marketing effort and adjustments.

Clay (1996) assessed market development for NTFPs by local producers and found that improvements in production and processing efficiency could lead to significant economic gains. Improving harvest methods, better price information, capturing green premiums in developed-country markets, and negotiating income-sharing agreements with manufacturers could increase income by 10 percent or more. Volume shipping could reduce costs by 10 percent or more; improved backhauling and purchasing consumer goods in bulk by up to 50 percent; and processing products to reduce water and waste by up to 70 percent. Improved local warehouses and storage, and improved transport to processing plants could reduce product losses by 25 percent or more. Marketing interventions made an even larger difference to financial returns. By holding the product to sell in the off-season, producer gross incomes rose by up to 200 percent; by adding value locally through processing, gross income increased by up to 500 percent.

STRENGTHEN PRODUCER ORGANIZATIONS

Many of the actions necessary to improve market position will require strong local producer organizations, whether they are community forest owners, public forest user groups, or organizations of small-scale farmers. Indeed, the weakness of local organizations is often the greatest constraint to commercial development.⁵⁷

Roles for Producer Organizations in Commercial Production

Commercial development may call for producers to make joint investments, undertake processing activities, organize marketing deals, or establish standard product quality or conservation controls. Groups may need to contract with intermediaries

to bundle outputs from their members in order to assure regular minimum supplies to a buyer. For example, the South African Wattle Growers Union (Phezukomkhono), first organized in 1993, contracts for its 600 small-scale producer members to supply international pulp and paper companies as outgrowers (Mayers and Vermeulen 2002). In forest co-management systems, local forest user groups must be organized to negotiate effectively with public forest agencies.

Members of jointly owned forest enterprises need to develop effective internal management systems. Communal forest owners must allocate the time necessary for internal dialogue to reconcile commercial activities with other subsistence and cultural priorities and must be able to reconcile potential conflicts between forest regulation and commercial management. There must be effective decision-making mechanisms for managing and using village funds generated through cooperative commercial forestry activities. Responsibility and authority for forest and enterprise management must be delegated to groups or individuals who are independent enough to respond nimbly to changes in forest or market conditions. To plan large enterprise investments, communities or groups must be already well organized and experienced in commercial activities. In this regard, long-established organized indigenous communities may be in a relatively strong position.

In regions with underdeveloped markets, groups of producers may have to work together to overcome value chain “gaps.” Cooperation can be essential to set up reliable transport services, recruit regional traders, establish log sorting yards, agree upon product quality standards, build special storage facilities to reduce waste or quality loss of NTFPs, lobby for policy change, provide market information, or organize major marketing efforts for regional products.⁵⁸ Tree farmer groups and forest communities are slowly beginning to federate for these purposes in many parts of the world (Scherr et al. 2001).

Building Successful Producer Organizations

Management of collectively owned resources is challenging, even for forests used mainly for subsistence purposes. Key “design principles” have been identified that contribute to success (Box 10). Commercial production in collectively-owned resource systems or enterprises generally requires a modification in rules to deal with allocation of commercial harvest rights, allocation of financial returns, and investment and marketing decisions. Key variables found to determine success include strong community rights, clear division of responsibilities, adequate financial returns, and useful relationships among local stakeholders (Dubois 1998).

BOX 10. Design Principles for Effective Management of Common Property Forests

Research on common property resource regimes, including community-owned forests, has identified key factors that increase the likelihood of success of local management organizations and institutions:

- 1) Individuals or households have the rights to use resources and the boundaries of the resource itself are clearly defined.
- 2) The distribution of benefits from appropriate rules is roughly proportionate to the costs imposed by the rules.
- 3) Appropriation (use) rules restricting time, place, technology, and/or quantity of resources are related to local conditions.
- 4) User groups are strongly linked to the resource through residence in the location of the resources, overlapping location of resources, and user residence; high importance to livelihoods; and greater knowledge of sustainable use.
- 5) Most individuals who are affected by the operational rules can participate in modifying these rules.
- 6) The monitors who actively audit resource conditions and user behavior are accountable to the users and may be users themselves.
- 7) Users who violate operational rules are likely to receive graduated sanctions (depending on the seriousness and context of the offence) from other users, from officials accountable to these users, or from both.
- 8) Users and their officials have rapid access to low-cost local arenas to resolve conflict among users, or between users and other stakeholders.
- 9) The rights of users to devise their own institutions are not challenged by external governmental authorities.
- 10) For community forest resources that are part of larger systems: appropriation, provision, monitoring, conflict resolution, and governance activities are organized in multiple layers of nested enterprises.

Source: Ostrom (1999).

Communities in Mexico have found that sustained success is often dependent upon careful, but not complete, separation between the management of the business and the governance of the community (Molnar 2002). In North America, for example, commercial operations have been most successful where they operate within a strong governance framework, as in the case of the Menominee Tribe in the United States (Cornell 2001). An observation made about Papua New Guinea indigenous forest communities is widely relevant: “Landowners who enter into development agreements with unsolved land and resource disputes have little chance of maintaining group solidarity in the face of conflicts with resource developers” (Filer and Sekhran 1998). Many local enterprise organizations will not be capable of avoiding pitfalls, failures, and corruption, and these risks must be clearly evaluated when external support, partnerships, or subsidies are being considered. For example, prob-

lems of social stratification and internal inequity among members plague many producer organizations and often become problematic with commercialization (N.C. Saxena, pers. comm. 2001).

Agroforestry and community forestry cooperatives organized for marketing and processing require cooperative discipline among members. Leadership must be credible and the marketing system both credible and efficient. Cooperatives need access to appropriate technical knowledge and pragmatic institutional support and must choose at least some activities that can provide demonstrable short-term success. Tools that have been used effectively in organizing include community meetings, land-use mapping, community education, and training in conflict management (FAO 1995).

Research on indigenous enterprises in the United States found that economic success hinged not on resource endowment, location or education, but rather on “sovereignty,” governance, culture, and strategic thinking (Box 11). A study of performance by community forest enterprises in Mexico also found a powerful role of

BOX 11. Sovereignty as the Key Factor in Economic Success in U.S. Indigenous Forestry Enterprises

The most comprehensive effort to examine the factors determining economic success in indigenous enterprises was the Harvard Project on American Indian Economic Development. Conclusions were drawn from statistical studies of large numbers of Indian nations and extended field-based research on smaller tribes that were begun in 1986, mainly in the United States but also with some First Nations in Canada and with Maori groups in New Zealand. This study found that many of the assumptions commonly held about which factors are important were wrong or incomplete. For example, the wealth of natural resource endowments, location of the enterprise, and education were not key determinants, although these are clearly helpful. Rather, “nation-building” is required to equip indigenous nations with the institutional foundations necessary to increase their capacity to assert self-governing powers on behalf of their own economic, social, and cultural objectives. The four key determinants were the following:

- 1) Self-rule (a necessary, although not sufficient, condition), because it puts the development agenda in indigenous hands and establishes a clear link between decisions and their consequences.
- 2) Governance with effective, non-politicized dispute-resolution mechanisms, because it provides a clear message of responsible economic management to investors and community members.
- 3) Formal institutions of governance which are congruent with indigenous cultural (not necessarily traditional) conceptions of how authority should be organized and exercised so that people trust and believe in them.
- 4) Strategic thinking by the community and its leaders about long-term development strategy, based on a systematic examination of priorities and concerns as well as assets and opportunities to avoid the pitfalls of simply reacting in response to the pressures of the moment or to funding decisions made far away by governments serving diverse interests and handicapped by lack of local knowledge.

Sources: Cornell (2001); www.udallcenter.arizona.edu; www.ksg.harvard.edu/hpaied

human social capital (Antinori and Rausser 2000). Organizational success in commercialization is often strongly associated with ethnic, religious, or political affiliation of members, situations where social capital is strong and members are not cooperating solely for commercial reasons.

Women are often especially dependent on NTFPs and non-farm income sources and play a central role in gathering and processing. Yet women are rarely provided equal opportunity for management and leadership training or to participate fully in community planning processes. To strengthen the role of women requires involving them in problem analysis, decision-making, and design activities from the start and explicitly discussing options to include them. Women can be employed as role models in key positions, and ancillary commercial activities can be run by women (van Helden and Schneemann 2000).

Capacity-Building and Networking

It is generally unwise for inexperienced producer groups to “jump” into complex commercial production and marketing enterprises. Such initiatives typically result in business failure or displacement of local people by other actors. Rather, it makes sense to phase market development over time so that producer capacity can develop the skills needed, both because of the need for producers to maintain a portfolio strategy, and also because of the commercial value of business and market “secrets.” It has typically been more effective to provide business support for local organizations in the form of enterprise support, rather than having a product focus (Fisher 2001). Extensive efforts around the world to build producer organizational and management capacity in forestry and other sectors have generated a number of promising strategies (Ford 1998). An especially successful project-based model has been the PROCYMAF in southern Mexico which links capacity-building with community forestry investment and empowers local people to contract with service providers of their own choosing (Box 12).

Producer networks of indigenous forest communities, local forest users of public forests, and non-indigenous forest owners are also forming. Some have been promoted by the government, but these often impose many rules to manage the community-state relationship. Other networks have functioned more as development institutions, supporting local producers to build assets, develop markets, increase food security, and encourage community empowerment.⁵⁹ These include a number of international networks initiated by international agencies or NGOs, such as the Forest, Trees and People Programme of FAO and the Rural Development Forestry Network of the Overseas Development Institute. Among the services such organizations provide to members are: market information, legal advice, technical advisory services, training courses, financial analysis, linkages to political supporters,

BOX 12. Strengthening Community Forest Producer Organizations in Mexico

In the early 1980s, indigenous communities in the poor mountainous southern states of Mexico—angered by watching their forests degraded by outside loggers—formed a regional organization and succeeded in stopping the government from renewing timber concessions. Many of these communities went on to establish their own community forest enterprises. In 1997, the Proyecto de Conservación y Manejo Sustentable de Recursos Forestales (PROCYMAF), co-financed by the government and the World Bank, began to operate in the pine-oak forests of the state of Oaxaca.

The project works on a demand basis assisting 256 communities to become more organized and build capacity. Communities that are not actively engaged in commercial forestry first develop land use plans and evaluate their land governance systems. Communities that are already engaged in forestry activities use project funds either to develop new management plans, establish new community-protected areas, or to explore new business or marketing options. Training courses regularly provide information about silviculture, management, and marketing of wood and non-wood forest products. The project has a separate component that involves private sector consulting services for communities.

Since the project's start, the area under forest management has expanded from 500,000 to 650,000 hectares and total wood production has increased from 400,000 to 660,000 cubic meters annually. Forests are also better managed: some 13,500 hectares of permanent old-growth reserves have been established, and some 90,000 hectares have already been certified by the Forest Stewardship Council. These communities currently have been selling their timber to a local door manufacturer at a premium of 15 percent.

This additional wood production generates at least an additional US\$10 million in value annually. About 1,300 new jobs in forest management and processing have resulted, and an additional 175 jobs have been generated in non-timber forest product activities including mushroom production and fresh water bottling. As a result, the state of Oaxaca is taking in an additional US\$1 million a year in tax revenue, and communities' social expenditures, apart from salaries and wages, have increased at least US\$1 million a year.

Sources: PROCYMAF (2000); DeWalt, Olivera, and Betancourt Correa (2000).

mobilization of investment funding through grants or credit lines, assistance with forest planning and certification (Colchester et al. 2003).^{60, 61} The more successful initiatives have put in place a process to maintain a shared vision, to find partners who share that vision, and to monitor the process to adjust to new goals as they evolve (Augusta Molnar, pers. comm. 2003).

There have been many good initiatives around capacity-building to support commercial forestry by local people. However, the present scale of activity is wholly inadequate relative to the needs of local forest enterprises and much less to the potential demand from such enterprises if policies were to encourage local commercial production more actively. While, in the short-term, the upfront costs of developing this local business capacity may be higher than simply having forest industry work with suppliers who are already “ready,” the long-term benefits could be far greater.

FORGE STRATEGIC BUSINESS AGREEMENTS

Strategic business agreements can benefit both private industry and small-scale local forest producers. The most common business models include industry outgrower schemes with local producers, company logging or NTFP harvest concessions in community forests, and joint business investments by local groups and private companies. All of these provide some of the benefits of vertical integration, while retaining more independence and flexibility for local producers. By partnering with large companies, communities may gain political advantage to influence public policy (Mayers and Bass 1999).

Of course, private companies will not always be interested in contracting or partnering with small-scale or low-income producers. International firms in particular may prefer to deal with large-scale private landowners in middle- or high-income countries or regions. Thus, these models are relevant mainly where agroecological considerations favor forest or tree production in indigenous or smallholder-dominated areas, or where such producers can offer significant cost savings or quality premiums.

Models of Company-Community Agreements

Diverse models exist for business agreements between communities and private business, often including NGO or government partners. A recent global review found that 57 countries had at least one forest community-company partnership (Mayers 1999). Promising models include: outgrower schemes, leasing harvest rights to private companies, and investment partnerships.

Outgrower schemes. A survey of 17 outgrower schemes found four types of arrangements:

- agreements in which growers are largely responsible for production, with company assurance/guarantee they will purchase the product;
- agreements in which the company is largely responsible for production, paying landholders market prices for their wood allocation;
- land lease agreements in which landholders have little involvement in plantation management; and
- land lease agreements with additional benefits for landholders.

Contracts ranged from 10 to 40 years. The size of schemes ranged from 60 to 60,000 hectares, with the average area planted by growers being 1 to 200 hectares, and the number of growers ranging from 25 to 2000 (with most planting less than 5 hectares) (Desmond and Race 2000).

Such arrangements benefit industrial firms by providing access to wood fiber and non-wood products at a competitive cost, access to productive land, resource security without the need to purchase land, greater flexibility in the use of their own

land, diversification of supply, local ecosystem expertise, increased cooperation with and support from local communities and social branding opportunities (Desmond and Race 2000). Industrial partners in turn can provide local producers with high-quality planting materials, technical assistance, quality control, investment resources, and marketing expertise (Box 13). In some cases, private firms have provided business services and technical assistance to interested suppliers, even without requiring sales contracts or providing credit.

BOX 13. South African Farmers Contract to Produce Industrial Pulpwood

In the 1980s, farmers in KwaZulu-Natal, South Africa, entered into outgrower schemes with the international pulp and paper companies Sappi and Mondi. The two firms now contract with more than 10,000 growers on nearly 18,000 hectares. The average plot sizes are small: 1.5 hectares for the Mondi project, and 2.7 hectares for the Sappi project. Farmers, more than half of whom are women, grow trees on their own land under purchasing agreements with the companies. The companies provide material goods such as seedlings, tools, and fertilizer; low- or no-interest loans; and assistance with establishing and maintaining small eucalyptus woodlots. In return, the companies expect to harvest from each plantation after a growing cycle of 6 years on the coast and 7 years inland. There is little competition with food crops for land or labor.

The schemes were started as corporate social responsibility exercises, but the partnership is good business for the companies. Because the land is held under communal tenure, it would otherwise be unavailable for purchase or lease agreements. While the costs of administering the schemes per ton of fiber appear to be higher than those incurred from commercial plantations, the additional land rental fees associated with commercial land probably offset such costs. Furthermore, the outgrower system generates the fiber supply needed to maximize economies of scale in the companies' pulp mills.

Because the farmers obtain cash income at harvest they see trees as a form of savings. Even highly vulnerable households are able to join the outgrower schemes if they have sufficient land. Outgrower schemes contribute 12 to 45 percent of the income needed for a household to remain above the "abject poverty line."

Source: Mayers and Vermeulen (2002).

Leasing harvest rights. Forest communities may lease timber or NTFP concessions to private logging companies, or lease forest resources from the government or private owners to supply raw materials for their forest enterprises. To ensure sustainable management of the resource and a competitive return, communities need to understand concession management in terms of marketing, bidding, pricing, contract management, and monitoring. In many cases, local people can provide better oversight of company compliance with contracts because they are present in the forest. Alternative strategies that can be adapted from those presently used for government-owned forests include: short-term timber sales sold by auction, bidding or tender; long-term timber sales; sale of felled timber at roadside or at central log yards; long-term forest management licenses or volume-based timber quotas (Gray 2002). In Papua New Guinea, for example, local communities grant concessions to entrepreneurs who establish portable sawmills within the concession and process logs for exports (Filer and Sekhran 1998).

Investment partnerships. Buyers of forest products can help finance local businesses to improve their operations through investment partnerships. The company brings investment resources, business management expertise, and market links; local enterprises bring access to forest resources, established businesses, and local contacts. Some international furniture retailers have used such partnerships to help their suppliers obtain forest certification. Some investment funds and conservation organizations seeking to invest in forest carbon emission offsets have partnered with local producer organizations to develop carbon projects (Smith and Scherr 2002).

Investors in such partnerships need to be “hands on,” paying close attention to markets and helping local partners to develop management capacity. Investors can seek other strategic partnerships (with conservation organizations or local governments, for example) to support the investment. Both investors and communities must stay focused on developing a profitable enterprise (Moles 2000). An example of a promising private company-indigenous community partnership in Canada is described in **Box 14**.

In cases where the scope for local communities to participate competitively as producers in technologically complex and capital-intensive forest industries does not exist, atten-

BOX 14. First Nations of British Columbia Partner with Multinational Firm

Iisaak Forest Resources is a company owned by the indigenous, or First Nations, populations of Canada's Clayoquot Sound and Weyerhaeuser Corporation's British Columbia Coastal Group. Iisaak is working towards an economically viable way of conserving and managing valuable coastal old growth forests that are outside of public protected areas.

Iisaak has tenure rights to 87,000 hectares of public land. The company originated from an intense social conflict over industrial harvest in Clayoquot Sound's old growth forests. Widespread civil disobedience brought both logging and expansion of protected areas to a halt in 1993. In 1994-95, a scientific panel evaluated the rain forest ecosystem and identified uses consistent with conservation. In 1998, initiatives to develop a new joint venture began. The partnership took two years to develop, as confidence was established between the previously conflicting partners. Individuals deemed trustworthy by both sides took an innovative step by agreeing to share a single strategic planning office.

The negotiations involved not only First Nations and Weyerhaeuser, but also local governments, the federal government, environmentalists and unions. A Memorandum of Understanding, eventually signed in 1999 with five major environmental NGOs, resolved the historic conflict while also respecting First Nations' traditional ownership of their territories, enhancing local sustainable economic development opportunities, and providing stability for local communities. In 2000, the UNESCO Biosphere Program named the region a World Heritage Site. First Nations, who have majority ownership of Iisaak, consider this a step toward full government recognition of their territorial claims.

Iisaak is developing three business segments. The commercial timber segment is producing high-quality cedar sawlogs for specialty products. The second business will be based on non-timber forest products, recreation, and ecotourism. The third component keep develop market conservation values such as carbon storage and biodiversity habitat.

Source: Baird and Coady (2000).

tion should focus on enabling rural stakeholders in the resource to benefit financially as shareholders or joint venture partners. For this to benefit the poor will require institutional mechanisms that channel and allocate such benefits equitably (Arnold 2001).

Making Company-Community Agreements Work

The history of business-community agreements in many parts of the developing world has been problematic either due to unstable communities, business partners who reduce the level of services or prices over time, or rent-seeking in production costs. Industry partnerships may pose real risks for communities, including lost income by restricting buyers, highly unequal access to market information, weaker local control over enterprise management, inability to enforce contracts, and potential corruption of community enterprise leaders. Communities need to be aware of the difficulties of negotiating and enforcing business contracts developed between highly unequal partners (Findlay 2002). Nonetheless, communities may still be better off in such relationships than without them. Important lessons have been learned about the conditions under which such partnerships are successful (Table 8).

Table 8. Principles for Successful Community-Company Partnerships

1. *Mutual respect* of each partner's legitimate aims
2. *Fair negotiation process* where partners can make informed and free decisions
3. *Learning approach*—allowing room for disagreement and experimentation, treating deals as learning processes
4. *Realistic prospects of mutual profits*—partners being able to derive benefits commensurate with their contributions
5. *Commitment over a long period* to optimize the returns from deals—as strategic commercial as well as socio-cultural and environmental ventures (e.g., overcoming short-term risk aversion caused by rises and falls in product markets)
6. *Equitably shared risks, clearly spelled out*—accurate calculation and sharing of risks in production, market, social, and environmental terms, planning for a mix of short-, medium-, and long-term benefits, and a range of low-, medium-, and high-risk investment opportunities to attract both cautious and bold partners
7. *Partners have access to accurate, in-depth, and independent information* on: likely short- and long-term prospects (with contingency scenarios explored if arrangements are nullified); current and likely long-term viability of prospective partners; and likely long-term context for local forestry development (e.g., market trends, product volumes, and competitiveness, necessary infrastructure, government policy, code of practices, wider community support)
8. *Sound business principles*—not exploitative relationships, not public relations exercises
9. *Contribution to broader development strategies* and programs of community empowerment

Sources: Adapted from Mayers et al. (2000); Desmond and Race (2000).

Industrial companies, which can usually benefit—and manage the risks—from specialization, need to respect the risk-reducing business strategies of their lower-income partners. An assessment of aboriginal-industry partnerships in Canada concluded that integral building blocks were an understanding and awareness of each culture and acknowledgment of differences along with a well thought-out and involved partner selection and clarification of each partner's role. Clear communications lead to open and informed decisions. Partnerships benefit from using best practices in business development, employment, training. They work best if the most sensitive sites are protected. Because of the need to reconcile what are often quite different perspectives and modes of operation, it is important not to hurry any stage of the development process.⁶² The study concluded that government also has a strategic role to play in promoting these aboriginal-industry partnerships through securing capital to complement limited Aboriginal equity; facilitating co-management initiatives; providing tenure and forest licenses; assisting to gain market access; providing training programs, and undertaking forest research to address key Aboriginal forest and partnership issues (NAFA/IOG 2000).

To establish effective agreements requires a long-term perspective for business development. Contract terms need to be flexible with special attention to reducing business risks (such as spreading sources of supply among different producer groups) and mechanisms to reduce transaction costs. In taking decisions about forest and business management with local communities basic social principles must be respected, including: inter-generational equity, acknowledged rights, community management structures, and attention to the health of forest actors, cultures, and the forest (Colfer and Byron 2001).⁶³ As agreements are developing, they need to have space to regularly renegotiate the deal, and communities may need support in these negotiations. Such partnerships are more likely to be balanced where markets are competitive.⁶⁴ To maximize transparency, some externally-funded projects supporting public-private-community commercial partnerships have experimented with contracting professional journalists to publish locally key information on payments, finance, market prices, and other indicators of contract compliance, costs, and benefits. While the forestry community has an increasingly clear vision of the need for agreements, there is still much to learn about the steps needed to get there.

PURSUE NEW SOURCES OF FINANCING

A variety of strategies have been successfully used to finance community forestry development. Most begin with self-financing and bring in external financing for expansion and modernization.

Self-Financing

Most local forest enterprises must depend initially on self-financing, at least until they have demonstrated business success. Individual and group savings may be generated through agricultural production, non-farm employment, or other household or com-

munity enterprises (**Box 15**). Revolving credit programs have been successfully mobilized in forestry to provide long-term incremental capitalization. In several Latin American countries, regional forest and ecosystem planning groups composed of member producer or indigenous organizations are mobilizing capital to be competitively accessed by members (e.g., GEF 2001: De Walt, Oliveira, and Correa 2000).

Box 15. Financing Community Forest Enterprises in Mexico

During the period of government-led forest industrialization in Mexico, forest communities provided the main source of labor for many parastatal sawmills. When the forestry parastatals were dismantled in the 1970s many communities were permitted to take over the mills and equipment. While outdated, inefficient, and often in poor repair, these provided the initial capital base for many fledgling community forest milling enterprises; others gradually invested in capital equipment. In Oaxaca, 30 of 329 forest communities had milling operations in 2002. Initially, much of the cost of operating these enterprises was met by mobilizing pre-existing systems of community labor obligations, so that the enterprises were able to avoid going into debt. Since a principal community objective of the enterprise is to generate local employment, community members are willing to invest some of their labor for capitalization. A financial analysis found that in fact 74 to 94 percent of wealth generated by the mills in Oaxaca stayed in the community. As the mills and forestry operations became profitable, many of the communities chose to re-invest much of the profits to modernize milling equipment, increase efficiency of forest operations, implement third-party certification, and make other improvements.

The experience of the Mancomunados Communities, a group of eight Zapotec indigenous communities in the northern Sierra of Oaxaca, demonstrates the potential for self-financing forestry investment. The Communities began organizing forestry activities in 1976 and installed their first sawmill of 6000 board-feet (bf) in 1981. In 1994 they organized into operational management groups and by 1997 were able to draw on business savings of more than 300,000 pesos to install a 15,000 bf per shift mill that greatly increased quality and yields and lowered unit costs. In 1998, they invested further to purchase wood dryers that could process 120,000 bf. In 2002, Mancomunados processed 25,000 m³ of wood from its own forests and purchased more from neighboring communities to take advantage of economies of scale in processing. When the PROCYMAF project (Box 12) began working in Oaxaca after 1998, the community was able to put forward 600,000 pesos (US\$60,000) to obtain matching project grant funds to study further opportunities for value-added forestry enterprises.

Sources: Fuge (1999); Santiago (2002); Merlet et al. (2003a, 2003b).

External Financing

Dependence on self-financing alone will exclude many communities from investing in forest enterprises. In the PROCYMAF project in Mexico, only 10-15 percent of communities were able to self-finance or borrow locally to implement their promising investment opportunities identified.

Possible sources of external finance include grants and public subsidies, credit, investment finance, and conservation finance. In all cases, success requires substantial community participation in designing the arrangements, including the choice of

species, accommodation of both subsistence and commercial uses of those species, the management system, and the cost structure.

Grants and public subsidies. Some private foundations, government agencies, and development organizations provide grants on a small scale for the development of local forestry enterprises. Grants may involve much lower transaction costs than loans, or the organization may be willing to absorb the capital costs in order to achieve associated environmental or welfare benefits. Complementary public investments are often critically important to increase commercial returns, such as the construction of bridges, roads, port facilities, and other infrastructure.

Bank credit. Bank credit is a potential source of finance, but under limited circumstances. Rural financial credit is chronically lacking around the world, even for profitable, established business ventures.⁶⁵ Private bank credit for small-scale agriculture is often provided only where backed by public guarantees. Banks typically finance only well-established large businesses, and then mainly to cover short- or medium-term costs.⁶⁶ The longer investment cycle of many forestry operations further reduces creditor interest. Those who succeed in obtaining credit often find that terms are pre-determined on the basis of a standard forest enterprise “model” and are non-negotiable, even though their own forest enterprises are organized quite differently. Local people are generally willing to utilize conventional formal bank credit for forestry only if they have assured markets for their products (John Spears, pers. comm. 2001). Nonetheless, development banks have played an important role in developing local forest enterprises in some countries, including Joint Forest Management systems in South Asia and plantation enterprises in China.

Microcredit. Despite the difficulties faced by poor households in developing countries to access conventional bank loans, the myth that they are not creditworthy or are unable to save has been firmly put to rest in recent years. Microcredit programs around the world, using a variety of models, have shown that poor people achieve strong repayment records—often higher than those of conventional borrowers. Repayment rates are high because, through a system of peer support and pressure used in many microcredit models, borrowers are responsible for one another’s success (Daley-Harris 2002).

Successful microfinance programs face three key challenges: outreach (reaching the poor both in terms of numbers and depth of poverty), financial sustainability (meeting operating and financial costs over the long term), and impact (discernible effects upon clients’ quality of life). Governments can play an important role in supporting micro-finance by helping with startup costs and creating favorable regulatory and supervisory systems (Zeller and Meyer 2002). Key lessons from informal financial systems for the poor that need to be adapted to other financial services are: credible long-term partnership, tailoring financial services to specific demand patterns, knowledge by decision-makers of the local economy and/or the loan recipients,

method for enforcing contract compliance, group-based transactions, and provision of savings services (Zeller and Sharma 1998).

Microfinance programs are commonly run by NGOs, but development banks have mobilized financing effectively through micro-finance, even including group loans for some leasehold forest managers in Nepal and India. The World Bank in early 2000 financed 1985 rural and microfinance projects worth \$7 billion (John Spears, pers. comm. 2001). The Microcredit Campaign launched in 1997 seeks to reach 100 million of the world's poorest families with credit for self-employment and other financial and business services by the year 2005 (<http://www.microcreditsummit.org>). Such funds could be used more strategically for forest market research and training, and to strengthen local forest producer organizations.

Investment finance. Private sources could potentially mobilize financing for local forest enterprises on a much larger scale. Such investments are modest as yet and must be demonstrated to be profitable at least in the medium term before they are likely to expand. Specialized investment and venture capital firms as well as private entrepreneurs have begun to develop in response to the financial opportunities for "green" and "socially responsible" investments in forestry. Several innovative community development investment groups have become active in forestry, such as the Community Development Venture Capital Alliance (an umbrella group with government, foundation, and private sector members related to the 85 community development venture capital funds that have arisen in the past decade in the United States), a British investment fund (in which half the capital came from the British government), and in Latin America the Small Enterprise Assistance Fund (SEAF). Most of the funds are set up within or parallel to a non-profit organization. These investors provide business training for local enterprises, and help them scale up operations by becoming more involved in management and operations (Box 16).

Buyers of forest outputs may help finance growing businesses to improve their operations, through investment partnerships or payments for ecosystem services. New ways are being devised to tap funds from stock markets, pensions and insurance markets. In some cases, it may be possible to condition domestic investment protocols or export guarantee systems on some level of community participation.

Conservation finance. Some governments, conservation agencies, and organizations have begun to pay private landowners for "producing" biodiversity and watershed services. Forest conservation easements, along the lines of wetlands conservation easements in agricultural lands, are being developed with NGO funds for wildlife corridors. NGOs and donors may be motivated to cover some of the costs of establishing local forest enterprises, such as planning, mapping and capacity building (McNeely and Scherr 2003). Conservation trusts have been established, using both philanthropic and public funds, to ensure acquisition and long-term management of valued conservation areas, especially in Latin America (Landell-Mills and Porras 2002).

Box 16. Venture Capital Firm Builds Sustainable Industry with Amazon Communities

Small- and medium-sized Latin American companies began earning competitive profits while increasing biodiversity with the help of A2R's Terra Capital. The venture capital fund was a partnership between Axial Renewable Resources of Brazil and Grantham, Mayo and Otto (GMO) Renewable Resources of Boston. Investment areas included organic agriculture, sustainable forestry, non-timber forest products, ecotourism and bio-prospecting. Several Terra Capital investments involved community-based forestry in the Brazilian Amazon—including a processing plant for heart of palm, a babaçu palm processing company, and a large certified sustainable softwood production and processing enterprise. A2R was committed to improving local livelihoods and conserving forest resources as part of its core business strategy. An interdisciplinary team of financial and technical specialists from A2R visited the enterprises frequently to provide business support.

For example, A2R acquired a financial interest in a heart-of-palm processing plant on a remote island in Marajo, in the state of Pará, which was suffering from unreliable raw material supply and poor administrative and financial management. A2R helped to resolve local land conflicts and to secure local rights for growing palm fruits, thereby ensuring a regular and secure source for the processing plant. Within three years, the enterprise achieved sales of US\$4 million, supporting 100 factory employees and increasing incomes and assets for 5000 producing families in one of the poorest parts of the Amazon. A2R also helped local people produce the palm fruits more sustainably. They have begun to seek Forest Stewardship Council certification, which would establish the first certification for heart of palm in Brazil.

Source: Patricia Moles, A2R, pers. comm. (2000).

ADAPT CERTIFICATION FOR SMALL-SCALE AND INDIGENOUS FORESTRY

Third party certification of low-income forest communities and farm forestry producers has fallen far short of original expectations, as discussed in the previous chapter. Only 50 communities have been certified worldwide, and most of these are in Mexico, Canada, the United States, and Guatemala. Greater efforts to train and qualify local certifying organizations are being pursued, for example by IMA-FLORA in Brazil, to reduce the cost of certification and ensure accurate assessment of local conditions. Some buyers have actively sought partnerships with developing country certified producers, as with the Tropical Forest Trust based in Switzerland that links European buyers with producers. But as certification systems are presently designed, local communities find that standards are often inappropriate to their ecological conditions or their management system and that they are highly dependent upon intermediaries to establish market relationships (Markopolous 1999). Communities with multiple income streams face the dilemma of which products to certify: wood products, non-wood products, conservation practices, ecosystem services, or ecoagriculture (Molnar 2003).

Recommendations for facilitating community forest certification have been developed by a number of authors (Bass et al. 2001; Clay 2002; Higman and Nussbaum 2002; Markopolous 1999; Meidinger, Elliot, and Oesten 2003). The application of

rules for Small and Low-Intensity Managed Forests (SLIMFs) was recently approved by the Forest Stewardship Council General Assembly (Fernholz 2000; Forest Stewardship Council 2003). New certification systems for community forestry are being developed by the Indonesian Eco-Labeling Foundation with the Rainforest Alliance. There are also proposals for introducing a step-wise or modular certification to provide more time to achieve best practices (Atyi and Simula 2002). Proposed “phased certification” systems specify steps toward certification and producers are “certified” if they can demonstrate achievement of intermediate steps. Group certification systems have been introduced which define the group as a legal entity, building quality systems, using sampling for assessment. Regional group certification has been discussed as an option, but this system confronts problematic issues of participant commitment and accommodation of land use change (Rametsteiner and Simula 2001). The recent SLIMF rules have provisions for group certification (FSC 2003).

Based on a comprehensive review of community experience with forest certification, Molnar and colleagues (2003) concluded that two sets of further actions are needed and require greater active collaboration among various stakeholders (donors, governments, accreditation bodies, certifiers, investors, the forest industry, technical assistance agencies, and environmental non-profits). The first is to revisit the objectives of certification and modify the criteria and indicators and process of certification to reach a wider range of forest communities. Certification systems are not presently taking advantage of long-standing practices of communities that achieve the same environmental and social goals, but in a different way. The second is to target actions to those forest communities for which certification is not a currently viable option to foster and expand coverage of alternative sustainable forestry instruments (such as fair trade, ethical collection, standards, deregulation of market barriers, devolution of rights and responsibilities, and business support). Alternatives must address the multiple income streams that many forest communities derive from the forest so that application of sustainable forestry instruments is financially viable.

ENCOURAGE BUSINESS SERVICE PROVIDERS FOR LOW-INCOME PRODUCERS

Business, technical, and legal service providers play a critical role in enabling low-income local forest businesses to develop and succeed, and their presence signifies a mature smallholder forest industry. In the early stages of local market development, such services rarely exist. Where they do exist, services are typically provided by non-profit civic agencies or public agencies (Ford 1998).⁶⁷ Once market systems for local forest enterprises are fully developed, many of these roles will be met by private providers. But early on in market development, private suppliers may need to be

actively encouraged. For example, in southern Mexico PROCYMAF organized a roster of Providers for Technical and Professional Services to diversify the supply of technical services to the communities and to be more responsive to their needs and demands. These experts received additional training to enhance their expertise on relevant topics such as non-timber products, building social capital, and promoting participation. Some complex businesses, such as forest carbon offset projects, will call for service providers who can integrate multiple business and technical support functions. The major challenge is to provide high-quality business and technical services at a cost in keeping with the clients' income and the volume of sales and production, and in ways that do not displace the people or their decision-making authority. As local capacity and scale of production expand, private sector service providers will begin to find such work profitable.

Business Services

Business services essential to the establishment and profitable management of forest enterprises include management advice, market information, and market intermediation.

Management advisory services. For large firms, business services such as advice in developing business management plans, management training, equipment selection, or monitoring systems are available on a fee-for-service, retainer consultancy, or in-house basis. Alternative models—such as NGOs, non-profit foundations, or private providers funded by donors or industry—are needed to service small-scale producers.⁶⁸ Independent advisory boards may provide backstopping to local forest groups and their business partners, particularly to consider environmental and social impacts of business plans.⁶⁹ These services can provide market research and feasibility planning.⁷⁰

Market information services. An important weakness of small-scale, local forest producers in negotiating with buyers and traders is their lack of information about prices in different markets, especially national markets. Market price information services can improve the availability and accuracy of price information. Providing the service requires a set of standard grades for wood and other products, regular collection of data at specified points in the value chain, and dissemination of data to producers. This role may be played by a government agency, an environmental or development support organization, or a producer cooperative. For example, in several southeast Asian countries, tree producer associations organized participatory price information collection systems through their members (Raintree and Francisco 1994). PROCYMAF in Mexico financed 60 marketing studies among 375 communities and initiated 10-12 NTFP pilot projects to test enterprise models (<http://www.procymaf.org>). The Asian Network for Sustainable Agriculture and

Bioresources (ANSAB) provides market information services to producers in several Asian countries as well as enterprise development training (<http://www.ansab.org>). National associations of farm forestry enterprises in Australia and New Zealand also provide members with regular market updates (<http://www.nzffa.org.nz/tree-grower.html>).

Market intermediation. Third parties have successfully brokered and provided intermediary services for partnerships between large formal sector firms and small-scale producers. There is a particular need for intermediary organizations to support unsophisticated forest collectors. This role has often been played by public forest agencies,⁷¹ although such systems generally undermine local interests when established as monopoly buyers not accountable to local producers. Conservation organizations have also begun to play an active intermediary role. The Rainforest Alliance, WWF, and The Nature Conservancy have all helped to broker “fair trade” deals, carbon emission offset deals, and SFM certification. National NGOs, such as Instituto Socio-Ambiental in Brazil, have helped to broker deals for forest products from indigenous rainforests. For NTFPs, trade fairs can be organized to help local producers establish connections with potential buyers. Environmental groups have played an important role as intermediaries in ecosystem service markets (Landell-Mills and Porras 2002).

Technical Services

Low-income forest producers need support to help them meet the technical challenges of sustainable forest management and processing for commercial enterprises. This may be provided in two ways: through technical assistance services or by contracting management services.

Technical assistance services. Local producers who manage their own forests and agroforestry plots require technical assistance to select and access high-quality planting materials, information on efficient and environmentally sustainable forest management and harvest practices, and processing technologies that are appropriate to their production systems and business strategies. Such services need to be tailored explicitly to low-income forest producers. However, public forest and agroforestry extension programs remain weak in most countries. Stronger programs have been run by NGOs or as part of large-scale forest development programs without charge to producers. However, because most public technical assistance programs have no related business or market component, their advice is not always cost-effective. At the same time, some commercially-oriented technical assistance programs fail to address issues of ecosystem management.

Some public and NGO development projects have sought to privatize technical assistance by providing financial resources to local producers to purchase such serv-

ices directly and thus to develop the service sector. Private forest industries often provide technical assistance services to outgrowers to raise product quality and productivity. Some buyers interested in retailing certified products have provided training to backstop certification.

Box 17. Small-Scale Farmers in Mexico Partner with Environmental NGO to Produce Carbon Emission Offsets for Automobile Federation

The Scolel-Té (“growing trees”) Pilot Project for Community Forestry and Carbon Sequestration in Chiapas, Mexico developed in 1997 as a prototype scheme for sequestering carbon in sustainable forestry and agricultural systems. The project involves several thousand hectares belonging to 400 farmers in 20 indigenous Mayan communities. The cost of assisting their transition to more sustainable land uses (from swidden agriculture) is being financed by revenues from a greenhouse gas mitigation agreement with the International Automobile Federation which is committed to offsetting the carbon emissions resulting from sponsored car races. DFID of the United Kingdom funded organizational costs for the carbon deal, which is being jointly implemented by El Colegio de la Frontera Sur, a Mexican university, Ambio, a Mexican NGO, and the University of Edinburgh in the UK. Resources are being used to train and assist indigenous maize and coffee farmers to produce farm-scale plans that include agroforestry systems and small tree plantations. The NGOs provide financial and carbon accounting services, and they also intermedicate with investors.

Farmers are adopting diverse practices, principally “improved fallows” in which trees are planted and left to grow during the fallow phase of the maize production cycle; and “taungya” where maize and beans are cultivated between rows of trees during the early phases of plantation establishment. The long-term increase in carbon storage potential depends on the density and type of trees grown. Farmers receive 60-80 percent of the total resource rent (US\$10 per ton of carbon) in stages over the first rotation; the remaining 20-40 percent is used for monitoring, technical assistance, training, and administration. Without the program, an estimated 2 to 3 percent annual loss of forest (and associated carbon benefits) would occur.

Sources: Bass et al. (1999); Wilson, Moura Costa, and Stuart (1999); www.eccm.uk.com/planvivo/

Forest management services. Forest communities can contract with private companies to manage their natural forests, as has been done by the Tsitsikamma Khoisan Village in South Africa and the Suchiteco Civil Society Promoters in Guatemala (Mayers and Vermeulen 2002). Professional management services may also be provided by industrial buyers of community products or by public forest extension agents. The Forest Stewardship Council recognizes “certified resource managers” who can serve as consultants to community forest operations (Jenkins and Smith 1999). Small forest producers can pool their assets under professional management, providing shared regular income, as harvests are rotated across parcels, as is being done by the Forest Bank in the United States (TNC and CCED 2001).⁷² Such forest managers can play a critical role in fostering linkages in the value chain.

INVEST IN COMMUNITY FOREST ENTERPRISE DEVELOPMENT

Public or quasi-public agencies have been created to promote rural development in many parts of the world. These have been little used to promote community forest development. But for strategically selected sites where underlying market conditions are favorable and government institutions supportive, the approach could have a great deal of promise. Successful forestry examples include the Honduras and Kentucky State (U.S.) examples described in **Boxes 9 and 18**. Such agencies can help to facilitate business partnerships, improve infrastructure, finance local businesses, and provide training and other services needed for local economic development. For example, in Costa Rica, CODEFORSA has evolved to become a service organization for the Huertar Norte Region, with 700 associates including farmers, timber companies, transporters and forestry professionals (Watson et al. 1998).

Forestry leaders can draw lessons from one of the most successful examples of program-led poverty reduction in mountainous Lempira Sur, one of the poorest regions of Honduras. The program's strategy focused on small-scale rural enterprise development. It was highly integrated, including investments in producer organization, governance, local storage facilities, and technical extension for commercially-oriented conservation agriculture and forestry, which was linked closely to enterprise creation. The program promoted both short-term agricultural income sources and

Box 18. Community Forest Development in Kentucky State, USA

In 1976, ten community development organizations in the Central Appalachian mountains created the non-profit Mountain Association for Community Economic Development (MACED) to provide technical and financial assistance to community-based groups in this impoverished region. Kentucky has a rich mesophytic hardwood forest resource with almost five million hectares of commercial forestland owned by more than 400,000 landowners. MACED channeled much of their resources to the hardwood products industry. In 1979, MACED started to provide technical assistance to small operators of sawmills and wood-product manufacturing firms, focusing primarily on proper use of equipment, improved cutting techniques, financial management, cash-flow analysis, inventory control, and marketing skills. In 1981, MACED and a partner started up a lumber concentration yard to buy lumber from local sawmills and then grade, repackage, and resell it—effectively creating a market for lumber from Appalachian Kentucky's many small sawmills. By 1983, MACED had created a US\$2.5 million venture capital fund to assist in financing new business ventures and began to invest in sawmill start-ups and expansions with entrepreneurs with innovative ideas and a long-term vision. MACED educated local sawyers and loggers supplying these mills—many of whom are farmers and laid-off miners—about proper grading and pricing, advanced management techniques, and the benefits of value-added processing. In 1994, MACED sharpened its focus on sustainable development through four programs: developing an Appalachian Forest Resource Model to guide forest industry investments; facilitating the formation of certification standards for Central Appalachian forests; educating stakeholders; and establishing land trusts. Throughout its history, MACED has lent and leveraged more than US\$23.5 million (not all in forestry), mainly from foundation grants and low-interest government loans. It is considered one of the most effective development organizations in Central Appalachia.

Source: Poffenberger and Selin (1998).

longer-term investments. The participating municipalities suffered from chronic grain deficits prior to the project but became net grain exporters by 1998. Interestingly, the program used as one of their key indicators of success the number of local entrepreneurs (Augusta Molnar, pers. comm. 2003).

TARGET FORESTRY RESEARCH, EDUCATION AND TRAINING

To develop a large and commercially viable local forest producer sector will require producers to have access to improved production, processing, and management systems. Substantial new investment in research, education, and training must be targeted to this sector.⁷³

Research

Past forestry research investment has concentrated overwhelmingly on large-scale producers and mono-cropped trees. Technical research for small-scale producers must emphasize intercropping, “mosaic” production, and multi-functionality, and methods and equipment that are inexpensive or can be purchased incrementally. Production research is needed to raise commercial yields and reduce costs in community and household forest and tree management systems.⁷⁴ Ecological research is needed to learn how to maximize biodiversity, water, and other ecosystem values within forest mosaic landscapes that also generate income and livelihoods for poor rural people.

But business research is also needed to help guide and inform producer organizations, their industrial business partners and those providing support services, including to:

- Analyze the viability, profitability and sustainability of different forest business models;
- Understand the structure, and trends in domestic forest product markets, and their linkages with international markets;
- Identify business models and opportunities;
- Quantify the costs and benefits of existing policy regimes for small-scale commercial forest producers;
- Analyze alternative legal and regulatory frameworks for incentives for sustainable production; and
- Set priorities for allocating public resources.

It is important for researchers to work closely with forest communities and farm forestry associations to set research priorities and to provide support for them in

adapting new forest and enterprise management methods (Bäckstrand 2002). Professionals, technicians, and para-technicians who are members of indigenous groups and other rural communities can play a critical role in bridging relationships and communications among non-traditional science and policy partners. For example, university researchers have played a catalytic and supportive role in community forestry in the Philippines.

Local people need access to the results of scientific, market, and other studies to inform both their strategic planning and day-to-day enterprise management decisions. Findings should be made as widely available as possible through websites and other media, and in local languages. At the present time, very little of the scientific literature is available in the local languages spoken by forest resource managers. In the Andes, for example, one study found that less than one percent of all the information collected on forest biodiversity is available in local languages.

Education and Training

This agenda to develop markets for low-income producers will require professionals and technicians who have new types of expertise. Educational programs must be designed that integrate sustainable forest management, business and marketing, and communication skills. The present shortage of indigenous trained professionals for indigenous community enterprises must be addressed by recruiting greater numbers of indigenous forestry students and integrating indigenous peoples' issues into their core forestry curricula. The University of British Columbia in Canada has recently launched such a program.

Meanwhile, many high-quality training programs and materials are already available for small-scale forest enterprise, although most are oriented to NTFPs. But the scale of these programs has been quite marginal relative to even present demand, much less that required for a major expansion. More training programs need to be developed for small-scale logging and wood processing, and for certification and ecosystem service markets. Greater support is needed for programs that train managers to develop and run environmentally sustainable enterprises, such as the Humboldt Institute in Colombia, RECOFTC in Thailand, and EARTH University in Costa Rica, all of which train students from around the world. These programs should be replicated widely, and curricula should be developed specifically to serve developing markets for forest products and services produced sustainably by low-income producers. Private sector companies and business service providers should be encouraged to partner, and even lead, in these initiatives.

At the same time, however, experience around the world has shown that “horizontal” exchange of information between communities, including field visits and train-

ing by communities of other communities, often has the greatest short-term impact on organization and enterprise management. Successful examples in forestry include the community exchanges sponsored by UNOFOC in Mexico and PROCYMAF's sponsorship of training in improved resin tapping techniques for Lachivaa, Oaxaca communities that was done by the San Juan Nuevo community (Augusta Molnar, pers. comm. 2002).

NOTES

- 51 Value chain analysis includes: identification of the actors involved from the extraction to retail level; evaluation of income and profit at and within each level of the commodity chain; evaluation of the distribution of income and profit within each group along the chain; and analysis of the distribution of benefits to trace the mechanisms by which access to benefits is maintained and controlled (Dubois 1998; Ribot 1998).
- 52 Production-to-consumption system analysis can be used to evaluate the degree of vertical and horizontal integration and the intensity of production and processing activities (Belcher 1998).
- 53 For example, rattan producers in Indonesia have successfully created horizontal linkages for commercial cooperation (Belcher 1998).
- 54 A classic case of poor market research has been documented for the eucalyptus pole market in India. During the 1980s, farmers planted millions of hectares of eucalyptus in response to high market prices. Early adopters did extremely well, but as more wood came on the market it, supply greatly exceeded demand and prices plummeted (Dewees and Saxena 1995).
- 55 In Oaxaca Mexico, producers determined that they could dramatically increase income through higher-value processing, but to realize the potential, they needed to be able to deliver 18,000 board-feet of wood every six months. Given their production risks, this was simply not a feasible strategy (Augusta Molnar, pers. comm. 2001).
- 56 Very good, user-friendly guidelines have been developed by several organizations to help guide and support the process of identifying market opportunities (ANSAB 2000; Lecup and Nicholson 2000).
- 57 For example, a regional review of tribal forestry businesses in the Pacific Northwest of the U.S. documented many organizational weaknesses, including lack of skill and experience in sales and marketing, lack of information, lack of investment capital and understanding of investor expectations, tribal interference in business management activities, and inefficient use of computers (Jansens 2001).
- 58 For example, regional forest producers in Guanacaste, Costa Rica, and in the Pacific Coast of Guatemala organized to carry out major marketing studies for tree products (Current, Lutz, and Scherr 1995). The National Aboriginal Forestry Association of Canada (1997) promotes holistic multiple use forestry by grassroots member organizations.
- 59 Some community forestry networks and associations represent social movements and are more engaged in political lobbying, land rights claims, and mobilization for policy or market change; these will be discussed in the next chapter.
- 60 Useful websites (many of which include downloadable technical and market information) include: the Forest Farming Association of Queensland, Australia (www.FFAQI.org); the International Network of Forests and Communities (www.forestsandcommunities.org); the Regional Community Forestry Training Centre for Asia-Pacific (www.recoftc.org); the National Aboriginal Forestry Association (www.nafaforestry.org).
- 61 The First Nations Development Institute manages a Sustainable Forestry Fund for Native American tribes (www.firstnations.org).
- 62 For example, indigenous groups from many countries recently banded together to lobby for an international moratorium on forest carbon offset deals, partly to allow sufficient time for their members to educate themselves before negotiating business deals (Forum of Indigenous Peoples 2000).

- 63 A new law in Madagascar requires environmental mediation to ensure long-term common objectives in partnerships between local organizations and businesses. The mediator has no power in the negotiations but judges whether the final deal is likely to be sustainable (Babin and Bertrand 1998).
- 64 In some cases, partnerships with international firms which are subject to greater NGO and public oversight may pose lower risks than partnerships with national firms closely allied to non-democratic political interests (Fuge 2001).
- 65 Data for Mexico in 1991 show that less than 10 percent of rural credit from the national agricultural banks, and only 1.5 percent of commercial bank credit, went to the forest industry (World Bank 1995).
- 66 For example, in the Brazilian Amazon, FNO-ProAmbiente is seeking to establish a special line of subsidized bank credit for environmentally sustainable forestry, agroforestry and fire-less agriculture among smallholders. Possible sources of funds being considered to underwrite this credit are: an ecological tax; payments from activities most responsible for current deforestation (oil and mining royalties, road and waterway payrolls); and global funds for biodiversity conservation (Young and Nepstad 2002).
- 67 For example, experience in Lempira Sur, Honduras and in Northwest Brazil indicates that small non-farm industries in very poor areas evolved only because donors, NGOs or governments paid for the start-up costs of technical assistance (Molnar 2001).
- 68 The Humboldt Institute in Colombia has a "Sustainable Bio-Trade Initiative" to support small- and medium-size businesses. Clients receive courses from nine specialized "incubators" and are helped to develop good business plans and market research (www.humboldt.org.co). The Asia Network for Small-Scale Agricultural Bioresources provides training in enterprise development for natural products in several Asian countries (ANSAB 2000). In the U.S., the First Nations Development Institute, an NGO, provides accountants and MBAs to review artisanal businesses and help them to determine product prices (www.firstnations.org). Several forest investment firms and retail companies, including A2R, IKEA, and Home Depot, have set up non-profit foundations to provide executive training for their local partners.
- 69 For example, Lisaak Forest Resources (described in Box 12) worked with a Scientific Panel, composed of internationally recognized scientists and aboriginal Elders to make recommendations on land use and management, and to identify ecosystem sensitivity and desirable spots for logging (Baird and Coady 2000). Terra Capital (described in Box 16) had a Biodiversity Advisory Board, drawing diverse experts to determine guidelines, evaluate project bio-consultant reports, and approve or reject projects on biodiversity criteria (Moles 2000).
- 70 For example, methods have been developed to help Amazon farmers evaluate the costs and benefits of timber and NTFP extraction.
- 71 For example, in China, local government forest bureaus in Sichuan Province have acted as paid intermediaries to facilitate a business partnership between over 600,000 farmers producing timber in a joint venture with the private company Plantation Forest Timber Products, Ltd, Rabobank, and the International Finance Corporation (Mayers 1999).
- 72 This approach has been used in the U.S. through private providers (Jenkins and Smith 1999) as well as conservation organizations like The Forest Bank organized by The Nature Conservancy (TNC and CCED 2001).
- 73 Blomstrom and Kokko (2001) emphasize the role of education and research in shifting forestry in northern Europe from an emphasis on raw materials to a high-technology sector.
- 74 For example, in China, research has led to the development of poplar varieties that allow canopy closure after only three years, when previous varieties required eight years (Asia Timber 2001).

7. REMOVING POLICY BARRIERS TO LOCAL MARKET PARTICIPATION

Forest governance and markets in most developing countries bear an uncanny resemblance to agrarian arrangements in medieval Europe, with their restraints on trade, government control over land and forests, official monopoly suppliers and buyers, and the absence of local voices in formulating forest policy. Many governments today claim control of far more forestland than their bureaucracies can possibly manage, including ancestral lands traditionally owned by local people and forests on private lands.⁷⁵ After World War II, strategies of state-led industrialization sought to exploit these government-claimed forest resources. Forest market institutions often still reflect this model, decades after other sectors of the economy have been liberalized. In part to protect state monopolies, complex regulatory systems govern forest use, harvest, transport, and processing. These regulations create high barriers to trade within and between regions, sharply raising operating costs for forest business, and making illegal operation the norm. Governments often grant monopoly power to selected private businesses or agencies as political favors, while restricting rights of local forest producers and workers. Thus the potentially valuable forest assets of rural communities become what de Soto (2000) calls “dead capital.” Moreover, forest agencies sometimes use oppressive and undemocratic techniques to control community access to forests, even as they are powerless to stop much larger-scale deforestation promoted by other branches of government (Colchester 1999).

Fortunately, the above policy barriers are increasingly recognized, and some countries are taking steps to modernize, streamline, and democratize forest governance (Brown et al. 2002; Mayers and Bass 2000). In this chapter we highlight policy reforms essential to enable more profitable market participation by low-income people with better conservation outcomes. These include: securing forest ownership and use rights, reducing the regulatory burden, leveling the playing field in forest markets, involving forest communities in forest governance and policy negotiation, and protecting the livelihoods of the poorest forest-dependent people.

SECURE THE FOREST OWNERSHIP AND USE RIGHTS OF LOCAL PEOPLE⁷⁶

Restricted forest access, tenure insecurity, and controls on use are the most serious constraints to development of local forestry enterprises and mutually beneficial business contracts as well as partnerships with forest industry. Colonial and post-colonial governments claimed most forest land (and even trees on private lands) for the state.⁷⁷ Still, today half to two thirds of all forests are state-controlled, including large deforested areas, degraded forest lands, and farmlands on steeper slopes. Most parks

and protected areas are under state control with strict limits on local use. Brazil illustrates how this situation is sub-optimal for everyone. Even though indigenous people's rights to large areas of forest have now been recognized, they are strictly prohibited from utilizing much of that resource commercially. Thus they do so illegally, selling mahogany to buyers for a fraction of its commercial price, unable to raise capital or access technical assistance to institute sustainable management systems (White and Martin 2002).

However, such extensive state control of forests is under serious question today. Overwhelming evidence has shown that economic and social development simply does not occur in places where most local people's access to resources is limited or insecure, and environmental protection is hampered.⁷⁸ The Philippines, for example, shifted from being the world's largest producer of tropical hardwood in 1975 to a timber-importing nation in 1994, all while the government owned the vast majority of forest lands. By 2000, over 21 million people lived in upland "forest zones," yet acceptance of upland dwellers as legitimate forest managers took 26 years (1971-1997). Forest policy there now emphasizes community-based forest management under a variety of tenure arrangements, although the degree of local control still varies and the vast majority of valuable forests are gone (Chiong-Javier 2001).

Another practical consideration is the inadequate fiscal capacity of most low-income countries to manage public forests. A study of African government spending on forests during the 1990s found that on average they spent only 82 cents (U.S.) per hectare. Of 16 countries providing information, spending had fallen in ten (FAO 2003).⁷⁹ These levels are insufficient to meet ambitious objectives of forest conservation, and yet they are unlikely to increase to adequate levels in the near future.

Much greater efforts are needed to secure and strengthen local forest rights, including return or transfer of ownership of public forests to the private ownership of rural communities and households; strengthening of local use and management rights in public forests; and safeguarding local rights over ecosystem services from forests (Ellsworth 2001). The secure establishment of such rights, and of suitable governance mechanisms and processes for devolution are a policy priority in most countries (Agrawal and Ostrom 2001).

Return or Transfer Public Forests to Rural Communities

Recognizing local ownership makes sense, even in areas considered important for environmental protection. Rather than utilizing their own resources for forest protection and management, governments can support indigenous communities to defend their own protected areas and support local farmers to establish agroforestry systems through landscape configurations that conserve environmental values.⁸⁰

Legislative reforms in many countries are re-establishing local peoples' historical ownership rights of forest lands (Ford 1998; Lynch and Talbott 1995). The proportion of forest owned or administered by communities doubled in the last 15 years to approximately 350 million hectares today. Transferring forest assets to the ownership of the poor, recognizing community ownership, and securing long-term use rights are politically and financially feasible strategies for poverty reduction. They are also a necessary condition for producers to enter actively into long-term business contracts and to take advantage of the financial incentives for conservation and efficient use that come with private rights.⁸¹

Recognize local ownership. Rights may take diverse forms. Some countries have granted (or formalized) full individual or group⁸² ownership rights over lands previously claimed by the government, especially to indigenous peoples (e.g., Poffenberger and Selin 1998; see data in Annex 1). For example, the Indigenous Peoples' Rights Act of 1997 in the Philippines established the right of local people to claim ancestral land domains (Chiong-Javier 2001). Serious analysis is underway of the feasibility and effective processes for large-scale transfer of forest land ownership rights from government to local communities in Indonesia, following landmark legislation in Parliament in 2001 (Contreras-Hermosilla 2002). Even where legislation presents clear instruction to allocate forests to communities, implementation has been very slow (e.g., Djeumo 2001; FAO 2001b; Lazo 2001). Meanwhile, the highest quality forests are still usually retained by the state, or the state claims a disproportionate share of income from them (e.g., Mariki 2001 and **Box 19**).⁸³ If local people are to develop successful forest enterprises to overcome their poverty, then the more commercially valuable forest resources must be transferred as well.

An assessment of cases in which NGOs and others have succeeded in strengthening community forest tenure security found a number of strategies: legal activism for community claims; public education and lobbying to develop a shared understanding of the problem and solutions; supporting working groups to transform a bureaucracy; strengthening politically active coalitions of cause leaders, organizations and networks; piloting working models that demonstrate change; and building civic mobilization around a cause. To facilitate the process, civil society, and environmental organizations have assisted many indigenous communities to map and delineate the boundaries of their customary rights (e.g., Fox, Yonzon and Podger 1996). But seizing this opportunity will require the development of a new, much larger, and more effective international political constituency and community of practice. Diverse institutional actors—community federations and associations, public law groups, activists and NGOs, researchers, policy groups, community development and training organizations, multilateral institutions, and government agencies—each have a critical role to play (Ellsworth and White 2002).

Develop institutions for community forest governance. Laws governing local forest management need to strengthen and clarify local rights with provisions that improve

Box 19. Extending Forest Rights for Local People in State Forest Lands of Vietnam

Vietnam's forest resources are mainly found in the midlands and uplands where about 25 million people live, one-third of the population and most of the poor. Following Vietnamese independence, all forest resources were claimed as state property. Yet the state was unable to protect or manage this resource. Between 1943 and 1993, forest cover declined from 43 to 26 percent. Given the success of land allocation initiatives in the lowlands, in 1983 the Central Committee of the Communist Party began the process of allocating forest land with the purpose of improving management and protection of land resources through a sense of ownership and responsibility. Two systems were put in place. The first is direct allocation (much of which is bare land) to households who are issued land tenure certificates for a 50-year period. The second is contracting of responsibility for management and protection of land under forest cover from state forest enterprises (SFE) to collectives and households on a renewable yearly basis.

While SFEs still have been allocated the most productive forest land, by 1999, 1.43 million of the 9 million hectares under natural forest cover were allocated to households and cooperatives. Of 1.4 million hectares of plantation forests, nearly 0.6 million were allocated to local producers. Households allocated bare land for "protection forest" receive financial assistance for reforestation. Regulations regarding the use of protection forests have been loosened to allow farmers to undertake a variety of production and extractive activities so long as adequate vegetative cover is maintained on their lands as watershed protection. Field studies in some mountainous regions indicate that allocation of forest land rights to households has led to significant increases in income and more sustainable land management practices, particularly when contrasted with former policies seeking to halt shifting cultivation.

The system represents an improvement for the inhabitants from their prior illegal status. However, Vietnam shares with many other countries some key limitations on local rights. Households and communities are allocated mainly degraded or bare forest lands, rather than assets of significant value. On "production forest" that is presently "bare," farmers are permitted to establish agroforestry systems that meet certain criteria. But the system has assumed that "bare" land was unused and thus available for afforestation, when in fact much was already being used for crops, fallows or grazing. Households allocated bare or recovering young forest land for "protection forest" are guaranteed 80-85 percent share of all income earned from wood harvests, but such income is very low. Of income earned from well-stocked forests, households retain only a 60 percent share with the rest going to the state. When they are allocated land with well-established forest cover, local people participate in forest management decisions but do not have the final say.

Source: FAO (2001a).

long-term security and preserve flexibility. Communities can handle internal management challenges without clear state laws, but the latter are needed to define the rules by which they interact with outsiders to define the limits of state power, provide basic protections for individuals against the abuse of local power, and provide basic guidelines for protection of wider societal interests (Lindsay 1998).⁸⁴ Devolution must establish the legitimacy of local institutions, provide sufficient autonomy to undertake development activities and modify local rules and institutions, and increase the accountability of self-governing institutions. They must also extend citizens' recourse against arbitrary allocation of resources. It is important that the legal property, access, and benefit-sharing rights of women and minority groups be recognized and that they participate in decision processes (Anderson et al. 2002). For community-based enterprises to be profitably involved in forest leasing or other

arrangements requires forest governance mechanisms that promote equitable bargaining, informed consent, adequate notice, formalization of community and local legal personality, and third-party support for negotiations on benefit-sharing (Lynch and Talbot 1995).⁸⁵

For example, rural communities in Mali who received organizational training through the Operation Haute Vallée development and extension project were able to negotiate agreements with the forest service so that the service would no longer issue permits to outside commercial fuelwood cutters on community lands (previously a common practice). In return, the communities agreed to implement management plans limiting cutting of living trees, and some communities organized periodic patrols of forests to keep illicit cutting to a minimum. Agricultural extension programs helped them to intensify farming methods and rehabilitate degraded lands as well. Despite population increases, deforestation rates declined or reversed between 1988 and 1999, and over 70 percent of village lands remain in forests (Anderson et al. 2002).

Address concerns and arguments against forest ownership reform. Large-scale forest tenure reform presents clear challenges. However, many commonly expressed concerns are exaggerated or can be addressed with good implementation strategies (Contreras-Hermosilla 2002).

Concerns about poor conservation outcomes were addressed in Chapter 4 and will also be discussed later in this chapter. In many countries government performance in protecting forest resources has been extremely poor. Forest tenure reform clearly needs to be accompanied by greater provision of technical assistance to producers and support for locally-led landscape planning. Field evidence suggests that when rights to harvest and sell tree products increase, farmers often plant more and harvest less than expected (Mayers and Bass 1999).

A second concern of governments is that forest tenure reform could lead to pressure to extend reform to areas with the richest or most endangered biodiversity. Contreras-Hermosilla (2002) notes that such expectations did arise in the cases of forest tenure reform in Chile and Bolivia, but that they were managed by proactive efforts to establish appropriate rules. In many countries, such as Indonesia, the option does not seem to be whether occupation will continue or not, but whether such penetration will take place in an illegal and perhaps violent and chaotic manner or whether instead the government will be willing and able to steer it in an orderly way. In some cases, securing community rights would, however, need a vastly expanded capacity of the state to impose law in state forest lands to avoid land invasions and squatting.

Another concern is that farmers will sell their land or forest resources to large corporations or other powerful actors with both forest and people ending up in a worse condition than before the reform. In addition, unrestricted market forces without

safety nets create the risk of increased land concentration. Transferring rights to communities rather than to individuals has addressed this problem in some cases, such as Mexico, China, and India.

Fourth, there is a real risk that community elites will take over the tenure reform process and increase the level of internal community inequality. Programs for increasing transparency of decisions and for informing communities of their rights and the consequences of decisions could potentially help to promote better community governance. There may also be increased conflicts between communities. Communities may disagree about land boundaries and there may be overlapping claims to land and conflicts over other traditional rights to resources on that land. This means that mechanisms must be put in place for processing and handling complaints and settling conflicts quickly. A separate agrarian court could be considered.

Finally, questions of equity have been raised over granting rights over valuable public resources to small groups of poor people, especially if the resources were not originally alienated from those groups. But many state actions and investments benefit particular (usually much richer) groups. It is both practical to allocate forests to local people who live there and far less problematic than agrarian land reform that redistributes privately held land.

Strengthen Local Rights in Public Forests

New mechanisms have proliferated for devolving forest usufruct and management rights for public forests to local communities, villages, user groups or households, even when the state retains ownership. Strong access rights to forests can often be more useful than weak ownership rights. Site-specific arrangements include co-management agreements (notably in South Asia), village forest reserves, and long-term community or household forestry leases, often upon agreement to manage the areas in accordance with an agreed-upon plan (Christy, Mekouar, and Lindsay 2000). In Nepal, for example, the Leasehold Forestry Development Programme begun in 1990 provides groups of poor villagers with a 40-year lease on otherwise productive land for tree-growing and livestock-raising. The Program now operates in 26 districts and has helped 11,000 families (mostly from disadvantaged ethnic groups) to reclaim 7,000 hectares of hillside land. Incomes have increased, and studies show that six percent of project households report the return of a household member who had previously migrated for work elsewhere (Pant 2003).

Successful collaborative management requires that the objectives of local communities and state agencies “fit,” and that management rights be explicitly recognized (Shepherd, Arnold and Bass 1999). The most effective arrangements usually build on existing local institutions and processes (Sarin 2001).

In several countries, local groups have successfully negotiated new land use rights by

demonstrating willingness to adopt sustainable management practices and control deforestation (**Box 20**). Recent studies in Ecuador, Guatemala, India, Uganda, and the United States found that local community groups were indeed able to regulate the use of threatened forests to which they were granted management rights under certain circumstances. Success is more likely where government agencies do not undermine local efforts to monitor forest use, sanction abuses, and resolve conflicts;

Box 20. Sustainable Management to Obtain Forest Rights in Sumatra, Indonesia

In Lampung Province, Sumatra in Indonesia, farmers have created over the past century damar-based agroforests that dominate the landscape over 100,000 hectares. In a mature damar forest garden, damar, the tree from which commercial resin is harvested, accounts for two thirds of the trees; the rest of the multi-layered agroforest includes numerous other fruit, food, spice, and medicinal perennial species, plus other wild species. More than 80 percent of the damar resins produced in Indonesia is supplied by these damar gardens. Despite their agricultural use, these high-canopied agroforests—which physically resemble natural forests—have been under the jurisdiction of the Forest Department, when they would most logically be regulated under an agrarian regime. A history of strict regulations designed for natural forests has seriously disadvantaged farmers.

A landmark decision of the Ministry of Forestry in 1998 created a special tenure instrument that secured the rights of farmers to 29,000 hectares of their agroforests that lie within the state-designated public forest zone on the west side of the Barisan National Park. A coalition of NGOs, university staff, and an international research organization was instrumental in conducting the ecological research in this humid tropical forest zone that provided the empirical foundation for this decision. The creation of this new designation as Special Management Area opened the door to new opportunities in community forestry. It was followed by a decree that gives community organizations residing inside state-defined forest zones the right to manage the forest, while not owning the land. There are barriers to the utility of this decree, such as a lack of information upon which the state can be assured that the watershed hydrological services or biodiversity are being adequately protected by the residents, and a lack of clear and pragmatic processes by which the agreements can be concluded and compliance monitored. However, the watershed in the Krui area has been entirely planted and husbanded by local communities with complex agroforests, leaving little doubt in the minds of the state foresters that the hydrological functions, and even a major part of the biodiversity functions, are well intact. The new land classification is unprecedented in that it:

1. Sanctions a community-based natural resource management system as the official management regime within the State Forest Zone;
2. Allows non-governmental organizations to work with local people to be directly involved in the drafting of a forestry decree;
3. Allows the harvesting of timber from within the State Forest Zone by local people;
4. Allows the limited harvesting of timber from within a watershed, provided the watershed functions are still met;
5. Devolves the management responsibility of State Forest Lands to a traditional community governing structure (Masyarakat Hukum Adat); and
6. Is a right provided without a time limit.

Sources: ASB (2001b); Fay and Michón (2003); Michón et al. (2000).

where local groups perceive forests as important; where groups have previous organizational experience and share a common understanding of what is happening in the forest; where the forests are small enough to easily monitor; and where the political system empowers groups within communities that favor sustainable forest management rather than those with a strong vested interest in unsustainable activities (Poteete and Ostrom 2001).

Managing a system of harvesting rights for heterogeneous commercial NTFPs often requires an approach different from conventional timber regulation. It is difficult to guarantee exclusive access, and commercial user groups are often highly mobile. There may often be high NTFP industry resistance to the introduction of a management regime and high transaction costs associated with industry collaboration. There is typically a lack of investment in the resource stock and uncertainty about whether the benefits of management will exceed the costs. Thus any system of managing the land base must allow for overlapping and interdependent system of rights and responsibilities, and ongoing monitoring (Tedder, Mitchell and Hillyer 2002).⁸⁶

In these local use and co-management arrangements, government forest departments typically retain important decision-making powers, including the power to draft and approve management plans, and to decide about species selection, marketing of harvested products, and use of benefits by local groups. The strength of the rights granted or recognized under local arrangements may be unclear because the government has apparently wide powers to terminate the agreement for poorly defined reasons. It is not uncommon that when forest products acquire real value government authorities reassert control over the resource, as has been done in Nepal and Lao, or that they are subject to renewed regulations or restrictions (Fisher 2001). For commercialization to be successful, these types of issues must be addressed.

Some argue that co-management approaches are the best solution to forest tenure problems. However, the most serious problem worldwide in implementing co-management schemes is the tendency of government institutions to keep control of key decisions. Few communities are prepared to run businesses or work as equals with government institutions, especially as there is often a high level of mistrust. Co-management entails substantial ongoing costs in negotiating, determining roles, establishing sharing agreements monitoring and evaluation, etc. Thus experience suggests that while co-management arrangements have advantages, they are poor substitutes for land ownership (Contreras-Hermosilla 2002).

Secure Local Rights to Ecosystem Services of Forests

Rights to most ecosystem services of forests have not been legally established in most countries. As the financial value of these services increases, there will be greater political negotiation over those rights. There is already considerable debate in many countries, as new markets and payment schemes for these services are being set up.

It is critical that local people's rights be strengthened and clarified before the rules governing these markets are formalized. Once financial payments are available for watershed or biodiversity services, definitions and rights must become more specific and are likely to change, potentially to the detriment of traditional local users (Powell, White and Landell-Mills 2001). The prospect of large-scale expropriation of local land rights by government or private interests to develop financially valuable forest carbon projects is one of the main reasons that many indigenous organizations around the world initially opposed including forests in global carbon emissions trading schemes (Declaration of the First International Forum of Indigenous Peoples on Climate Change 2000). "Bio-piracy" has already become an important issue for indigenous peoples (Vogel 2000). On the other hand, if local rights are enforced, and equitable, transparent, and efficient systems for organizing resource transfers and compliance monitoring are being developed, ecosystem service payment schemes could provide large financial benefits to poor rural communities.

REDUCE THE REGULATORY BURDEN ON LOCAL FOREST PRODUCERS

Reducing the excessive regulatory burden on local forest producers will often be necessary for them to participate profitably in forestry markets. Even producers owning their own forest or growing their own trees typically face prohibitions or restrictions on commercial use and marketing that pose high economic and welfare costs. Many forest agency permit systems were originally put in place to earn revenue and are unlinked to any specific management or conservation objective. Regulations can often be radically simplified with little loss—and possible gain—for forest conservation.

Restrictions on Commercial Use of Forests

Forest market activity in most countries is choked by excessive state regulation (Köhler 2000). As eloquently noted by Christy, Mekouar and Lindsay (2000):

In a significant number of countries, one can point to complex and costly processes and bureaucracies that have taken on a life of their own, and the related phenomenon of entire professional sub-specialties, in both the public and private sectors, devoted to arranging, obtaining or granting exemptions or permissions, the reasons for which may be unclear or forgotten.

Barriers are posed by permit systems, management plan requirements, and designation of species and areas off-limit to commercial harvest, even for producers using artisanal methods or simple gathering. The bureaucratic gauntlet facing those who wish to sell timber is illustrated by the case of West Bengal, which entails ten steps to sell timber grown on private lands (Box 21). Countries also impose numerous business rules, ranging from requirements for the location of sawmills (for accessi-

bility of regulators, rather than the forest resource) to restrictions on the use of chainsaws for processing by small-scale loggers (only recently lifted in Honduras). In India, most aspects of NTFP collection and marketing are strictly regulated (Mallik 2000). Although the widespread legislative bans on cutting hardwood species for woodcarving are rarely enforced, they present a disincentive for planting or management by local people and create confusion (Belcher et al. 2002).⁸⁷ Industrialized countries also have cases of unnecessarily restrictive rules on NTFP harvest (for example, with mushrooms pickers in the U.S.; McLain 2002).

Box 21. Procedures Required for Sale of Timber from Private Trees in West Bengal, India

1. Initial application to the Village Council and the Chief.
2. Application referred to standing committee consisting of the Block Development Officer, Range Officer, and some elected members.
3. Range Officer approves.
4. Check with local Land Reforms Officer to verify ownership of the land.
5. Range Officer to estimate the value of the plantation (this decides who in the forest hierarchy would issue the permit).
6. The buyer makes an affidavit to obtain a court order to cut the trees.
7. The buyer cuts the trees.
8. The buyer applies to the Range Officer for a transit permit.
9. The Range Officer (or his superior, depending upon the value of the plantation) inspects and hammers the trees, and issues the transit pass.
10. The sale is completed.

Source: N.C. Saxena, pers. comm. (2000).

Strict and standardized regulations combined with weak institutional capacity of the responsible federal agency commonly result in strong incentives for illegal extraction. Standardized regulations are not cost-effective when the risks for different forest types and ownership patterns are very different, and are particularly ill-suited for small dispersed forest-based enterprises with limited capital flows and fluctuating levels of return. Moreover, strict centralized regulation creates difficulties for decentralization and generates conflicts between federal, state, and local government entities (Molnar et al. 2001). As discussed in Chapter 4, criminalizing local forest use harms the poor, undermines local initiative for forest conservation and establishment, and diverts public resources for forest protection. For example, Brazil's attempts to control the mahogany export trade have increased corruption, especially species misspecification, and diversion of mahogany to less discriminating domestic markets where governance problems are more acute (Richards et al. 2003).

Required forest management plans are a ubiquitous barrier for low-income producers whether to qualify for forest use rights, marketing rights, or for technical or financial support. Such plans typically have complex requirements—drawn from large-scale concession models—that force them to contract for external technical assistance, as well as elements that are completely irrelevant to the management of small forest areas (Christy, Mekouar and Lindsay 2000; Kaimowitz 2003).⁸⁸ Externally developed management recommendations are often technically inappropriate to local conditions. It is particularly inappropriate to require a management plan that assumes a single extractive cut by a single entity where forests are allocated in small parcels to different community members and managed independently, as in Mexican ejidos (Molnar and White 2001).

Expensive, complex, poorly understood, and contradictory regulations make it difficult for local producers to stay in compliance. Often the same forest area is subject to regulatory oversight from multiple agencies.⁸⁹ Forest rules are thus easily abused as social or political controls through selective enforcement. The high cost of compliance encourages illegal operations, particularly for producers of low-value commodities or low volumes. In Nepal, requirements for communities to install sawmills are so restrictive that they effectively represent a ban (Malla 2000). These constraints largely preclude a large number of small-scale (illegally) functioning forest enterprises from growing into more efficient, profitable, and environmentally sustainable businesses.

Moreover, evidence suggests that the complex regulatory approach has been largely unsuccessful in encouraging sound forest management. Agency resources are often inadequate, regulations are often ecologically unsuitable for local conditions, local people are frequently unaware of the rules (Contreras-Hermosilla and White 2004).

Approaches to Regulatory Reform

Forest resources, both natural forests and larger-scale plantations, clearly require some form of regulation to protect against socially unacceptable losses of ecosystem services and biodiversity.⁹⁰ However, alternative approaches must be developed to replace the current oppressive, expensive, and largely ineffective system of strict, complex, centralized regulation. There are four broad recommendations for regulatory reform that could be applied in different situations:

Focus regulations and enforcement on critical problems. The first recommendation is to focus public regulations and enforcement on only the most important externalities, the most important sites, and the most important operators:

- *Limit regulations to the most important externalities.* Public regulations limit property rights. Thus they should be used with caution and only for the most important externalities of public concern. In the United States for example, there are no

federal forestry regulations, rather only two regulations that directly affect forest practice, one focusing on endangered species and the second on water quality. This prioritization enables government officials to dedicate their scarce enforcement efforts to the issues deemed most critical to the public.

- *Focus enforcement on the most important sites.* All forests are not created equal from a biodiversity or ecosystem function perspective. Much work in the last decade or so has gone into identifying enforcement sites with particularly high conservation value. Focusing enforcement on these particular sites, whether on governmental or private land, would similarly allow a more efficient use of government resources.
- *Focus enforcement on the most important operators.* The needed “crackdown” on illegal forest use should focus on large-scale actors with the greatest potential to do large-scale damage in the short-term. Another reason for targeting large-scale actors is that they are by far the greatest direct beneficiaries of public forest concessions in developing countries and have contractual obligations to protect public forest resources.

Simplify regulations. The second approach is to drastically simplify forest regulations to reduce cost and complexity and to remove discrimination against local smaller-scale producers. A review of successful natural resource management programs in Africa found that an alternative more effective approach to forest regulation is to set minimum standards that specify goals, set targets, and establish restrictions and guidelines for environmental use and management. Any organization, individual or government agency operating within those restrictions and meeting goals/targets needs no approval from a government or management plan to use or manage resources. This approach allows for innovation and initiative as well as responsibility to be developed at the local level (Anderson et al. 2002). Outcome-based policies that, for example, specify residual stand, site disturbance, gap size, tree demography, or water quality could serve to reduce the forest bureaucracy and the high costs of prescriptive policies (Bennett 1998).

Liberalization of markets and the removal of bureaucratic controls could be implemented immediately where markets pose no environmental risks, such as where significant production is from trees on farmlands in regions where agricultural markets work fairly well and for gathering of low-value NTFPs for sale (N.C. Saxena pers. 2001 comm. 2001 ASB 2001a). The World Agroforestry Centre has proposed three categories of tree species already grown mainly in farm plantings as ripe for immediate deregulation in Indonesia: exotic species that do not originate from any of the country’s natural forests; indigenous species now found mostly in farmers’ fields and indigenous pioneer species that grow mainly in forest gaps and are not present in mature natural forests (ASB 2001a). Simplification of regulatory systems could help not only small-scale producers but also other actors in commercial markets.⁹¹

The Community Ecosystem Trust model being proposed for indigenous forest management in British Columbia, Canada involves an approach to regulation that moves beyond the limits of both de-regulation/voluntary compliance and centralized rule-making. Through the community trust charter, the community management authority develops a management plan for the trust area, which shifts from standard-setting to the establishment of mandatory performance-based objectives that all licensees in each sector must meet and that mandate the ongoing use of best practices in each sector. These practices then become the baseline for decision-making, unless a potential licensee is able to demonstrate that an alternative practice is appropriate or adequate. Other elements proposed include graduated licensing that rewards higher-level practitioners with less oversight, associational self-regulation wherein user groups monitor their own members within a code of compliance based on the trust objectives, management plan, and performance standards/best practices; and citizen enforcement through a range of mechanisms, including a specialized tribunal (M'Gonigle, Egan and Ambus 2001).

Encourage local regulation and voluntary compliance. The third recommendation is to devolve forest regulation to local governments and encourage voluntary compliance. In general, forest regulations should be tailored to local conditions and monitored locally. Rather than focus on punitive regulatory controls for local forest producers and users, conservationists should resolve to undertake the slower, but more sustainable, approach of building social expectations and pressure for improved practice. This would focus on education to help actors understand the rationale for forest management recommendations and would leverage social incentives for compliance. In many cases detailed management plans could be replaced by packages of voluntary “best management practices” with transparent and participatory processes to monitor compliance (Box 22), coupled with “bad actor” laws for punishing egregious failures of compliance. In general, community forest management should be based on local realities and use local rules as a starting point (Kerkhof 2000; Smith, Scott and Merkel 1995).

Foster certification. In some situations, third-party, private certification can be the lowest-cost approach to ensuring conservation outcomes from forest use and management. Already some governments are exempting certified forest producers from compliance with government regulations, since part of the certification process ensures that critical management practices are used. Meidinger (2003) makes the point that forest certification functions *de facto* as a form of environmental law-making by global civil society.⁹² Some certification schemes are methodically crafted by international networks of policy actors to define and implement the rules under which forest management enterprises are to operate and to verify that standards are met. Meidinger argues that the certification movement could benefit by learning from the experience of legal and socio-legal analysis, in particular to improve enforcement, adapt based on experience, achieve consistency across varied situations, and attain legitimacy.

Box 22. Auditing “Best Management Practices:” A Low-Cost Alternative to Forest Regulation in the USA

The state of Montana in the U.S. has 22.5 million acres (9.1 million hectares) of forest land. In 1987, in response to new federal legislation to address non-point source pollution, Montana passed a resolution to use qualitative Best Management Practices (BMP) audits to improve environmental performance of forestry, particularly to encourage compliance with a Streamside Management Zone Law—the only major piece of formal regulation. No formal forest management plans are required by the state. Rather, every landowner who proposes to harvest must submit a 2-page harvest plan that includes a map and identifies locations of roads, harvest units, etc., and indicates measures to be taken to mitigate biodiversity and water impacts, and to reduce potential fire hazards. Educational programs have been developed for loggers, landowners, and land stewards to encourage widespread knowledge about the rationale and proper use of BMPs.

The BMPs—developed jointly and endorsed by industry, conservation organizations, and government agencies—cover roads, timber harvesting, stream crossings, winter logging, and use of hazardous substances. Prior to logging activities, the state forest agency notifies all forest owners about BMPs. The audit process itself encourages observation, and results are used to focus training needs and identify the need for changes in BMPs. Audits are held every two years for a random selection of one percent of forests across ownership types (state, private industry and non-industrial private forest) and regions, with a special focus on forests near stream sites. The auditing team includes representatives of diverse stakeholder groups. They undertake field visits jointly to ensure complete transparency of results.

If BMPs were not followed, forest owners can be sued for egregious violations and can be required to participate in additional training for minor infractions. This system has demonstrated several important advantages: the costs are very low, approximately US\$30,000 per year; dissension and distrust among actors has diminished; the system impinges minimally on private property rights; it encourages forest owner knowledge. Auditing in the year 2000 found that BMPs were properly applied in 96 percent of audited sites, up from 78 percent in 1990. Only ten percent of sites had departures from BMP that resulted in significant erosion. On “high-risk” sites, BMPs were properly applied on 92 percent of sites, up from 53 percent in 1990. Many sites had at least one departure from BMPs, but most were minor and did not cause erosion or deliver material to streams. Since the early 1980s, there have been observable improvements in standards of forest management. BMPs are updated regularly to reflect new scientific knowledge and social concerns.

Sources: Etheridge and Hefferman (2000); Andy White, pers. observation (2002).

To meet the regulatory challenges for small-scale and community forest producers, Kaimowitz (2003) argues the need not only for forestry law reform but also reform of the institutions involved in forest regulation, enforcement of existing laws that favor rural livelihoods, and more community-based enforcement. An adaptive management and learning approach is most sensible, given the extensive gaps in knowledge about enforcement practices and impacts. Legitimate conservation concerns about deregulation may be addressed by undertaking reforms on a pilot basis and monitoring the impacts. New systems of remote-sensing and community forest-watch organizations can provide reliable monitoring of forest activity and trigger intervention where major threats to forests arise. Local people can also organize their own monitoring strategies, based on locally agreed indicators (Ottke et al. 2000).

LEVEL THE PLAYING FIELD FOR LOCAL PRODUCERS IN FOREST MARKETS

In many cases, participation by the poor in forest markets is constrained mainly by underlying market weaknesses: physical isolation, the low commercial value of forests, high transport costs, or highly fragmented markets with high transaction costs. But in other areas with economically valuable forest resources, good market access, and integrated economies, forest market policies that discriminate against the poor pose the most formidable barrier for local enterprises. Governments widely subsidize or provide privileged access to large-scale producers and processors, establish market rules that especially burden small-scale producers, set price policies that undervalue the forest resource, establish official buyer monopolies, create artificial incentives for outside actors to clear local forests, and set excessive taxes and forest agency service charges.⁹³ With increasing consolidation of forest companies, large-scale buyers can manipulate the market to the disadvantage of weaker suppliers, and large vertically-integrated producers can set up unscalable barriers to new entrants in the market.

Table 3 showed that poorer forest producers benefit most from a “level playing field”—from markets with many buyers and sellers, few limitations on market entry or operation, flexible quality and volume requirements, and without subsidies or regulations favoring large-scale actors. Steps can be taken to promote more competitive markets and remove fiscal policies, and reform forest market rules and forest revenue systems to make markets fair to low-income producers. These steps will often benefit the forest sector as a whole by increasing efficiency.

Promote Competitive Markets

Efforts are needed to reduce forest market monopoly buyer and seller control and diversify the pool of market intermediaries. For example, the use of “tied” credit deals that oblige local producers to sell to individual private traders often consolidates control and market power in the hands of the buyer. Local producers harvesting in public forests should be free to sell to any buyer and should not be restricted to selling to a forest agency monopoly. Agencies should not be allowed to sell the right to collect NTFPs from public forests.⁹⁴ Minimal volume rules for bidding on forest concessions or purchase should be lowered or dropped as should minimum area limits for participation in forest development and conservation projects. Intermediaries should be encouraged to bundle products from small-scale producers to achieve economies of scale.

A variety of strategies could be used. In remote areas, it may be necessary for third parties to help local producers negotiate with monopsony traders. In well-linked areas, governments can encourage competition. For example, rattan auction markets

were established in Kalimantan, Indonesia to introduce more competition and help break the tight hold of a cartel of traders. As a result, price and quality criteria became more transparent to public users as well (Belcher 1998). Timber “floor” prices may be set to balance the monopoly power of timber buyers (Gray 2002). Rather than selling timber on the stump, which disadvantages small producers, a log sort yard can be set up as a central holding facility for logged wood. Such a facility allows for a variety of sorts of different grades and sizes, thus meeting the needs of producers with small, but varied levels of production, as well as different types of buyers.⁹⁵

New legislation facilitating community producer-industry contracts and partnerships may be needed. Legal and industry standards for fair business contracts can be developed to help safeguard the interests of less powerful local producers. Public information services can be set up to provide reliable price and market information,⁹⁶ as well as practical guidance on market entry.⁹⁷ Local communities can be enabled to take on a more active role in market governance as was done in woodfuel markets in Niger (Box 23).

While most of the commercial opportunities for low-income producers will be in domestic markets, it is important for trade negotiators to keep those producers’

Box 23. Improving Local Governance of Woodfuel Markets in Niger

Studies carried out in the 1980s concluded that the existing system of marketing woodfuel in Niger—based on government control through the granting of permits and harvested by mobile labor gangs from outside the region—was archaic, uncontrolled, and mainly benefiting selected merchant-transporters. To reform the system, a 1992 law radically reorganized the woodfuel sector within project areas. “Rural Markets” for woodfuel were created under the control of Local Management Structures (LMS). The LMS are composed only of representatives with local usufruct rights from different user groups in the village (woodcutters, farmers, herders). The forestry service chooses the villages where LMS are created on the basis of production potential. Annual quotas are determined by committees which are composed of one representative of the LMS, two staff members from the forestry service, and one staff member from the municipality. LMS manage the Rural Markets and supply them with woodfuel. Three types of markets were distinguished: “controlled” markets supplied by delineated and managed production zones; “oriented” markets, supplied by delineated but non-managed areas; and “uncontrolled” markets, tolerated during a transition period.

Wood tax collection was transferred from harvest to the transport level. Rural Markets charge less than other areas as an incentive for traders to purchase in areas where production is organized by the villagers. Tax revenues are divided between the public treasury, the LMS, and the local municipality. The more “controlled” the market, the more revenues are allocated to the LMS. Tax recovery within the rural market has amounted to almost 100 percent. Between 1992 and 1995, some 85 Rural Markets were created, covering an area of about 352,000 hectares. In 1995, their supply amounted to some 15 percent of demand in the city of Niamey and implementation has increased steadily. A similar model was introduced to the neighboring country of Mali in the late 1990s.

Sources: Dubois (1998); Ribot (1995).

interests in mind in shaping domestic and international trade regimes. National trade policies commonly disadvantage community forest producers. For example, Indonesian policymakers imposed high export taxes on both sawn timber and logs to promote domestic wood processing, harming millions of rubber farmers who sell rubberwood (ASB 2001a). At the international level, the World Trade Organization should not define investments and programs to support sustainable community forestry as prohibited “subsidies” and should make sure that labeling of forest products as “socially responsible” is an approved trade practice (Sizer, Downes and Kaimowitz 1999). International trade and investment rules for forest products must find ways to avoid undermining sustainable local forestry by flooding the market with non-sustainable and large-scale illegal sources.

Remove Discriminatory Fiscal Policies

Overall, it is difficult to generalize how tax regimes affect forest management in developing countries. Tax regimes change frequently. It has proven difficult to get enough data to analyze the issue, and many factors confound the results. There are usually wide discrepancies between the theoretical tax structures and what people really pay (Kaimowitz 2003). Nevertheless, it is evident that most forest subsidies and tax incentives favor well-off landowners and large forest industry.⁹⁸ In some countries where local fiscal policies have been studied, such as China and Niger, tax policies were found to discriminate against smallholders (Ribot 1996; Sun 2002). In the U.S. and Indonesia, stumpage fees charged to large industrial logging companies for wood from public forests are often set well below forest management and replacement costs, while small-scale enterprises are charged more or are ineligible to buy (Barber, Johnson and Hafild 1994).

To “level the playing field” for low-income local producers, discriminatory tax, fee, royalty, and subsidy systems need to be reformed.⁹⁹ Forest and other agencies can devise alternative revenue strategies that streamline collection costs, are more equitable, and do not disrupt economic activity (Landell-Mills and Ford 1999). In forest revenue structures, it is important not to front-load permits; more money may be raised by back-end taxation, as is done in most other economic sectors, and also in order to be fairer to local and low-income producers. Stumpage fees for wood from public forests can be set to reflect real values, so as not to out-compete stumpage from privately owned forests. Subsidies for forest plantations should also be designed in a non-discriminatory fashion. Comprehensive reforms to encourage local participation in forest product markets are underway in a few countries, such as Bolivia (**Box 24**). Reform has been made easier by the fact that many governments have developed more lucrative, alternative sources of revenue, such as wholesale and retail market taxes.

Box 24. Increasing Local Participation in Timber Markets in Bolivia

In 1996, the government of Bolivia passed a new forestry law to encourage more sustainable forest management. New policies (e.g., the Popular Participation Law) also strengthened the position of local producers to participate in timber markets. Key elements that have strengthened the market position of small-scale producers (primarily in domestic markets) included:

- **Forest rights:** Indigenous groups have been given legal titles to 2.9 million hectares, and another 13.2 million hectares are in process; one national park of 3.4 million hectares is under exclusive indigenous management.
- **Management plan exemptions:** Exceptions to the requirements for approved forest management plans have been issued for forest management in private properties less than 200 hectares; for timber extraction in areas equal or less than 3 hectares; and for some local user groups.
- **Concession fees:** Concession fees for private lands and indigenous communities are applied only to the area exploited in a given year, not the total area of the concession. Since only 5 percent of each private forest area or concession can be harvested per year, this means the actual fee represents only 1/20 of the rate paid by industry. The forest concession fee for NTFP extraction is only 30 percent that for timber. Reforested public lands are not charged with forest fees.
- **Simplified access to municipal forests:** Local communities may organize into Local Community Associations (ASLs) to utilize Municipal Forest Reserves, which can account for up to 20 percent of public forestlands. These associations can access public forest through the concession system, without going through the public auction process reserved for other timber utilization contracts.
- **Municipal support to communities:** Decentralization of forest management responsibilities to prefectures and municipalities has enabled greater local participation in forest policy in many cases. Some municipalities have supported ASLs by assisting in forest management plan inventories, equipment for forest access road improvement and maintenance, and funds to support transport costs.
- **Marketing and certification support:** The BOLFOR Project began to provide assistance in marketing and certification to indigenous producers and ASLs, as well as industrial producers.

There remain numerous difficulties facing local commercial forest producers, including delays in implementation of land rights, costs of forest management plans, lack of financial capital, and weak integration with value-added processing operations. ASLs currently produce only 5 percent of the nation's timber supply. Still, these institutional changes make it feasible for their share to rise significantly over the next decade.

Sources: Contreras-Hermosilla and Vargas (2001); Kaimowitz et al. (2000); Pacheco (2001).

INVOLVE LOCAL PRODUCERS IN FOREST GOVERNANCE AND POLICY NEGOTIATION

Better governance is a vital pre-condition for effective and equitable forest product markets and is essential to protect the social safety net and local ecosystem service functions of forests. Democratization and devolution create openings for more active participation of local forest producers in policy processes and force greater transparency in forestry markets. At least 60 countries have decentralized aspects of

forest and natural resource management, and this trend is opening up new opportunities for local participation in forest policy where local governments are truly democratic and have real power over major decisions (Ribot 2002).¹⁰⁰ Involvement of local producers in policy negotiations and governance that shape development of forest markets is desirable not only on democratic principle, but also because it results in more practical, realistic and lower-cost laws, regulations, and development plans. But to realize these opportunities, actions must be taken to legitimize local roles in forest policy and promote new political alliances.

Legitimize Local Roles in Forest Policy

Democratization is enabling local people and others outside the forestry sector to slowly gain a voice in the management of public forests and in forestry planning and policy. Decentralization of forest control and management from national agencies to local governments is creating conditions that are more conducive to local input (Kaimowitz et al. 2000). International norms have been developed that protect indigenous peoples' rights¹⁰¹ to manage their own resources, including Articles in the International Labor Organization, the Convention on Biological Diversity, and the RAMSAR convention (Tresierra 1999). The Aarhus Convention of 1998 on "Access to Information, Public Participation in Decision-Making and Access to Justice on Environmental Matters" calls for transparency in public decision-making for tropical forests as well as other resources and for active involvement of local communities (Petkova and Veit 2000). Where there is greater political openness, people can speak out more openly about abuses, corruption, environmental damage, negative social impacts and other elements of irresponsible forestry. Local communities and producer organizations still need to gain a voice in trade negotiations that could severely impact their livelihoods. An important step in this direction was the establishment in 2002 of a permanent Indigenous Peoples' Forum in the United Nations which emerged from the Decade of Indigenous People initiative under the United Nations Economic and Social Council.

Experience suggests a host of measures that can be taken to enhance transparency and accountability in forest decision-making. Laws should make explicit reference to basic criteria for decision-making, provide for public review and comment on legislation, and create oversight bodies including members drawn from non-forestry sectors and civil society.¹⁰² Legislation should also create a public right to information and create opportunities for citizens to bring suit against the government for violation of forest laws (Christy, Mekouar and Lindsay 2000). Greater transparency has been encouraged by the development of independent forest monitoring capacity through remote sensing and grassroots networks, particularly in countries where NGO activity is legal.¹⁰³ Such monitoring is making it easier to determine compliance of forest managers with social and legal protections, as well as with environmental standards.

Some countries have devised new arrangements to strengthen local voices in forest policy negotiations and institutions. In Ghana, local people's forest rights have been codified (Box 25); elsewhere, they have been empowered through new policy processes. For example, in the state of Oaxaca, Mexico, nine Natural Resource Councils, including representatives of forest communities, government, industry, university and NGOs, meet monthly to discuss forestry issues. Joint activities have included lobbying to defeat a mining concession; negotiations with the Federal Electricity Commission to reduce forest clearing under their high tension wires; negotiating prices for mushrooms collected in the forest; and establishing a prohibition on hunting of white-tailed deer to allow the species to recover (DeWalt, Olivera and Correa 2000). Various multi-institutional planning models have been developed for ecosystem approaches to biodiversity protection that can be applied for forest management in landscape mosaics (Chung 1999). Because local forest producers may be inexperienced in meeting procedures and in strategies for negotiation or face language or cultural disadvantages relative to other actors, proactive efforts are needed in the negotiation process to ensure fair decision-making (Edmunds and Wollenberg 2001).

Box 25. Enhancing the Role of Local People in Forest Governance in Ghana

Between 1874 and 1994, forestry policy in Ghana evolved in focus, but remained centralized and authoritarian. In the late 1990s, forestry resource and market crises catalyzed a re-appraisal of forest policy. The Ministry of Lands and Forestry led a shift to a more collaborative model with local people. Key elements of reform included:

- Consultation-based policy reform of off-reserve forest controls which strengthened the negotiation position of farmers and landholders *vis à vis* the timber industry;
- Legislation to replace concessions with timber rights contracts requiring strong environmental and social commitments and improved local rights over trees;
- Experimentation with collaborative and partnership arrangements involving timber companies, farmers and the Forestry Department;
- Re-orientation of the Forestry Department to be more "client-oriented;"
- Development of national certification standards through a consultative process;
- Farmers' rights to decide whether or not and when trees on their parcels are to be felled;
- Farmers' rights to claim payment at the time of felling and better compensation for felling damage;
- Involvement of farmers in issuance of permits for transport of timber.

While major challenges remain, some important policy lessons can be learned from Ghana, including the value of: negotiation in national forums and working groups; collaborative approaches to address power inequalities; good information quality and flow; institutional structures for adaptive learning linked to policy; a mix of complementary policy instruments; emphasis on local knowledge and institutions; mechanisms for dealing with conflict; and the importance of individual "crusaders" for change.

Sources: Kotey et al. (1998); Dubois (1998).

Promote New Political Alliances

An important outcome of democratization has been the freedom of rural and indigenous communities to organize for mutual support and political advocacy. Recognizing that economically and politically powerful market competitors have been setting the “rules of the game,” local people have begun to organize and lobby for policy action. Forest rights and regulatory reforms have been achieved through political alliances among local producer networks and with other actors—national and international—who stand to benefit from forest market development.

State and national alliances. Important political alliances have been formed at the state and national levels. In Costa Rica, JUNAFORCA—the National Smallholder Forestry Assembly—joins 56 forestry organizations with 27,000 producers to participate in policy negotiations. They have secured support for the establishment of regional organizations, modification to the Forest Law gaining group access to reforestation incentives, and have become actively engaged in key policy dialogues (Watson et al. 1998).

The early 1990s saw the emergence of networks that were genuinely rooted in community organizations themselves. The emergence of national forest users’ associations, such as Jan Sagharsh Morcha, a coalition of tribal organizations in India, the Assembly of the Poor in Thailand, the Federation of Community Forestry Users in Nepal (FECOFUN; www.trees.slu.se/news/31/3lfecofu.htm) which emerged in 1995, the National Tree Growers’ Cooperative Federation in India (www.ntgcf.org/projects.html), and AMAN in Indonesia in 1999, are part of this trend (Colchester et al. 2003).

The politicization of commercial associations must be handled carefully, however. Organizations such as the rattan furniture industry association in the Philippines, the teak furniture associations in Java; ASMINDO, the furniture and handicrafts association, and APKINDO, plywood association of Indonesia, all became corrupt tools for extortion, providing little real support for small-scale members (Brian Belcher pers. comm. 2001).

International alliances. Sub-regional and national groups from different countries have begun to link together to take action in the international arena, often with support from international NGOs. In 1991, the Indigenous and Campesino Coordinating Association for Central American Community Agroforestry (ACI-CAFOC) was established by a coalition of indigenous and peasant associations to press for reforms in favor of communities (www.acicafoc.org); the organization is officially recognized by the regional Council of Ministers. The following year, the International Alliance of Indigenous and Tribal Peoples of the Tropical Forests was

established, led by the effective regional indigenous peoples' coalitions which had emerged in Amazonia and the Philippines in the mid-1980s. The Alliance positioned itself around a strong human rights agenda and was successful in getting the Inter-governmental Panel on Forests to take into account indigenous rights. The creation of the Global Caucus for Community-Based Forest Management, set up in the context of the World Summit on Sustainable Development, is another step in this process (Colchester et al. 2003).

The International Network of Forests and Communities, founded in 1998, now includes over 400 members in 54 countries who are promoting sustainable community forestry, especially in sensitive ecosystems and the world's remaining natural and old growth forests. INFC supports campaigns to advance a consensus statement endorsed by its members, the Saanich Statement on Forests and Communities (INFC 1998), that calls on governments to advance community-based forestry. While most of these organizations have concentrated their efforts on acquiring and protecting land and forest rights, they could evolve into lobbying and advocacy groups for major reforms in forest markets that would benefit local producers. Indeed, indigenous organizations from a number of countries have banded together to influence the terms of international carbon trading. While one major group lobbied for an international moratorium on forest carbon offset deals, partly to allow sufficient time for their members to educate themselves before negotiating business deals (Forum of Indigenous Peoples 2000), another group organized to promote carbon trading rules that would explicitly benefit indigenous communities (Amazonian Indigenous Forum 2001).

Non-traditional alliances. Local people working to regain alienated lands or stop concession development in community forests are finding allies in unexpected places. In some countries, they are gaining support from investors and consumers interested in socially responsible forestry. Voluntary codes of conduct for private direct investment are developing, supported by the stockholders of multinational corporations. For example, Forest Stewardship Council certification is being used as an investment screen by a number of global equity investors. In Indonesia, local forest communities have allied with municipal governments to negotiate a change in jurisdiction over their lands from the Forest Department to the district government, with the latter supporting their interests in commercial activity for fiscal reasons (ICRAF 2001). In several upland regions of the Philippines, 17 indigenous federations and four farmers' associations have formed and joined alliances with municipal governments, environmental groups, and the private sector to advocate for policy changes as well as to provide support services for resource management by member groups (Chiong-Javier 2001).

PROTECT THE POOREST IN FOREST MARKET DEVELOPMENT

There is a long history of debate on the impacts of agricultural commercialization on the poor. Commercialization can help poor producers when they have the capacity to respond to new incentives (von Braun and Kennedy 1994). But where they do not have that capacity, they may lose their present buyers to more productive, better capitalized or better connected competitors, or be unable to manage business risks and uncertainties (Hellin and Higman 2003). Commercialization may weaken the position of already less advantaged producers. For example, where forest resources are held under common or informal tenure, there is evidence that when forest products rise in value, *de facto* (if not *de jure*) control of those resources shifts to more powerful actors. When products of trees traditionally managed or harvested by women are commercialized, control frequently shifts to men (Poulton and Poole 2001). Where farmland is converted from intensive annual crop production to low-intensity tree production, jobs for the landless may be lost (Deweese and Saxena 1995).

Mechanisms must be developed to protect the interests of the poorest forest users and producers without sacrificing the potential income gains from commercialization for individuals and rural communities. The most important goal is to retain the “safety net” function of the forests, in particular the access by poor people to both subsistence products and rights to gather products for sale during hard times. This can probably be done more effectively by landscape-level policies and planning, rather than parcel-specific approaches like certification. Community and public forest managers can reserve for the poor specific areas of forest, harvesting rights during particular seasons of the year or particular products.

Rules in community- and co-managed forests can be flexibly designed to guarantee subsistence needs take precedence. For example, in India the Joint Forest Management notification of 1998 instructed that “all members of HRMS(s) may be permitted to collect dry and fallen wood, fencing material, limited number of bamboo and poles free of cost from their respective joint management areas for their bona fide use and not for sale.” Nonetheless, some concerns have been raised in Haryana state about conflicts between the commercial sale of bhabbar and its availability to local livestock owners for fodder. In West Bengal, conflicts have arisen over too high levels of fuelwood sales, as women are often left with inferior quality fuelwood. This leads to “forest floor sweeping” which leads to damaged forest ecosystems and accounts of people not able to meet their fuel requirements. In such situations, the level of sale permits need to be reduced (Saigal, Arora and Rizvi 2002).

In the case of community-owned forests, poor households are often technically co-owners and thus should have rights to a share of the economic benefits produced by that forest—whether or not they are actively involved. Tree products can be produced on farms through agroforestry systems that increase, rather than reduce, local employment and subsistence food supplies. The landless poor can be granted glean-

ing rights in these man-made plantations, much as was traditionally done in staple grain fields. The landless can claim a voice in forest management planning organizations. At the same time, it is unreasonable to expect that safety nets for the poor should be principally provided by their marginally less-poor neighbors; rather this is a key role for governments, major employers and others better-resourced to do so.

Few economic sectors benefit the poorest disproportionately. But there is ample evidence that successful commercialization by small-scale, low-income producers provides much higher economic and employment multipliers than most other patterns of economic growth. There is reason to believe that such benefits would also accrue to millions of poor rural people with successful commercialization of locally produced forest products and services.

NOTES

- 75 Poffenberger and McGeen (1998) report wonderingly that in 1980, 120,000 public forest employees managed 23 percent of the entire land area of India and a similar number of people managed over 70 percent of Indonesia.
- 76 There is extensive research and experience on forest tenure. Readers are referred to Bruce (1993), Dubois (1998), the Forestry and Land Use Series of the International Institute for Environment and Development (IIED), and the FAO's Legal Department.
- 77 The evolution of community tenure rights has been documented in detail for India in Poffenberger (1996).
- 78 Political pressure for rent-seeking through allocating public forest resources has been demonstrably hard to resist (Contreras-Hermosilla 2002b) and in some countries will only be controlled if forest ownership is devolved from governments.
- 79 The same study found that foreign donors contributed about 40 percent of the money African governments spend on forests. Yet donor support fell from US\$132 million in 1995 to US\$110 million in 1999 (FAO 2003).
- 80 Evidence from Ethiopia showed that private tree planting was more successful than government plantings (Jagger and Pender 2000).
- 81 It is instructive to look at the positive experience of smallholder tenure in agriculture (Pinstup-Andersen, Pandya-Lorch, and Rosegrant 1997). For example the Kenya Tea Development Authority shifted thousands of hectares from large-scale companies to smallholders with enormously beneficial impacts (John Spears, pers. comm. 2001).
- 82 Private community rights can be established by government delineation of the perimeter of community property boundaries, leaving internal land rights allocation and management to communities themselves (Lynch and Talbott 1995). In most cases, indigenous land rights do not include the right to sell the land to outsiders (White and Martin 2002).
- 83 This creates perverse incentives. To create a maximum incentive for local people to manage forests well, they should be allowed to retain a higher percentage of income from higher-quality forests.
- 84 Some countries, such as Madagascar, are exploring a shift to more locally-based strategies to regulate rights. In such systems, general legal principles are laid out as the basis for negotiation and definition of long-term objectives. This leads to a common choice of instruments and setting up a local management authority; the law evolves and adapts with experience (Dubois 1998).
- 85 For more detailed discussion of devolution and local forest management, readers are referred to Baland and Platteau (1996); Meinzen-Dick and Knox (2002); Edmunds and Wollenberg (2001).
- 86 Some options for NTFP management being piloted in British Columbia public forests are: a buyer-licensing and-reporting system; allocating harvesting rights based on temporary pilot plots; auctioning areas with high NTFP values; and licensing of NTFP companies with no designation of harvest area or volumes (Tedder, Mitchell, and Hillyer 2002).
- 87 Many of the main species for woodcarving are considered state property requiring permission to cut (e.g., *Dalbergia melanoxylon* in Kenya and *Santalum album* in Indonesia). In Zimbabwe, three of the four most traded species for woodcarving are listed as illegal to extract.
- 88 For example, Molnar describes the common prescription of a single harvest cycle to facilitate external monitoring, even though staggered harvesting cycles would be more efficient and profitable for the community and environmentally less damaging (Augusta Molnar, pers. comm. 2001).

- 89 Community forest enterprises in Mexico are required to have separate plans for forest management, wildlife management, and mushroom protection (Augusta Molnar, pers. comm. 2001).
- 90 Such concerns also apply increasingly to agriculture, as the scale of agricultural land use has become more dominant in many landscapes, and impacts on ecosystem services become more apparent (McNeely and Scherr 2003).
- 91 Indonesia's forestry concessionaires commit to an administrative and technical regime that full compliance would require some 225 charts, books, forms, and associated documents to complete, most of which require multiple copies. Theoretically, each concessionaire should receive up to 57 monitoring visits a year from the Ministry of Forestry (Kaimowitz 2003).
- 92 He notes that, contrary to common assumptions, civil society has long been an important source of law and that the tendency to equate law with the state is a very recent prejudice that misconstrues the genesis of state law.
- 93 For example, in 1943 Mexico federal law created entities called Forest Exploitation Industrial Units as part of their import substitution program. This policy granted control over huge forested areas to large national industries which integrated logging, milling, and cellulose production. These industries carried out high-grading (selective logging to remove the best and largest trees) on land belonging to ejidos, indigenous communities and private smallholders; forest owners were compensated with a negligible stumpage fee. During the 1970s and 1980s, public incentives for tropical colonization (by Mexicans from more densely populated parts of the country), transformed 28 million cubic meters of forest into large-scale cattle pasture and agricultural lands (Jaffee 1997). More recently, in India, the combined impacts of the Forest Conservation Act of 1976, a felling ban, monopoly control of the Forest Corporation on resin and timber from village forests, and controls over NTFP marketing have "drastically reduced local livelihood and employment benefits from both village and other categories of forest" (Sarin 2001).
- 94 This structure is widespread in India, where it is associated with a policy of nationalization of key economic sectors (N.C. Saxena, pers. comm. 2001).
- 95 An example of successful government investment is the establishment of a log sort yard in Vernon, British Columbia, Canada. The Ministry of Forestry financed a project to promote SFM and also supported small-scale local forest producers and manufacturing employment (Jenkins and Smith 1999).
- 96 Information should include: important tree species and products; standardized measures of the product whose prices will be described; identification of the most important marketplaces; mechanisms for regular supply of information from the markets; and estimates of the size of the population interested in the market information in order to interest the media (Issar 1994). For example, the National Wastelands Development Board of India set up a scheme to improve market intelligence related to NTFPs, utilizing All-India Radio, television, newspapers, and state marketing boards (Deweese and Scherr 1996).
- 97 In the U.S., Europe, and Australia many newsletters and websites serve clients who are small-scale forest owners and enterprises, for example, "Overstory," a publication out of Hawaii, and the website www.agroforester.com.
- 98 In Chile, for example, subsidies were paid well after planting with evidence of successful establishment, but low-income smallholders were unable to wait so long for payment (Contreras-Hermosilla and Gregersen 2001). In Costa Rica, subsidies for forest conservation and afforestation were reserved for plots of defined minimum area, thus excluding most poor farmers and forest owners (Chomitz, Brenes and Constantino 1999).
- 99 For example, in the late 1990s in Mexico, forest communities in the state of Oaxaca successfully negotiated with the Ministry of Finance to stop paying stumpage fees for logs harvested from public forests. In the original legislation, stumpage fees were targeted for investment in the social infrastructure of the communities, such as schools, but in fact the funds were never invested in these ways and the communities had paid for their own social infrastructure and services (Augusta Molnar, pers. comm. 2001).
- 100 Ribot (2002), drawing from a set of detailed case studies of decentralization from 15 countries, concluded that for decentralization to deliver on its promises, central governments need to establish a small set of minimal environmental standards that local governments must meet; they also must ensure the rule of law, the democratic process, fiscal transparency, and the rights of individual citizens, women and minorities, while ideally also providing training and information.
- 101 The World Bank defines "indigenous people" as social groups who have a cultural identity distinct from the dominant society, which makes them vulnerable to being disadvantaged in the development process. Criteria include close attachment to ancestral territories and to natural resources there; self-identification and identification by others as members of a distinct group; an indigenous language, often different from that spoken nationally; and primarily subsistence orientation (Colchester 1999).
- 102 For example, the GEF-supported project on integrated ecosystem management in Mesoamerica is governed by indigenous advisory council "Wayib" (GEF 2001).
- 103 Examples include the Global Witness program in Cameroon (Robert Nasi pers. comm. 2001) and Global Forest Watch, coordinated by the World Resources Institute (Ottke et al. 2000).

8. A FRAMEWORK FOR ACTION

TOWARDS A NEW MODEL OF FORESTRY DEVELOPMENT

Around the globe, forests and forestry are in transition. These changes are creating the opportunity to develop a new model of forestry development for the joint benefit of forest conservation and low-income producers. More conventional models and some of their modern variants will continue to have a role. But they are largely inadequate because of the limited scale of what they deliver to the poor and for forest conservation.

Limitations of Other Models

Historically important models of forestry development and conservation include large-scale industrial logging of public forests, parks and protected areas, social forestry, and integrated conservation and development projects. Other models being actively promoted now are industrial plantations (to supply commercial demand so that natural forests can be reserved for conservation uses), forest certification (to restrict commercial trade only to products from sustainably-managed forests), and conservation concessions (to finance use of public forests for conservation). All of these models can be effective in some particular situations. But they all face serious limitations in terms of the scale or level of benefits they can deliver for forest conservation and the rural poor.

While industrial logging, industrial plantations, parks and protected areas (if used for nature tourism), and certification can certainly contribute to rural economic development, their scope is spatially quite limited. Industrial enterprises and many protected areas and conservation concessions are associated with low levels of local employment, and in many forms these models dispossess or disempower the poor, and restrict forest access for the people who live in and around them. Little wonder then that the potential role of forests to reduce poverty is rarely mentioned either in discussing strategies to achieve the Millennium Development Goal on Poverty (or even the Goal on Environmental Sustainability) or in Poverty Reduction Strategy Papers.

In our judgment, the principal forestry models are also inadequate to achieve large-scale forest conservation in the rural areas of developing countries where most tropical forests and threatened biodiversity are found. Developing countries currently spend about US\$1 per hectare per year to protect the 700 million hectares of public forest protected areas. Even in the best case scenario, total overseas development assistance, Global Environment Facility and private philanthropic contributions to forest conservation would not exceed some US\$2.5 billion a year in total. This would work out to about US\$1.80 per hectare per year for the public forest pro-

tected areas, approximately US\$6 per hectare per year if extended to the 210 million hectares of biodiversity “hotspots,” and about US\$0.70 per hectare per year if extended to the entire developing country forest estate of about 1.7 billion hectares. While these are important sums, they are not sufficient to enhance significantly the incentive for protection of protected areas, much less the forest outside of protected areas (White et al. 2002).

Advantages of “Making Forest Markets Work for Low-Income Producers”

The model of “Making Forest Markets Work for Low-Income Producers,” on the other hand, can potentially address all of these constraints in large areas of tropical forests and forest mosaics in the more fast-growing (economically and demographically) regions where forests are most threatened. Trends in forest ownership, demand for forest products and ecosystem services, governance, and forest productivity are opening up unprecedented opportunities for low-income forest owners and users in commercial markets. Communities and small-scale farmers own a high and rising share of the world’s forest resource. Burgeoning domestic demand offers new markets more accessible to local people. New technologies enable them to produce more economically and sustainably at lower capital cost. New partnerships can supply capital, expertise and markets. Better organized and politically empowered local producers are becoming more able to negotiate both business arrangements and policy reforms.

Moreover, this strategy could potentially mobilize vast new financial resources for forest conservation. Primary forest product exports alone are worth close to US\$28 billion a year and exports constitute less than 10 percent of all wood products traded in most countries. NTFPs add billions of dollars to this amount. Socially responsible investments and fair trade labels could increase dramatically in forestry under the right policy environment. Payments to land use and forestry carbon projects under the Clean Development Mechanism could be worth several billions of dollars in the next 10 years, and other markets for forest ecosystem services will certainly increase in value. The in-kind contribution of the millions of indigenous and other communities and the millions of smallholders to forest conservation as well as their incentive to manage their private property of some 200 million hectares are often overlooked. But even if valued at only US\$1 per day and 100 million forest owners, their active presence would be worth some US\$36.5 billion a year. A more strategic use of ODA and public funds could leverage these private flows and incentives to transform forest markets and new instruments for ecosystem services into positive contributors to both forest conservation and poverty alleviation (White et al. 2002).

Premises and Values Underlying the Model

Underlying this model are some core premises about market realities and some core values about development:

1. Sustainable use will be an essential strategy for conserving biodiversity in the majority of the world's forests that are located in regions with large, poor rural populations.
2. Local communities with secure ownership of forest resources have incentives for forest conservation for livelihood and cultural values that can be extended by increasing their commercial value.
3. Small-scale enterprises can be a powerful engine of growth and employment, as we have learned from the past 50 years of experience in agriculture and other sectors; business models exist that demonstrate these same factors can work in the forestry sector.
4. Forests are among the few economic assets available to the rural poor; securing their ownership and sustainable commercial use can help them cope with and move out of poverty.
5. Economic justice demands that we replace production systems that systematically exclude, disadvantage, and exploit the poor in ways that characterize many of the current forestry models.
6. Respect for human rights and the new global context demand a move away from direct public administration and management of the forest resource where local people have legitimate claims.
7. Market conditions facing small-scale producers have improved because of new sources of demand, diversification, and liberalizing economies.
8. Sustainable, profitable, and employment-generating forest industry can be based on local forest resources and enterprises (rather than a “maquiladora” strategy).

Local community- and farmer-grown wood is likely to supply only a small share of internationally traded commodity wood products and a slightly larger share of high-value timber, but the benefits producers receive from this trade could increase much more. Their role in domestic wood and NTFP supply could be far larger than it is today. Commercial forestry development with local producers could potentially help to meet rising demand for forest products, provide incentives for forest conservation in populated areas, and raise household incomes for some of the world's poorest people in regions that have few alternative pathways for development. The impacts on rural poverty reduction from such a strategy are hard to calculate at this time because they are so dependent on achieving the necessary policy reforms and capacity building. But those impacts could be large over the next 25 to 50 years—benefiting hundreds of millions of people living in some of the poorest parts of the globe.

ROLES AND RESPONSIBILITIES

After assessing the progress of Mexico's indigenous forest management and industries, DeWalt, Olivera, and Correa (2000) concluded:

“Mexico invested substantial subsidies over a very long period of time into the parastatals and private companies that mismanaged and devastated the country's forests. Now that indigenous communities and ejidos are finally being given management responsibility for their forests, we should not expect them to develop their management abilities in a short time and without assistance to do so.”

Their insight is widely relevant. We need to level the playing field for such producers and give them a real chance to succeed. In this paper, we have highlighted many potential opportunities, promising business models, and examples of successful enterprises and policy actions. But there remain large gaps in information and experience and major challenges to find the right market niches, support local forest businesses, and reform policies to enable profitable market participation by local people (Figure 2, in chapter 2). To achieve the potential benefits of this new forestry development model for forest conservation, rural livelihoods, and rural development will require proactive efforts by governments, producer organizations, private companies, and international development organizations over the time span of a generation. Their key roles and responsibilities are described below.

Governments

Expansion of local business opportunities requires both public investment and policy action by governments and inter-governmental institutions. Some governments have already recognized private rights of low-income people to land, forests, and trees. But this alone is not sufficient. It is not the forested land itself that is the valuable commercial forestry asset. Rather it is the presence and quality of particular valued commercial species, habitats, and ecosystem services produced in that forest, together with the owners' capacity to mobilize effectively and at competitive cost to supply rapidly changing markets. Thus, it will be important to encourage the development of supply chains for growth commodities, and linkages with buyers for high-value specialty products, who fully—or even preferentially—include low-income producers. Policymakers committed to promoting commercial forestry for rural development on a large scale will need to invest in building the capacity of low-income forest producers to manage forest resources and develop competitive forest enterprises.

Most importantly, governments must provide a policy environment that enables and encourages private, civic, and community investment in sustainable forest market development:

- Launch a major review of tenure and reform to rationalize forest ownership, including

- recognizing indigenous and local community ownership and access rights to forests;
- Accelerate implementation of tenure reforms where these are already legislated;
 - Explore alternative arrangements for the remainder of the public domain;
 - Strengthen local forest rights and producer organizations, simplifying regulations;
 - Establish a “level playing field” for local producers in forest markets;
 - Encourage forest business support services by the private businesses and NGOs;
 - Establish the legal and policy frameworks for the development of new markets for ecosystem services from forests in villages and municipalities as well as big cities;
 - Invest in social infrastructure serving the rural poor;
 - Re-shape public forest management, extension and research institutions, and retrain technical staff to treat local producers as a principal client;
 - Modify the curriculum in public education and training institutions to integrate studies in technical forestry, business and marketing, social development and communications; and
 - Use government procurement policies for forest products to increase demand from low-income producers.

In all of these endeavors, policymakers will need to reach out beyond the traditional forestry community and federal agencies. They will need to build bridges with agriculturalists, regional and municipal governments, business people, and educators.

International Institutions

In the years following the Rio Summit, the three goals of socially, environmentally, and economically sustainable development were usually addressed independently. Although some gains have been made, conditions of the forest poor, condition of the forest beyond the parks, and in many cases the viability of the parks themselves have deteriorated. New transitions in the forest sector mean that the agendas for forest conservation, indigenous peoples, and social development as well as economic development are converging, allowing new scope for an integrated approach to forest conservation and poverty alleviation.

This approach calls for international actions to:

- Develop global norms of behavior for international companies who partner with local communities;
- Organize global initiatives to promote market and institutional reforms to enable greater participation of low-income producers in international trade and to pro-

tect their interests against trade rules and initiatives that would create unfair competition against them;

- Develop new financial mechanisms to promote forestry investment for low-income producers, using domestic investment protocols and export guarantee systems to favor forest businesses that adopt business models supportive of low-income producers;
- Generate the research and information needed to provide quantitative estimates of present levels of market participation by different groups of low-income producers, incomes thus generated, business profitability, and actual competitive advantages;
- Transform the Clean Development Mechanism into an instrument for large-scale poverty reduction and natural forest regeneration and protection, as well as climate change mitigation; and
- Integrate program strategies to achieve the three objectives of the Convention on Biological Diversity: biological protection, sustainable use, and a fair sharing of benefits.
- Support forestry investments with low-income producers as a key strategy to achieve the Millennium Development Goals on Hunger, Poverty, Water and Sanitation, and Environmental Sustainability.

Private Sector

Private companies will necessarily play a pivotal role in integrating local producers into forest markets. International forest companies and financial investors will increasingly recognize that there are business and financial as well as environmental and political risks and costs associated with large-scale logging in natural forests and industrial plantations in many parts of the world (e.g., Barr 2002). Strategic assessment will identify long-term opportunities and potential benefits of engaging more with local forest producer organizations. Private sector actors interested in gaining the business benefits of working with low-income producers need to:

- Identify profitable forest business opportunities with local producers;
- Educate and make connections with investors who can finance investment in commercial enterprises of low-income producers;
- Learn how to develop effective business partnerships with low-income producer organizations; and
- Develop alliances with low-income producer organizations to lobby for responsible policy reforms that encourage well-functioning markets, while also benefiting low-income producers and conservation of forest ecosystem services.

Companies may gain competitive advantages in securing raw material supply, reducing supply risks or accessing specialized markets. In the short to medium term, business attention will sensibly focus on the most promising opportunities. These will be situations where: local producers have clear competitive advantages; tenure rights are secure and major market barriers removed; business people in the country have experience working as partners with the poor; local producers are already organized; and industry partners have a long-term view and a commitment to sustainable and socially responsible forestry. Further private sector investment and partnership opportunities will expand as these conditions spread.

Actors in private finance need to become acquainted with new business opportunities working with low-income forest producers and their partners and design suitable new financial instruments. These may range from specialized venture capital firms to socially responsible investment funds, to stock market, pension and insurance markets, to finance forestry development.

Private forest companies who can learn to operate efficiently in partnership with local producers can be better positioned over the long term. There is a wide range of potential models for collaboration with small-scale producers; companies can choose those models that work well in their own setting. To be successful they will need to partner with institutions and individuals that have strong community organization and communication skills, and will be willing to respect the perspectives and positions of their local partners. There is promising potential in many countries for growth in private sector businesses that provide services to local forest producers as well as for private-NGO partnerships to help build local producer capacity.

Responsible companies whose strategies involve plantation development will resist the temptation to lobby for special subsidies on spurious claims of protecting natural forest. Private industry can ally with community forest owners and small-scale private owners to lobby for reform of archaic forest laws and regulations, to secure tenure rights for potential local business partners, to promote lower-cost and more effective alternatives to improve environmental standards of forest management, and to encourage public investment for protection of natural forests and reforestation of treeless landscapes.

Community Producer Organizations

Local forest communities, forest user groups, and farm forestry organizations are the central players in this strategy. They face the challenge of strengthening their organizations in ways needed for successful commercialization and of making hard-headed and well informed decisions about which market niches and positions to pursue, what investments to undertake, and what partnerships to form. At the same time, they will have to find ways to balance commercial forestry with a broader portfolio of livelihood activities, and find ways to protect the most vulnerable forest-dependent members and safeguard essential ecosystem services.

Secondary producer organizations can provide critical business support and advisory services targeted explicitly to small-scale local producers. Such umbrella organizations can also facilitate horizontal integration among producers and stimulate regional action to overcome critical gaps in the value chain facing member producers. With carefully chosen allies, they can lobby for political reforms that open up markets to local producers. Key roles are to:

- Lobby for recognition of traditional rights to own and to use their forest resources;
- Constructively engage governments to reform regulatory frameworks and subsidy policies;
- Invest in local enterprises and organizational capacity that captures other investment and diversifies livelihood strategies;
- Invest in future leaders and local professionals to manage community forest enterprises;
- Exchange information with a network of other like actors to build a larger supply of products and services, set culturally appropriate standards, and lobby for policy reforms; and
- Invest in indigenous knowledge and applied research based on local interests and opportunities.

Development, Conservation and Philanthropic Organizations

Development, conservation, and philanthropic organizations have begun to pursue forestry initiatives more actively but have been overly cautious in supporting commercialization by low-income producers. We believe it is unacceptable to sacrifice the potential of forest assets (especially those in the 90 percent of forests lying outside biodiversity reserves) to be used for poverty reduction in exchange for unspecified and often dubious global environmental gains. Given global changes in the forest business, the opportunities that have arisen for local people to participate profitably in that business and the paucity of viable alternatives for rural development in agriculturally “marginal” regions, it makes sense for the development community to increase attention and financial investment many-fold to realize these potentials.

We believe that strategies exist and can be developed to advance the conservation and development agendas jointly. Indeed, to conserve biodiversity and mitigate climate change it will be essential to shift the predominant conservation strategy from the almost exclusive focus on protected areas to the broader forestry matrix. But this is also the right thing to do for low-income forest producers. Strategies to promote sustainable commercial forest production and agroforestry can also be integrated into the development of mechanisms to secure ecosystem services.

Development, conservation, and philanthropic organizations can play a crucial catalytic role to:

- Adopt and advance alternative conservation strategies that recognize basic human rights and embrace sustainable use by low-income peoples;
- Raise awareness of business opportunities;
- Promote policy changes to “level the playing field” for the poor;
- Encourage viable business partnerships;
- Support environmental and social monitoring of forests and forest businesses;
- Establish business support services targeted to poor producers;
- Provide strategic financing for institutional and policy reforms and build institutions (for example, by The World Bank and the regional development banks);
- Expose and mobilize public action against commercial players who exploit new market opportunities to strip forest assets or exploit local producers; and
- Support and reward policy reform.

CONCLUSION

Since the 1970s, development and conservation organizations and donors have been trying to promote forest conservation globally. But the major strategies pursued have had marginal impact on conservation while contributing little to poverty reduction. Industrialization based on large-scale production led to over-exploitation, weak social benefits, and corruption. Social forestry and integrated conservation and development programs have provided only limited benefits to local communities. Projects were too small-scale and site-specific, or else too large and top-down. They often ignored major market trends and market players and were shaped—and sharply limited—by a highly constrained policy environment. Nonetheless, in the process a great deal has been learned about how to work with local people and local forest enterprises and participation in those projects has unquestionably mobilized numerous farmers, community leaders, and government officials to rethink and begin to reshape forest policy.

We call upon these leaders to launch a new agenda for forestry development based on economic justice that generates benefits from commercial forestry and forest conservation for the rural poor. Models already exist that show this can be done. The next generation of forest investments should draw on those lessons and concentrate in areas where market, organizational, and policy conditions make it possible to have a major impact on rural poverty and forest conservation. Such successes can serve as “beacons” to convince policymakers and business people elsewhere that this new paradigm is indeed worth pursuing, illustrate what is needed to make it work, and create a skilled, experienced, and well-networked “community of practice” to mentor a new generation of community and business leaders.

REFERENCES

- ADB. 2002. *ADB Forest sector strategic framework*. Manila, the Philippines: Asian Development Bank. Draft.
- Agrawal, A., and E. Ostrom. 2001. Collective action, property rights, and devolution of forest and protected area management. In *Collective action, property rights and devolution of natural resource management—Exchange of knowledge and implications for policy*, ed. R. Meinzen-Dick, A. Knox, and M. DiGregorio, Proceedings of the international conference held from June 21-25, 1999 in Puerto Azul, the Philippines. Feldafing, Germany: DSE/ZEL.
- Ahmed, J., and F. Mahmood. 1998. *Pakistan: Changing perspectives on forest policy*. Policy that Works for Forests and People Series No. 1. IUCN with Government of Pakistan. London: International Institute for Environment and Development.
- Alden Wily, L., and S. Mbaya. 2001 *Land, people and forests in Eastern and Southern Africa at the turn of the century. The impact of land relations on community involvement in forest future*. Nairobi, Kenya: IUCN-EARO.
- Allegretti, M. 1990. Extractive reserves: An alternative for reconciling development and conservation in Amazonia. In *Alternatives to deforestation: Steps toward sustainable use of the Amazon rain forest*, ed. A. Anderson. New York: Columbia University Press.
- Amazonian Indigenous Forum. 2001. *Resolution of the Amazonian indigenous forum on climate change*. Manaus, Brazil, October 11.
- Anderson, J., A. Shaikh, C. Barrett, P. Veit, J. Ribot, R. Winterbottom, M. McGuahey, and R. Hagen. 2002. *Nature, wealth and power: Emerging best practice for revitalizing rural Africa*. Washington, D.C.: USAID/AFR/SD.
- Anderson, P. J. 1998. Using ecological and economic information to determine sustainable harvest levels of a plant population. In *Incomes from the forest: Methods for the development and conservation of forest products for local communities*, ed. E. Wollenberg and A. Ingles. Bogor, Indonesia: Center for International Forestry Research.
- Angelsen, A., and D. Kaimowitz. 2001. Agricultural technology and forests: A recapitulation. In *Agricultural technologies and tropical deforestation*, ed. A. Angelsen and D. Kaimowitz. Oxon, United Kingdom: CABI Publishing.
- Angelsen, A., and S. Wunder. 2003. *Exploring the forest-poverty link: Key concepts, issues and research implications*. Bogor, Indonesia: Center for International Forestry Research.
- ANSAB. 2000. *Manual on enterprise development for natural products*. Kathmandu, Nepal: Asia Network for Small-Scale Agricultural Bioresources.
- Antinori, C. M., and G. C. Rausser. 2000. *Vertical integration in Mexican community forestry*. Working Paper No. 915. Berkeley, CA: University of California at Berkeley, Department of Agricultural and Resource Economics and Policy.
- ARM, and J. Mundy. 2000. Policy risks for the forest sector associated with the implementation of the Kyoto Protocol. Washington, D.C.: Forest Trends.
- Arnold, J. E. M. 2001. *Forestry, poverty and aid*. CIFOR Occasional Paper No. 33. Bogor, Indonesia: Center for International Forestry Research.
- Arnold, J. E. M., and P. A. Dewees. 1995. *Tree management in farmer strategies: Responses to agricultural intensification*. New York: Oxford University Press.
- Arnold, J. E. M., G. Köhlin, R. Persson, and G. Shepherd. 2003. *Fuelwood revisited: What has changed in the last decade?* CIFOR Occasional Paper No. 39. Bogor, Indonesia: Center for International Forestry Research.
- Arnold, J. E. M., C. Liedholm, D. Mead, and I. M. Townson. 1994. *Structure and growth of small enterprises using forest products in Eastern and Southern Africa*. OFI Occasional Papers No. 47, Oxford: Oxford Forestry Institute, and GEMINI Working Paper No. 48. Bethesda, Maryland: Growth and Equity Through Micro-Enterprise Investments and Institutions (GEMINI) Project.
- Arnold, J. E. M., and M. Ruiz Perez. 1998. The role of non-timber forest products in conservation and development. In ed. Wollenberg and Ingles, op. cit.
- ASB. 2001a. *Deregulating agoforestry timber to fight poverty and protect the environment*. Alternatives to Slash and Burn Policy Brief No. 3. Nairobi, Kenya: World Agroforestry Centre.
- ASB. 2001b. *The Krui agroforestry systems: A model of sustainable community forest management*. Alternatives to Slash and Burn Policy Brief No. 2. Nairobi, Kenya and Bogor, Indonesia: World Agroforestry Centre.
- Ashley, C., C. Boyd, and H. Goodwin. 2000. *Pro-poor tourism: Putting poverty at the heart of the tourism agenda*. ODI Natural Resource Perspectives 51. London, United Kingdom: Overseas Development Institute.
- Asia Timber. 2001. Market Report. July/August.
- Asquith, N. M., M. T. Vargas Rios, and J. Smith. 2002. Can forest-protection carbon projects improve rural livelihoods? Analysis of the Noel Kempff Mercado Climate Action Project, Bolivia. *Mitigation and Adaptation Strategies for Global Change*, 7,323-357.
- Atyi, R. E., and M. Simula. 2002. *Forest certification: Pending challenges for tropical timber*. Yokohama, Japan: International Tropical Timber Organization.
- Auzel, R., G. M. Nguenang, R. Feteké, and W. Delving. 2001. *Small-scale logging in community forests in Cameroon: Towards ecologically more sustainable and socially more acceptable compromises*. Network Paper 25. London, United Kingdom: Rural Development Forestry Network.
- Baalu, T. R. 2003. India: JFM Committee to be further strengthened. MoEF Press Release, February 10, India.

- Babin, D., and A. Betrand. 1998. Managing pluralism: Subsidiarity and patrimonial mediation. *Unasylva* 49(3). Special Issue on "Accommodating Multiple Interests in Forestry."
- Bäckstrand, K. 2002. Civic science for sustainability: Reframing the role of scientific experts, policymakers and citizens in environmental governance. Paper prepared for the 2002 Berlin Conference on the Human Dimensions of Global Environmental Change, "Knowledge for Sustainability Transition: The Challenge for Social Science," Berlin, Germany, December 6-7.
- Baird, L., and L. Coady, 2000. A new economic model for conservation-based forestry in temperate old growth forests. Paper presented to the conference on "Developing Commercial Markets for Environmental Services of Forests," Vancouver, Canada: October 4-6, 2000. Available at www.forest-trends.org.
- Baland, J. M., and J. P. Platteau. 1996. *Halting degradation of natural resources: Is there a role for rural communities*. FAO, Rome. 1996.
- Barber, C. V., N. C. Johnson, and E. Hafild. 1994. *Breaking the logjam: Obstacles to forest policy reform in Indonesia and the United States*. Washington, D.C.: World Resources Institute.
- Barr, C. 2001. Profits on paper: Fiber, finance and debt in Indonesia's pulp and paper industry. Executive Summary of *Banking on sustainability: A critical assessment of structural adjustment in Indonesia's forest and estate crop industries*. Bogor, Indonesia: Center for International Forestry Research and World Wildlife Fund.
- _____. 2002. Will HPH reform lead to sustainable forest management? Questioning the assumptions of the "sustainable logging" paradigm in Indonesia. Bogor, Indonesia: Center for International Forestry Research.
- Bass, S., K. Thornber, M. Markopoulos, S. Roberts, and M. Grieg-Gran. 2001. *Certification's impacts on forests, stakeholders and supply chains*. Nottingham, United Kingdom: International Institute for the Environment and Development.
- Bazett, M. 2000. *Long term changes in the location and structure of forest industries*. Global Vision 2050 for Forestry. Washington, D.C.: World Bank/World Wildlife Fund Project.
- Bazett, M., G. Bull and A. White. 2004. Subsidies for industrial forest plantations: Issues and Implications. Washington, D.C. Forest Trends.
- Beer, J., M. Ibrahim, and A. Schlonvoigt. 2000. Timber production in tropical agroforestry systems of Central America. In *Sub-Plenary Sessions XXI IUFRO World Congress*, ed. B. Krishnapillay and E. Soepadmo, Kuala Lumpur, Malaysia.
- Belcher, B. M. 1998. A production-to-consumption systems approach: Lessons from the Bamboo and Rattan sectors in Asia. In ed. Wollenberg and Ingles, *op. cit.*
- Belcher, B. M., and C. Ruiz Perez. 2003. Characteristics of non-timber forest product markets. Paper presented at the International Conference on "Rural Livelihoods, Forests, Livelihoods and Biodiversity," Bonn, Germany. May.
- Belcher, B. M., B. Braedt, B. Campbell, A. Cunningham, S. Choge, W. de Jong, R. Höft, O. Ndoye, P. Omeja, P. Permadi, S. Purata, D. Rohandi, S. Schmitt, S. Shackleton, P. Shanley, and W. Standa-Gunda. 2002. Planning for woodcarving in the 21st century. CIFOR Infobrief 1. Bogor, Indonesia: Center for International Forestry Research.
- Bennett, C. 1998. Outcome-based policies for assessing and evaluating the social impacts of non-timber forest product projects. In ed. Wollenberg and Ingles, *op. cit.*
- Bennett, E. L. 2000. Timber certification: Where is the voice of the biologist? *Conservation Biology* 14 (4): 921-923.
- Bennett, E. L., and J. G. Robinson. 2000. Hunting of wildlife in tropical forests: Implications for biodiversity and forest peoples. Washington, D.C.: The World Bank, Environment Department.
- Berge, D. 2000. Attracting private capital to the new forest economy—A social investment perspective. Paper presented to the conference on "Developing Commercial Markets for Environmental Services of Forests," Vancouver, Canada: October 4-6, 2000. Available at www.forest-trends.org.
- Blomstrom, M., and A. Kokko. 2001. From natural resources to high-tech production: The evolution of industrial competitiveness in Sweden and Finland. Stockholm, Sweden: Stockholm School of Economics.
- Bojorquez, L. 1999. Evaluación de áreas críticas para la conservación de la biodiversidad en Michoacán, Guerrero y Oaxaca. Laboratorio de Análisis Ambientales. Instituto de Ecología. UNAM. Proyecto de Conservación de la Biodiversidad en Comunidades Indígenas de Oaxaca, Michoacán y Guerrero. World Bank/SEMARNAP.
- Bombay, H. 1996. *Aboriginal forest-based ecological knowledge in Canada*. Ottawa, Canada: National Aboriginal Forestry Association.
- Braedt, O., and W. Standa-Gunda. 2000. Woodcraft markets in Zimbabwe. *International Tree Crops Journal* 10: 367-384.
- Brand, D. 2000. *Emerging markets for forest services and implications for rural development, forestry industry, and government*. Paper presented to conference on "Developing Commercial Markets for Environmental Services of Forests," Vancouver, Canada, October 4-6, 2000.
- _____. 2002. Investing in the environmental services of Australian forests. In ed. S. Pagiola, J. Bishop, and N. Landell-Mills, *op. cit.*

- Brown, C. 2000. *The global outlook of future wood supply from forest plantations*. Rome, Italy: Food and Agriculture Organization.
- Brown, D., K. Schreckenber, G. Shephard, and A Wells. 2002. *Forestry as an entry point for governance reform*. ODI Forestry Brief 1. London, United Kingdom: Overseas Development Institute.
- Brubacher and Associates. 1999. *Non-timber forest products: Exploring opportunities for aboriginal communities*. Ottawa, Canada: National Aboriginal Forestry Association.
- Bruce, John W. 1993. The variety of reform: A review of recent experiences with land reform and the reform of land tenure, with particular reference to the African experience. In *Institutional issues in natural resources management*, ed. H. Secher Marcussen. Roskilde, Denmark: Roskilde University.
- Bull, G. 2003. Notes on global forest trends. Vancouver, Canada: University of British Columbia. Unpublished.
- Byron, N., and J. E. M. Arnold. 1999. What futures for the people of tropical forests? *World Development* 27 (5): 789-805.
- Cairns, M., and D. P. Garrity. 1999. Improving shifting cultivation in southeast Asia by building on indigenous fallow management strategies. *Agroforestry Systems* 47 (1-3): 37-48.
- Calibre, and SSC. 2000. *Number of forest-dependent people: A Feasibility study for DFID's Forestry Research Programme*. Reading, United Kingdom: Calibre Consultant and the Statistical Service Center, University of Reading.
- Campos, J. J. 2001. *Illegal logging in Costa Rica: An analysis for discussion*. Turrialba, Costa Rica: Centre for Tropical Agriculture Research and Education (CATIE).
- Carrere, R., and L. Lohmann. 1996. *Pulping the south*. New York: St. Martin's Press.
- Castejón, M. F., and A. Gulliver. 2000. Informe: Misión de apoyo al Banco Mundial para la elaboración de una solicitud de fondos para la formulación de un proyecto orientado a promover la protección y uso sostenible de la biodiversidad por comunidades indígenas a lo largo del corredor biológico mesoamericano. Rome, Italy: Food and Agriculture Organization.
- Cavendish, W. 1999. *Empirical regularities in the poverty-environment relationship of African rural households*. Oxford, United Kingdom: University of Oxford.
- Chapela, F. 2002. Illegal logging in Mexico. Paper presented to "Global Perspectives on Indigenous Peoples' Forestry: Linking Communities, Commerce and Conservation: An International Conference," Vancouver, British Columbia, Canada, June 4 - 6.
- Chiong-Javier, M. 2001. Local organizations in upland natural resource management in the Philippines: Country Overview. Paper presented to the SAN-REM Conference on "Local Governance of Natural Resource Management in Southeast Asia," Makati, Manila, May 28-30.
- Chomitz, K. 2000. An emerging tradable development rights system in Brazil. Paper presented to "Developing Commercial Markets for Environmental Services of Forests," Vancouver, Canada, October 4-6, 2000.
- Chomitz, K., E. Brenes, and L. Constantino. 1999. Financing environmental services: The Costa Rican experience and its implications. *The Science of the Total Environment* 240: 157-169.
- Christy, L., A. Mekouar, and J. Lindsay. 2000. Why law matters: Design principles for strengthening the role of forestry legislation in reducing illegal activities and corruption. Rome, Italy: Food and Agriculture Organization.
- Chung, B. R. 1999. *Community-based land use planning in conservation areas: Lessons from local participatory processes that seek to balance economic uses with ecosystem protection*. Training Manual, América Verde No. 3. Arlington, Virginia: The Nature Conservancy.
- Cincotta, R. P., and R. Engelman. 2000. *Nature's place*. Washington, D.C.: Population Action International.
- Clay, J. W. 1996. *Generating income and conserving resources—20 lessons from the field*. Washington, D.C.: World Wildlife Fund.
- _____. 2002. *Community-based natural resource management within the new global economy: Challenges and opportunities*. A report prepared by the Ford Foundation. Washington, D.C.: World Wildlife Fund.
- Clay, J. W., J. Alcorn, and J. Butler. 2000. Indigenous peoples, forestry management and biodiversity conservation: An analytical study for the World Bank's forestry policy Implementation Review and Strategy Development Framework. Washington, D.C.: World Bank.
- _____. 1999. Indigenous peoples and the new 'global vision' on forests: Implications and prospects. Discussion paper. Moreton-in-Marsh, UK: Forest People's Programme.
- Colchester, M. 2001. Survey of indigenous land tenure: A report for the land tenure service of the Food and Agricultural Service of the Food and Agriculture Organization, Unpublished draft, December.
- Colchester, M., T. Apte, M. Laforge, A. Mandondok, and N. Pathak. 2003. *Learning lessons from international community forestry networks: Synthesis report*. Bogor, Indonesia: Center for International Forestry Research.
- Colfer, C., and Y. Byron. 2001. *People managing forests: The links between human well-being and sustainability*. Washington, D.C.: Resources for the Future Press.

- Conroy, M. E. 2001. *Can advocacy-led certification systems transform global corporate practices? Evidence, and some theory*. PERI Working Paper No. DPE-01-07. Amherst, MA: University of Massachusetts.
- Contreras-Hermosilla, A. 2002a. Indonesia: Toward a rationalization of state forest areas. Washington, D.C.: Forest Trends.
- _____. 2002b. *Forest law compliance in the forestry sector: An overview*. Washington, D.C.: World Bank Institute, The World Bank.
- Contreras-Hermosilla, A., and H. Gregersen. 2001. Trade and transnationals. In *The private sector speaks*, ed. M. Chipeta. Bogor, Indonesia: United Nations Forum on Forests and Center for International Forestry Research. Draft.
- Contreras-Hermosilla, A., and M. Vargas. 2001. Social, environmental and economic impacts of forest policy reforms in Bolivia. Washington, D.C.: Forest Trends.
- Cornell, S. 2001. Nation-building and the treaty process: Remarks at the British Columbia Treaty Commission Forum. Vancouver, British Columbia, March 1.
- Cossalter, C., and C. Pye-Smith. 2003. *Fast wood forestry: Myths and realities*. Bogor, Indonesia: Center for International Forestry Research.
- Cunningham, A., S. J. Scherr, and J. A. McNeely. 2002. *Matrix matters: Biodiversity research for rural landscape mosaics*. Bogor, Indonesia: World Agroforestry Centre and Center of International Forestry Research.
- Current, D. Economic and institutional analysis of projects promoting on farm-tree planting in Costa Rica. In D. Current, E. Lutz, and S. J. Scherr, *op. cit.*
- Current, D., E. Lutz, and S. J. Scherr. 1995. *Costs, benefits, and farmer adoption of agroforestry: Project experience in Central America and the Caribbean*. World Bank Environment Paper No. 14. Washington, D.C.: World Bank.
- Daily, G. C. 1997. *Nature's services: Societal dependence on natural ecosystems*. Washington, D.C.: Island Press.
- Daily, G. C., and K. Ellison. 2002. *The new economy of nature: The quest to make conservation profitable*. Washington, D.C.: Island Press.
- Daley-Harris, S., ed. 2002. *Pathways out of poverty: Innovations in microfinance for the poorest families*. Bloomfield, Connecticut: Kumarian Press.
- De Jong, W., U. Chokkalingam, J. Smith, and C. Sabogal. 2001. Tropical secondary forests in Asia: Introduction and synthesis. *Journal of Tropical Forest Science* 13(4): 563-576.
- De Jong, W. and R. Utama. 1998. Turning ideas into action: Planning for non-timber forest product development and conservation. In ed. Wollenberg and Ingles, *op. cit.*
- De Jong, B. H., R. Tipper, and G. Montoya-Gómez. 2000. An economic analysis of the potential for carbon sequestration by forests: Evidence from southern Mexico. In *Ecological Economics* (33): 313-327.
- De Soto, H. 2000. *The mystery of capital: Why capitalism triumphs in the west and fails everywhere else*. New York: Basic Books.
- Desmond, H., and D. Race. 2000. *Global survey and analytical framework for forestry out grower arrangements*. Rome, Italy: Food and Agricultural Organisation of the United Nations.
- DeWalt, B., F. Olivera, and J. Correa. 2000. Mid-term evaluation of the Mexico community forestry project. Washington, D.C.: World Bank.
- Deweese, P. A., and N. C. Saxena. 1995. Wood product markets as incentives for farmer tree growing. In ed. J. E. M. Arnold and P. A. Dewees, *op. cit.*
- Deweese, P. A., and S. J. Scherr. 1996. *Policies and markets for non-timber tree products*. EPTD Discussion Paper No. 16. Washington D.C.: International Food Policy Research Institute.
- Djeumo, A. 2001. *The development of community forests in Cameroon: Origins, current situation and constraints*. Rural Development Forestry Network paper 25b(i). London, United Kingdom: Overseas Development Institute.
- Dove, M. R. 1995. The shift of tree cover from forests to farms in Pakistan: A long and broad view. In ed. J. E. M. Arnold and P. A. Dewees, *op. cit.*
- Dubois, O. 1998. Assessing local resilience and getting roles right in collaborative forest management: Some current issues and a potential tool. Rome, Italy: Food and Agriculture Organization.
- Ecott, T. 2002. *Forest landscape restoration: Working examples from 5 ecoregions*. Gland, Switzerland: WWF International.
- Edmunds, D., and E. Wollenberg. 2001. A strategic approach to multistakeholder negotiations. *Development and Change* 32(2): 231-253.
- Elliott, S., J. Kerby, D. Blakesley, K. Hardwick, K. Woods, and V. Anusarnsunthorn, eds. 2000. *Forest restoration for wildlife conservation*. Chiang Mai, Thailand: International Tropical Timber Organization and the Forest Restoration Research Unit, Chiang Mai University.
- _____. 2000. Encouraging discerning investment into Pacific Rim forestry. Washington, D.C.: Forest Trends.
- Ellsworth, L. 2001. A place in the world: Competing views on tenure security. Washington, D.C.: Forest Trends.
- Ellsworth, L., and A. White. 2002. Strategies for strengthening community property rights over forests: Lessons and opportunities for practitioners. Washington, D.C.: Forest Trends.
- Emerton, L. 2001. Why non-market benefits are no longer enough to ensure that natural woodlands

- are conserved in Tharaka, Kenya. Nairobi, Kenya: The World Conservation Union (IUCN).
- Entsminger, J. 1996. *Making a market: The institutional transformation of an African society*. Cambridge, United Kingdom: Cambridge University Press.
- Enters, T. 2001. *Trash or treasure? Logging and mill residues in Asia and the Pacific*. RAP Publication 2000/16. Bangkok, Thailand: Regional Office for Asia and the Pacific, Food and Agriculture Organization of the United Nations.
- Etheridge, R., and P. Heffeman. 2000. Montana: Monitoring best forestry management practices - The 2000 Forestry BMP Audits Report. Missoula, Montana: Montana Department of Natural Resources and Conservation Forestry Division.
- Falconer, J., and J. E. M. Arnold. 1989. *Household food security and forestry: An analysis of socioeconomic issues*. Community Forestry Note 1. Rome, Italy: Food and Agriculture Organization.
- FAO. 1995. *Non-wood forest products for rural income and sustainable forestry*. Technical papers: Non-Wood Forest Products 7. Rome, Italy: Food and Agriculture Organization.
- _____. 1996. FAOSTAT. Food and Agriculture Organization: Rome, Italy.
- _____. 1997. *Forest trends and outlooks*. Rome, Italy: Food and Agriculture Organization
- _____. 1999. Future developments in forest product markets. Paper prepared for the World Bank Forest Policy Implementation Review. February. Draft.
- _____. 2000a. *Commodity market review 1999-2000*. Rome, Italy: Commodities and Trade Division, Food and Agriculture Organization.
- _____. 2000b. *Global forest products outlook study*. Rome, Italy: Food and Agriculture Organization.
- _____. 2000c. *Annual report*. Rome, Italy: Food and Agriculture Organization.
- _____. 2001a. *State of the world's forests*. Rome, Italy: Food and Agriculture Organization.
- _____. 2001b. *Global forest resource assessment*. Rome, Italy: Food and Agriculture Organization.
- _____. 2001c. Vietnam country profile. Paper presented to "The Role of Forestry in Poverty Alleviation," in Tuscany, Italy, September.
- _____. 2003. *Situation of the world's forests*. Rome, Italy: Food and Agriculture Organization.
- Fay, C., and G. Michón. 2003. Redressing forest hegemony: When a forestry regulatory framework is better replaced by an agrarian one. Paper presented at the International Conference on 'Rural Livelihoods, Forests and Biodiversity,' Bonn, Germany, May.
- Fay, C., and M. Sirait. 2001. Reforming the reformists: Challenges to government forestry reform in post-Suharto Indonesia. In *Which way forward? Forests people and policy in Indonesia*, ed. C. J. P. Colfer and I. A. P. Resosudarmo. Washington, D.C.: Resources for the Future.
- Fernandez, E. 2001. The case of community production and door manufacturing for export to DIY retailers. Presentation at the conference "From Forest to Furniture: The New Green Market Opportunities for China," Shanghai, China, September.
- Fernholz, K. 2000. Private forest owners in the US and FSC certification: A cooperative model for increasing trust, reducing costs, and accessing markets. Presented to "The Institute for Agricultural Trade Policy - 11th Annual Conference," November 10-13.
- FFAQI. 2000. Portable sawmills: Weighing up the potential for on-farm processing. RIRDC Short Report No. 38. Queensland, Australia: Forest Farmers Association.
- Filer, C., and N. Sekhran. 1998. *Papua New Guinea: Loggers, donors and resource owners*. Policy that Works for Forests and People Series No. 2. London, United Kingdom: International Institute for Environment and Development.
- Findlay, C. 2002. *Structuring a joint venture: Understanding the lawyer's role*. Paper presented to "Global Perspectives on Indigenous Peoples' Forestry: Linking Communities, Commerce and Conservation: An International Conference," Vancouver, British Columbia, Canada, June 4-6.
- Fisher, R. J. 2001. *Poverty alleviation and forests: Experiences from Asia*. Bangkok, Thailand: RECOFTC.
- Ford Foundation. 1998. *Forestry for sustainable rural development: A review of Ford Foundation-supported community forestry programs in Asia*. New York, New York: Ford Foundation.
- Forum of Indigenous Peoples. 2000. Declaration of the First International Forum of Indigenous Peoples on Climate Change. Presented in Lyon, France. September 4-6.
- Fox, J., P. Yonzon, and N. Podger. 1996. Mapping conflicts between biodiversity and human needs in Langtang National Park, Nepal. *Conservation Biology* 10: 562-569.
- _____. 2000. *Principles and criteria*. Bonn, Germany: Forest Stewardship Council.
- Forest Stewardship Council. 2003. Forest stewardship standards interpreted for small and low intensity managed forests (SLIMFs). Forest Stewardship Council. PSU-GUI-20-101 SLIMFs Example Standard Draft 1.0. Bonn, Germany: Forest Stewardship Council International Centre, March.
- Franzel, S., and S. J. Scherr. 2002. *Trees on the farm: Assessing adoption potential of agroforestry practices in Africa*. Wallingford: Commonwealth Agricultural Bureau International.
- Fuge, P. 1999. Back to the office report to the World Bank. World Bank Supervision Mission to PROCY-MAF. Washington, D.C.: World Bank, September.

- Gardner-Outlaw, T., and R. Engelman. 1999. *Forest futures: Population, consumption and wood resources*. Washington, D.C.: Population Action International.
- GEF. 2001. Global environment facility project concept note. Indigenous Community Integrated Ecosystems Management Project. CCAD and CICAFOC. Washington, D.C.: Global Environment Facility.
- Gilmour, D. A. 1995. Rearranging trees in the landscape in the middle hills of Nepal. In ed. M. Arnold and P. Dewees, *op cit*.
- Gray, J. A. 2002. *Forest concession policies and revenue systems: Country experience and policy changes for sustainable forestry*. Washington, D.C.: World Bank.
- Gutman, P. 2001. *Forest conservation and the rural poor: A call to broaden the conservation agenda*. Macroeconomics Program Office. Washington, D.C.: World Wildlife Fund.
- Hammett, A. L. 1994. Developing community-based market information systems. In *Marketing of multipurpose tree products in Asia*, ed. J. B. Raintree and H. Francisco. Proceedings of an international workshop held in Baguio City, Philippines, 6-9 December, 1993. Bangkok, Thailand: Winrock International.
- Hellin, J., and S. Higman. 2003. *Feeding the market: South American farmers, trade and globalization*. Yorkshire, United Kingdom: Intermediate Technology Development Group.
- Higman, S., and R. Nussbaum. 2002. *Getting small forest enterprises into certification: How standards constrain the certification of small forest enterprises*. Oxford, United Kingdom: ProForest.
- Homma, A. 1996. Modernisation and technological dualism in extractive economy in Amazonia. In *Current issues in non-timber forest products research*, ed. M. Ruiz Perez and J. E. M. Arnold, Proceedings of the Workshop "Research on NTFPs", Hot Springs, Zimbabwe, August 28-September 2, 1995. Bogor, Indonesia: Center for International Forestry Research: Bogor, Indonesia.
- Honey, M. 1999. *Ecotourism and sustainable development: Who owns paradise?* Washington, D.C.: Island Press.
- Howard, S., and J. Stead. 2001. *The forest industry in the 21st century*. Washington, D.C.: World Wildlife Fund International, March
- Humboldt Institute. 2002. Experiences providing technical support services: The role of business incubators and technical assistance organizations. Presentation to the conference "Global Perspectives on Indigenous Peoples' Forestry: Linking Communities, Commerce and Conservation: An International Conference," Vancouver, British Columbia, Canada. June 4-6.
- Hyman, E. 1996. Technology and the organization of production, processing, and marketing of non-timber forest products. In *Current issues in non-timber forest products research*, ed. M. Ruiz Perez and J. E. M. Arnold. Proceedings of the Workshop "Research on NTFP", Hot Springs, Zimbabwe, August 28-September 2, 1995. Bogor, Indonesia: Center for International Forestry Research: Bogor, Indonesia.
- ICRAF. 2001. Negotiation support system for natural resource conflict resolution to enhance environmental services in Southeast Asia. EAPEI proposal. Bogor, Indonesia: World Agroforestry Centre.
- IFAD. 2001. *Rural poverty report 2001: The challenge of ending rural poverty*. New York: Oxford University Press.
- IIED. 1996. *Towards a sustainable paper cycle: An independent study on the sustainability of the pulp and paper industry prepared for the World Business Council for Sustainable Development*. London, United Kingdom: International Institute for Environment and Development.
- Imhoff, D. 1999. *The simple life guide to tree-free, recycled and certified papers*. Philo, California: Simplelife.
- INFC. 1998. Saanich statement of principles on forests and communities. International Workshop on Ecosystem and Community-Based Forestry. INFC. Victoria, British Columbia, Canada.
- Iqbal, M. 1993. *International trade in non-wood forest products: An overview*. Working Paper. Rome, Italy: Food and Agriculture Organization.
- Issar, R. 1994. Development of market intelligence and infrastructure for agroforestry in India. In *Marketing of multipurpose tree products in Asia*, ed. J. B. Raintree and H. Francisco. Proceedings of an international workshop held in Baguio City, Philippines, 6-9 December, 1993, Winrock International Bangkok, Thailand.
- ITTO. 2000. *Tropical timber market report*. Yokohama, Japan: International Tropical Timber Organization.
- . 2003. *Tropical timber trade and production trends*. Yokohama, Japan: International Tropical Timber Organization.
- Jaffee, D. 1997. Confronting globalization in the community forests of Michoacán, Mexico: Free trade, neoliberal reforms, and resource degradation. Paper presented at the Latin American Studies Association Congress, Guadalajara, Mexico, April.
- Jagger, P., and J. Pender. 2000. *The role of trees in sustainable development of less favored lands: The case of eucalyptus in Ethiopia*. EPTD Discussion Paper No. 65. Washington, D.C.: International Food Policy Research Institute, April.
- Jansens, J.-W. 2001. Barriers to and opportunities for effective forest product marketing of tribal forestry operations in the USA. *Common Ground*. Santa Fe, New Mexico, February.
- Jansens, J.-W., E. Kretzman, and S. Harrington. 2002. Forest certification on tribal lands: A resource manual for native American forest management

- operations and forest product enterprises. Fredericksburg, Virginia: First Nations Development Institute.
- Jenkins, M. B., and E. T. Smith. 1999. *The business of sustainable forestry: Strategies for an industry in transition*. Washington, D.C.: Island Press.
- Johnson, N., A. White, and D. Perrot-Maitre. 2001. *Developing markets for water services from forests: Issues and lessons for innovators*. Washington, D.C.: Forest Trends with World Resources Institute and the Katoomba Group.
- Jones, Eric T., R. McLain, and J. Weigand. 2002. *Non-timber forest products in the United States*. Lawrence, Kansas: University Press of Kansas.
- Kaimowitz, D. 1995. *Livestock and deforestation in Central America in the 1980s and 1990s: A policy perspective*. EPTD Discussion Paper No. 9. Washington, D.C.: International Food Policy Research Institute.
- _____. 2000. Memo on forestry development in conflict and post-conflict areas. Bogor, Indonesia: Center for International Forestry Research.
- _____. 2003. *Forest law enforcement and rural livelihoods*. Bogor, Indonesia: Center for International Forestry Research. Draft.
- Kaimowitz, D., C. Vallejos, P. Pacheco, and R. Lopez. 1999. *Municipal governance and forest management in lowland Bolivia*. Bogor, Indonesia: Center for International Forestry Research.
- Kerkhof, P. 2000. *Local forest management in the Sahel*. London, United Kingdom: SOS Sahel.
- Köhler, V. 2000. A general analysis of forest laws and aspects of implementation in select countries south of Sahara. Tropical Ecology Research Program. Implemented by the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH on behalf of the Federal Ministry for Economic Co-operation and Development (BMZ).
- Kotey, N. A., J. Francois, J. G. K. Owusu, R. Yeboah, K. S. Amanor, and L. Antwi. 1998. *Falling into place: Ghana country study*. Policy that Works for Forests and People Series No. 4. London, United Kingdom: International Institute for Environment and Development.
- Krishnaswamy, A., and A. Hanson. Our forests, our future. Summary report World Commission on Forests and Sustainable Development. Cambridge, United Kingdom: Cambridge University Press.
- Kumar, N., and N. C. Saxena. 2002. India's forests: Potential for poverty alleviation. In ed. Lele, *op cit*.
- Lal, P. 2000. Private sector forestry research—A success story from India. Andhra Pradesh, India: ITC Bhadrachalam Paperboards Limited.
- Landell-Mills, N., and I. Porras. 2002. *Markets for forest environmental services: Silver bullet or fool's gold? Markets for forest environmental services and the poor—Emerging issues*. London, United Kingdom: International Institute for Environment and Development.
- Landell-Mills, N., and J. Ford. 1999. *Privatising sustainable forestry—A global review of trends and challenges*. London, United Kingdom: International Institute for Environment and Development.
- Lazo, F. 2001. El papel forestal en la mitigación de la pobreza: Perfil de Honduras. Background paper for inter-agency forum on "The Role of Forestry in Poverty Alleviation," Tuscany, Italy, September 2001. Rome, Italy: Food and Agriculture Organization.
- Leakey, R. 1999. Agroforestry for biodiversity in farming systems. In *Biodiversity in agroecosystems*, ed. W. W. Collins and C. O. Qualset. New York: CRC Press.
- Leakey, R., and A. Newton, eds. 1994. *Tropical trees: The potential for domestication and the rebuilding of forest resources*. London, United Kingdom: HMSO.
- Lecup, I., and K. Nicholson. 2000. *Community-based tree and forest product enterprises*. Rome, Italy: Food and Agriculture Organization.
- Lele, U., ed. 2002. *Managing a global resource: Challenges of forest conservation and development*. World Bank Series on Evaluation and Development, Volume 5. New Brunswick: Transaction Publishers.
- Lele, U., V. M. Viana, and A. Verissimo. 2002. Brazil's forests: Managing tradeoffs among local, national, and international interests. In ed. U. Lele, *op. cit*.
- Leslie, A. J. 2002. *For whom the bell tolls: What is the future of the tropical timber trade in the face of a probable glut of plantation timber?* Yokohama, Japan: International Tropical Timber Organization.
- Lindsay, J. 1998. Creating legal space for community-based management: Principles and dilemmas. Paper presented to the International Seminar on "Decentralization and Devolution of Forest Management in Asia and the Pacific," Davao, Philippines, November 30-December 4, 1998.
- Lipper, L. 2000. Forest degradation and food security. *Unasylva* 51(202):24-31.
- Lybbert, T., C. Barnett, and H. Narjisse. 2001. Who benefits from a bioprospecting-based boom? The case of argan oil in Morocco. Ithaca, New York: Cornell University. Draft.
- Lynch, O., and K. Talbott. 1995. *Balancing acts: Community-based forest management and national law in Asia and the Pacific*. Washington, D.C.: World Resources Institute.
- MacQueen, D. 2000. The identification and prioritization of constraints and opportunities for greater integration between forest-based industries and communities: A sustainable livelihoods approach based on data from Belize, Guyana and the Eastern Caribbean States. Kent, United Kingdom: Natural Resources International Ltd.
- Malla, Y. B. 2000. Impact of community forestry policy on rural livelihoods and food security in Nepal. *Unasylva* 51(202):37-45.

- Mallik, R. M. 2000. Sustainable management of non-timber forest products in Orissa: Some issues and options. *Indian Journal of Agricultural Economics* 55(3): 383-397.
- Mankin, W. E. 1998. *Entering the fray: International forest policy processes—An NGO perspective on their effectiveness*. ILED Policy that Works for Forests and People Series No. 9. London, United Kingdom: International Institute for Environment and Development.
- Mariki, S. 2001. United Republic of Tanzania: Country profile presented to the conference "The Role of Forestry in Poverty Alleviation," Tuscany, Italy, September 2001. Rome, Italy: Food and Agriculture Organization.
- Markopoulos, M. 1999. Community forestry enterprise and certification in Mexico—A review of experience with special reference to the Union of Zapotec and Chinantec Forestry Communities, Oaxaca. Oxford, United Kingdom: Oxford Forestry Institute.
- Contreras-Hermosilla, A. and A. White. 2004. *Rethinking forest regulations*. Washington, D.C.: Forest Trends.
- Masera, O., R. D. Masera, and J. Navia. 1998. *Dinámica y uso de los recursos forestales en la región Purepecha: El papel de las pequeñas empresas artesanales*. Patzcuaro, Michoacán, Mexico: Grupo Interdisciplinario de Tecnología Rural Apropiada (GIRA).
- Mather, A. 2001. Technological change and the transition from deforestation to reforestation in Europe. In ed. A. Angelsen and D. Kaimowitz, *op. cit.*
- Matthews, E., R. Payne, M. Rohweder, and S. Murray. 2000. *Pilot analysis of global ecosystems: Forest ecosystems*. Washington, D.C.: World Resources Institute.
- May, Peter. 1985. A modern tragedy of the non-commons: Agro-industrial change and equity in Brazil's babaçu palm zone. Latin America Program Dissertation Series. Ithaca, New York: Cornell University.
- Mayers, J. 1999. Company-community forestry partnerships: A growing phenomenon. *Unasylva* 200 (51): 33-34.
- Mayers, J., and S. Bass. 1999. *Policy that works for forests and people*. London, United Kingdom: International Institute for Environment and Development.
- _____. 2000. Executive summary of series overview: Forests and people on the world stage. Policy that Works for Forests and People Series. London, United Kingdom: International Institute for Environment and Development.
- Mayers, J., and S. Vermeulen. 2002. *Company-community forestry partnerships: From raw deals to mutual benefits?* London, United Kingdom: International Institute for Environment and Development.
- McLain, R. 2002. Business as usual: The exclusion of mushroom pickers in wild mushroom management in Oregon's national forests. In *Non-timber forest products in the United States*, ed. E.T. Jones, R. McLain, and J. Weigand. Lawrence, Kansas: University of Kansas Press.
- McNeely, J., and S. Scherr. 2003. *Ecoagriculture: Strategies to feed the world and conserve wild biodiversity*. Washington, D.C.: Island Press.
- Meidinger, E. 2003. Forest certification as environmental law making by global civil society. In ed. E. Meidinger, *op. cit.*
- Meidinger, E., C. Elliott, and E. Oesten, eds. 2003. *Social and political dimensions of forest certification*. Remagen, Germany: www.forstbuch.de.
- Meinzen-Dick, R., and A. Knox. 2002. Collective action, property rights, and devolution of natural resource management: A conceptual framework. In *Collective action, property rights and devolution of natural resource management—Exchange of knowledge and implications for policy*, ed. R. Meinzen-Dick, A. Knox, and M. DiGregorio. Proceedings of the International Conference held from 21-25 June, 1999 in Puerto Azul, the Philippines. Feldafing, Germany: DSE/ZEL.
- Melnyk, M. 2000. Resource rights: Conditions for effective country-based fire management. Presentation to "Community-Based Fire Management," Bangkok, Thailand: Kasetsart University, 6-8 December. Bangkok, Thailand: RECOFTC and Project Firefight Southeast Asia.
- Merino, L. 2002. *Illegal logging in Mexico: Summary of the issues*. Mexico, D.F.: Universidad Nacional Autónoma de Mexico.
- Merlet, M., L. A. Arguelles, N. Aguilar, and I. Santiago. 2003a. *Evaluación económica del proyecto PROCYMAF. Tomo I. Estudio de las empresas sociales forestales de Oaxaca*. Paris, France: Institut de Recherches et d'Applications des Methods du Seveloppement and Center for International Forestry Research, May.
- Merlet, M., D. Current., N. Aguilar, I. Santiago, and A. Arguelles. 2003b. *Evaluación económica del proyecto PROCYMAF. Tomo II. Análisis del proyecto. Evaluación económica de sus acciones en Oaxaca*. Paris, France: Institut de Recherches et d'Applications des Methods du Developpement and CIFOR, May.
- Messerschmidt, D. A. 1993. *Common forest resource management: Annotated bibliography of Asia, Africa, and Latin America*. Rome, Italy: Food and Agriculture Organization.
- M'Gonigle, M., M. Egan, and I. Ambus. 2001. *The community ecosystem trust: A new model for developing sustainability*. Victoria, Canada: Polis, University of Victoria.
- Michón, G., H. de Foresta, Kusworo, and P. Levang. 2000. The damar agroforests of Krui, Indonesia: Justice for forest farmers. In *People, plants, and*

- justice: *The politics of nature conservation*, ed. C. Zerner. New York: Columbia University Press.
- Miller, K. R., A. E. Chang, and N. Johnson. 2001. Defining common ground for the *Mesoamerican biological corridor*. Washington, D.C.: World Resources Institute.
- Moles, P. 2000. *Markets for biodiversity products and services*. Paper presented to the conference on "Developing Commercial Markets for Environmental Services of Forests," Vancouver, Canada: October 4-6, 2000. Available at www.forest-trends.org.
- Molnar, A., ed. 2002. *Global perspectives on indigenous peoples' forestry: Linking communities, commerce and conservation—An international conference: Proceedings*. Vancouver, British Columbia, Canada June 4 - 6, 2002. <http://www.foresttrends.org/whoweare/meetings.htm#vancouver2002>
- Molnar, A. 2003. *Forest certification and communities: Looking forward to the next decade*. Washington, D.C.: Forest Trends.
- Molnar, A., S. J. Scherr, and A. Khare. 2004. *Who Conserves the World's Forests?* Washington, D.C.: Forest Trends.
- Molnar, A., and A. White. 2001. Forestry and land management. In *Mexico: A comprehensive development agenda for the new era*, ed. M. M. Guigale, O. Lafourcade and V. H. Nguyen. Washington, D.C.: The World Bank.
- Monela, G. C., G. C. Kajemba, A. R. S. Kaoneka, and G. Kowero. 1999. *Household livelihood strategies in the Miombo woodlands of Tanzania: Emerging trends*. Bogor, Indonesia: CIFOR.
- Mott, J., and B. Deren. 1998. A framework to consider forest product marketing: An opening address for the October 30-31, 1998 National Workshop of Forest Products in India.
- Mundy, J., and C. Eyre. 2000. *Risk mitigation in forestry: Linkages with Kyoto and sustainable forestry management*. Washington, D.C.: Forest Trends.
- National Aboriginal Forestry Association. 1997. *Value-added forestry and aboriginal communities: The perfect fit*. Ottawa, Canada: National Aboriginal Forestry Association.
- NAFA/IOG. 2000. *Aboriginal-forest sector partnerships: Lessons for future collaboration*. Ottawa, Canada: National Aboriginal Forestry Association.
- NAFA. 2001. *Sustainable Forest Management*. National Aboriginal Forestry Association Newsletter (Fall). Ottawa, Canada: National Aboriginal Forestry Association.
- Ndoye, O., M. Ruiz Perez, A. D. Mamoun, and D. Lema Ngono. 1999. Les effets de la crise economique et de la devaluation sur l'utilisation des plantes medicinales au Cameroun. Implications pour la gestion durable des forets. Libreville, Gabon: Seminaire FORAFRI.
- Neumann, R. P., and E. Hirsch. 2000. *Commercialisation of non-timber forest products: Review and analysis of research*. Bogor, Indonesia: Center for International Forestry Research.
- Nysenkyiere, E., and M. Simula. 2000. Comparative study on the auditing systems of sustainable forest management. ITTO.
- Ortiz, S. 2001. Community forestry for profit and conservation: A successful community management experience in timber production and marketing in Guatemala. ITTO Newsletter (online). Yokohama, Japan: International Tropical Timber Organization.
- Ostrom, E. 1999. *Self-governance and forest resources*. CIFOR Occasional Paper No. 20. Bogor, Indonesia: Center for International Forestry Research, February.
- Ottke, C., P. Kristensen, D. Maddox, and E. Rodenburg. 2000. *Monitoring for impacts- Lessons on natural resources monitoring from 13 NGOs*. Vol. I and II. Washington, D.C.: World Resources Institute and Conservation International.
- Pabuayon, I. M. 1994. Marketing services in Philippine agricultural and forestry extension. In ed. J.B. Raintree and H. Francisco, *op. cit.*
- Pacheco, P. 2001. Bolivia—Country profile presented to "The Role of Forestry in Poverty Alleviation," Tuscany, Italy, September. Rome, Italy: Food and Agriculture Organization.
- Padoch, C., and M. Piñedo-Vasquez. 1996. Smallholder forest management: Looking beyond non-timber forest products. In ed. M. Ruiz Perez and J. E. M. Arnold, *op. cit.*
- Pagiola, S. 2001. Deforestation and land use changes induced by the East Asian economic crisis. EASES (East Asia Environment and Social Development Unit) Discussion Paper March 2001. Washington, D.C.: World Bank.
- Pagiola, S., J. Bishop, and N. Landell-Mills. 2002. *Selling forest environmental services: Market-based mechanisms for conservation and development*. London: Earthscan Publications.
- Palo, M. 2000. *World forests from deforestation to transition?* Dordrecht, Holland: Kluwer Academic Publishers.
- Pant, Surecha. 2003. Leasehold forestry programme to benefit the poor. *The Kathmandu Post*. Kathmandu, Nepal. February 27.
- Perlin, J. 1989. *A forest journey: The role of wood in the development of civilization*. New York: W. W. Norton & Company.
- Perrot-Maitre, D., and P. Davis. 2001. Case studies of markets and innovative financial mechanisms for water services from forests. Washington, D.C.: Forest Trends.
- Petkova, E., and P. Veit. 2000. Environmental accountability beyond the nation-state: The implications of the Aarhus Convention. *Environmental Governance Notes*. Washington, D.C.: World Resources Institute.

- Piñedo-Vasquez, M., D. J. Zarin, K. Coffey, C. Padoch, and F. Rabelo. 2001. Post-boom logging in Amazonia. *Human Ecology* 29 (2): 5.
- Pinstrup-Andersen, P., R. Pandya-Lorch, and M. Rosegrant. 1997. *The world food situation: Recent developments, emerging issues and long-term prospects*. 2020 Food Policy Report. Washington, D.C.: International Food Policy Research Institute.
- Poffenberger, M., ed. 1996a. *Communities and forest management*. A report of the IUCN Working Group on Community Involvement in Forest Management, with recommendations to the inter-governmental panel on forests. Washington, D.C.: IUCN-The World Conservation Union.
- _____, ed. 1996b. *Keepers of the forest: Land management alternatives in Southeast Asia*. West Hartford, Connecticut: Kumarian Press.
- Poffenberger, M. 2000. *Communities and forest management in South Asia*. Working Group on Community Involvement in Forest Management. Regional profile series. Washington, D.C.: IUCN-The World Conservation Union.
- Poffenberger, M., B. McGean, N. H. Ravindranath, and M. Gadgil. 1992. *Diagnostic tools to support community forest management: Manual of field methods*. Society for Promotion of Wasteland Development: New Delhi, India.
- Poffenberger, M., and B. McGean, eds. 1998. *Village voices, forest choices: Joint forest management in India*. Delhi, India: Oxford University Press.
- Poffenberger, M., and S. Selin, eds. 1998. *Communities and forest management in Canada and the United States*. Regional profile series. Working Group on Community Involvement in Forest Management.
- Poschen, P., and M. Lougren. 2001. *Globalization and sustainability: The forestry and wood industries on the move*. Report for discussion at the Tripartite Meeting "Social and Labour Dimensions of the Forestry and Wood Industries on the Move," Geneva, Switzerland, International Labor Organization.
- Poteete, A., and E. Ostrom. 2001. *An institutional approach to the study of forest resources*. Bogor, Indonesia: Center for International Forestry Research.
- Poulton, C., and N. Poole. 2001. *Poverty and fruit tree research: Issues and options paper*. Ashford, Kent, United Kingdom: Agricultural Economics and Business Management Research Group, Imperial College at Wye.
- Powell, I., A. White, and N. Landell-Mills. 2001. *Developing markets for ecosystem services of forests*. Washington, D.C.: Forest Trends.
- Power, T. 1996. *Lost landscapes and failed economies: The search for a value of place*. Washington, D.C.: Island Press.
- Primack, R. B., D. Bray, H. A. Galletti, and I. Ponciano, ed. 1998. *Timber, tourists and temples*. Washington, D.C.: Island Press.
- PROCYMAF. 2000. Proyecto de conservación y manejo sustentable de recursos forestales en México. Informe y avance 1998-2000. Misión de evaluación de medio término. Mexico: SEMARNAP.
- Putz, J. 2003. *Timberland report* 4(3):1-4. James Sewell Company.
- Raintree, J. B., and H. A. Francisco. 1994. *Marketing of multipurpose tree products in Asia*. Proceedings of an international workshop held in Baguio City, Philippines, 6-9 December, 1993. Bangkok, Thailand: Winrock International.
- Rametsteiner, E., and M. Simula. 2001. *Forging novel incentives for environment and sustainable forest management*. Presented to the European Commission DG Environment, Brussels, Belgium, Workshop on Forest Certification, Sept. 6-7.
- Reed, D. 2002. *Poverty is not a number; the environment is not a butterfly*. Viewpoint Series on Poverty and the Environment. Washington, D.C.: World Wildlife Fund, Macroeconomics for Sustainable Development Program Office.
- Reid, W., S. A. Laird, C. A. Meyer, R. Gámez, A. Sittenfeld, D. H. Janzen, M. A. Gollin, and C. Juma. 1993. *Biodiversity prospecting: Using genetic resources for sustainable development*. Washington, D.C.: World Resources Institute, National Biodiversity Institute of Costa Rica, Rainforest Alliance, African Centre for Technology Studies.
- Ribot, J. C. 1995. From exclusion to participation: Turning Senegal's forestry policy around? *World Development* 23(9): 1587-1599.
- _____. 1996. Participation without representation: Chiefs, councils and forestry law in the West African Sahel. *Cultural Survival Quarterly* (Fall): 40-44.
- _____. 1998. Theorizing access: Forest profits along Senegal's charcoal commodity chain. *Development and Change* 29:307-341.
- _____. 2002. Democratic decentralization of natural resources, institutionalizing popular participation. World Resources Institute: Washington, D.C.
- Rice, R., C. Sugal, S. Ratay, and G. da Fonseca. 2001. *Sustainable forest management: A review of conventional wisdom*. Washington, D.C.: Conservation International.
- Richards, M. 1997. Common property resource institutions and forest management in Latin America. *Development and Change* 28: 95-117.
- Richards, M., C. Palmer, C. Frickmann Young, and K. Obidzinski. 2003. *Higher international standards or rent-seeking race to the bottom? The impact of forest product trade liberalisation on forest governance*. Report prepared for FAO and IIED project: London, United Kingdom.
- Robbins, C. S. 2000. *Mahogany matters: The U.S. market for bio-tropical mahogany and its implications for the conservation of the species*. Washington, D.C.: TRAFFIC North America.

- Rosa, H., and S. Kandel, and L. Dimas. 2003. *Compensation of environmental services for communities: lessons from the Americas and key issues for strengthening community strategies*. PRISMA: San Salvador, El Salvador.
- Rozelle, S., J. Huang, and U. Lele. 2002. China: The world's largest experiment in conservation and development. In ed. U. Lele, *op. cit.*
- Rudel, T. K. 1998. Is there a forest transition? Deforestation, reforestation and development. *Rural Sociology* 63 (4): 533-552.
- _____. 2001. Did a green revolution restore the South's forests? Forest cover in the American South, 1935-1975. In ed. Angelsen and Kaimowitz, *op. cit.*
- Ruiz Perez, M. R., and J. E. M. Arnold. 1996. *Current issues in non-timber forest products research*. Bogor, Indonesia: Center for International Forestry Research.
- Ruiz Perez, M. R., and N. Byron. 1999. A methodology to analyze divergent case studies of non-timber forest products and their development potential. *Forest Science* 45 (1): 1-14.
- Ruiz Perez, M., Z. Maogong, B. Belcher, X. Chen, F. Maoyi, and X. Jinzhong. 2000. The role of bamboo plantations in rural development: The case of Anji County, Zhejiang, China. *World Development* 27 (1): 101-114.
- Saigal, S., H. Arora, and S. Rizvi. 2002. *The new foresters: The role of private enterprise in the indian forestry sector, instruments for sustainable private sector forestry series*. New Delhi and London: Ecotech Services and the International Institute for Environment and Development.
- Saigal, S., and D. Kashyap. 2000. *Review of company-farmer partnerships for the supply of raw material to the wood-based industry. Sub-study for the instruments for sustainable private sector forestry project*. London, United Kingdom: Ecotech Services and the International Institute for Environment and Development.
- Samoyoa-Urrea, O. 1995. Economic and institutional analysis of agroforestry projects in Guatemala. In ed. D. Current, E. Lutz, and S. J. Scherr, *op. cit.*
- Santiago, Israel. 2002. Production unit for forest management of pueblos mancomunados. Paper presented to "Global Perspectives on Indigenous Peoples' Forestry: Linking Communities, Commerce and Conservation: An International Conference," Vancouver, British Columbia, Canada June 4 - 6, 2002.
- Sarin, M. 2001. Disempowerment in the name of 'participatory' forestry? Village forests joint management in Uttarakhand. Forests, Trees and People Program. Rome, Italy: FAO.
- Scherr, S. J. 1995. Meeting household needs: Farmer tree-growing strategies in Western Kenya. In ed. Arnold and Dewees, *op. cit.*
- _____. 1999. *Poverty-environment interactions in agriculture: Key factors and policy implications*. Poverty and Environment Issues Series No. 3. New York, N.Y.: United Nations Development Program and the European Commission.
- _____. 2000. A downward spiral? Research evidence on the relationship between poverty and natural resource degradation. *Food Policy* 25: 479-498.
- _____. 2002. *Choosing instruments to promote environmental services from forests*. Presented to Forest Trends-China Workshop on "Forests and Ecosystem Services in China," Beijing, China. April.
- Scherr, S. J., J. Amornsanguasin, E. Chiong-Javier, D. Garrity, S. Sunito, and Saharuddin. 2001. Local organizations in natural resource management in the uplands of Southeast Asia: Policy context and institutional landscape. Paper presented to the SANREM Conference on "Sustaining Upland Development in Southeast Asia: Issues, Tools and Institutions for Local Natural Resource Management," Makati, Metro Manila, Philippines, May 28-30.
- Scherr, S. J., and P. A. Dewees. 1994. Public policy and NTFP market research: Issues and approaches. Paper presented at the IFPRI/CIFOR/ICRAF/NRI Workshop on NTFP Market Research, Annapolis, Maryland, December 12-14 1994.
- Scherr, S. J., A. White, and D. Kaimowitz. 2001. *Making markets work for forest communities*. Washington, D.C.: Forest Trends.
- Schmidt, R., J. K. Berry, and J. C. Gordon. 1999. *Forests to fight poverty*. New Haven, C.T.: Yale University Press.
- Scoones, I., M. Melnyk, and J. N. Pretty. 1992. *The hidden harvest: Wild foods and agricultural systems: A literature review and annotated bibliography*. London, United Kingdom: International Institute for Environment and Development.
- Sedjo, R. A., and D. Botkin. 1997. Using forest plantations to spare natural forests. *Environment* 30 (10): 14-20, 30.
- Segura, G. 2000. Mexico's forests sector and policies: A general perspective. Mexico, D.F.: Ecological Institute, Universidad Nacional Autónoma de México.
- Shanley, P., S. A. Laird, A., R. Pierce, and A. Guillén. 2002. *Tapping the green market: A guide to the management and certification of non-timber forest products*. London: Earthscan Publications.
- Sharma, M., M. Garcia, A. Quershi, and L. Brown. 1996. *Overcoming malnutrition: Is there an ecoregional dimension? Food, Agriculture, and the Environment Discussion Paper 10*. Washington, D.C.: International Food Policy Research Institute.
- Shepherd, G., J. E. M. Arnold, and S. Bass. 1999. *Forests and sustainable livelihoods: Current understanding, emerging issues and their implications for World Bank forest policy and forestry practice*. A

- contribution to the World Bank Forestry Policy Review process. Washington, D.C.: The World Bank, September.
- Simons, A. J., H. Jaenicke, and Z. Tchoundjeu. 2000. The future of trees is on farm: Tree domestication in Africa. In *Sub-Plenary Sessions XXI IUFRO World Congress*, ed. B. Krishnapillay and E. Soepadmo, Kuala Lumpur, Malaysia.
- Simula, M. 1999. *Trade and environmental issues in forest production*. Environment Division Working Paper. Washington, D.C.: World Bank.
- Sizer, N., D. Downes, and D. Kaimowitz. 1999. *Liberalization of international commerce in forest products: Risks and opportunities*. WRI Forest Notes, November. Washington, D.C.: World Resources Institute, November.
- Smeraldi, R., and A. Verissimo. 1999. *Hitting the target: Timber consumption in the Brazilian domestic market and promotion of forest certification*. São Paulo, Brazil: Amigos da Terra Programa Amazonia.
- Smith, J., and S. J. Scherr. 2002. *Forest carbon and local livelihoods: Assessment of opportunities and policy recommendations*. Occasional Paper No. 37. Bogor, Indonesia: Center for International Forestry Research and Forest Trends.
- Smith, P., G. Scott, and G. Merkel. 1995. *Aboriginal forest land management guidelines: A community approach*. Ottawa, Canada: National Aboriginal Forestry Association.
- Smith, R. C. 2000. *Community-based resource control and management in Amazonia: A research initiative to identify conditioning factors for positive outcomes*. Woods Hole Massachusetts: Woods Hole Research Center.
- Snook, L. K. 2000. *Utilization and management of timber and non-timber forest resources in the forest ejidos of Quintana Roo, Mexico*. FAO case studies on combined timber-non-timber management. Rome, Italy: Food and Agriculture Organization, May.
- Spears, J. 2000. *Summary of main findings emerging from Phase 1 and their implications for further research*. Washington, D.C.: World Bank/World Wildlife Fund Alliance.
- Sun, C. 2001. *A proposal for pilot community forest certification: Developing a new economic model for community-based forest management and utilization in Southern China*. Beijing, China: Research Centre for Environmental and Ecological Economics, September.
- Sun, Changjin. 2002. *Reflections on China's forest ecological compensation fund*. In *Workshop on payment schemes for environmental services: Proceedings*, ed. Xu Jintao and Ulrich Schmitt. CCICED Task Force on Forests and Grasslands. Beijing, China: China Forestry Publishing House.
- Sunderlin, W., A. Angelsen, and S. Wunder. 2003. *Forests and poverty alleviation*. In FAO, *State of the world's forests 2003*. Rome, Italy: Food and Agriculture Organization of the United Nations.
- Tabuna, H. 2000. *Evaluation des échanges des produits forestiers non ligneux entre l'Afrique subsaharienne et l'Europe*. FAO, CARPE. Accra, Ghana: Advent Press.
- Tattenbach, F., B. Kleysen, W. Alpizar, P. Manzo, L. Corrales, J. Galvez, M. Leiva, P. Imbach, and G. Mora. 2000. *A GHG emissions reductions project proposal for five community forest concessions in the Mayan Biosphere Reserve, Petén, Guatemala*. Prepared by the OCIC Consulting Group for USAID Contract 596-0-00-00056-00.
- Tedder, S., D. Mitchell, and A. Hillyer. 2002. *Property rights in sustainable management of non-timber forest products*. British Columbia, Victoria, Canada: British Columbia Ministry of Forests and Forest Renewal.
- Templeton, S., and S. J. Scherr. 1999. *Impacts of population increase and economic change on mountain forests in developing countries*. In *Forests in sustainable mountain development: A state of knowledge report for 2000*, ed. M. Price. Wallingford, United Kingdom: CABI Publishing with IUFRO (International Union of Forestry Research organizations).
- TNC, and CCED. 2001. *The forest bank*. Arlington, Virginia, USA: The Nature Conservancy and the Center for Compatible Economic Development.
- Tognetti, S. 2001. *Creating incentives for river basin management as a conservation strategy - A survey of the literature and existing incentives*. Washington, D.C.: US World Wildlife Fund.
- Tomich, T. P., M. van Noordwijk, S. Budidarsono, A. Gillison, K. Kusumanto, D. Murdiyarso, F. Stolle, and A. M. Fagi. 2001. *Agricultural intensification, deforestation and the environment: Assessing tradeoffs in Sumatra, Indonesia*. In *Tradeoffs or synergies? Agricultural intensification, economic development and the environment*, ed. D.R. Lee and C.B. Barrett. Wallingford: CABI Publishing.
- Townson, I. M. 1995. *Forest products and household incomes: A review and annotated bibliography*. Tropical Forestry Papers 31. Oxford, United Kingdom: Center for International Forestry Research and Oxford Forestry Institute.
- Tresierra, J. 1999. *Rights of indigenous peoples over tropical forest resources*. In *Forest resource policy in Latin America*, ed. K. Keipi. Washington, D.C.: Inter-American Development Bank.
- United Nations. 2000. *Millennium development goals*. New York: United Nations.
- Van Helden, F., and J. Schneemann. 2000. *Cutting trees to keep the forest: An overview of lessons learned from community-based sustainable forestry programs with emphasis on the production and marketing of timber*. Zeist, The Netherlands: Interchurch Organization for Development Cooperation.

- Vergara, N. 1997. *Wood materials from non-forest areas*. Asia-Pacific Forestry Sector Outlook Study Working Paper No: APFSDS/WP/19. Rome and Bangkok: Forestry Policy and Planning Division and Regional Office for Asia and the Pacific.
- Victor, D. G., and J. H. Ausubel. 2000. Restoring the forests. *Foreign Affairs*. (Nov-Dec): 127-145.
- Vlosky, P., and J. A. Aguirre. 2001. Increasing marketing opportunities of lesser known species and secondary wood products in tropical Central America and Mexico. Baton Rouge, LA: Louisiana Forest Products Development Center, August.
- Vogel, J. H., ed. 2000. *El cartel de la biodiversidad: Transformación de los conocimientos tradicionales en secretos comerciales*. Quito, Ecuador: CARE, Proyecto SUBIR.
- Von Braun, J., and E. Kennedy, eds. 1994. *Agricultural commercialization, economic development, and nutrition*. Baltimore: Johns Hopkins University Press.
- Warner, K. 2000. Forestry and sustainable livelihoods. *Unasylva* 202 (51): 3-12.
- Watson, V., S. Cervantes, C. Castro, L. Mora, M. Solís, I. T. Porras, and B. Cornejo. 1998. *Costa Rica: Making space for better forestry*. Policy that Works for Forests and People Series No. 6. London, United Kingdom: International Institute for Environment and Development Publications.
- White, A., and A. Martin. 2002. *Who owns the world's forests?* Washington, D.C.: Forest Trends.
- White, A., A. Molnar, A. Martin, and A. Contreras-Hermosilla. 2002. *To Johannesburg and beyond: Strategic options to advance the conservation of natural forests*. Discussion Paper for the GEF Forest Roundtable in conjunction with the 2nd UN Forum on Forests, New York, March.
- Wilkie, D., and R. Godoy. 1996. Trade, indigenous rain-forest economies and biological diversity. In *Current issues in non-timber forest products Research*, ed. M. Ruiz Perez and J. E. M. Arnold. Bogor, Indonesia: Center for International Forestry Research.
- Wilson, C., P. Moura-Costa, and M. Stuart. 1999. Transfer payments for environmental services to local communities: A local-regional approach. IFAD proposed special programme for Asia. Rome, Italy: International Fund for Agricultural Development. Draft.
- Wollenberg, E., and A. Ingles, eds. 1998. *Incomes from the forest: Methods for the development and conservation of forest products for local communities*. Bogor, Indonesia: Center for International Forestry Research and the World Conservation Union.
- Wood, S., K. Sebastian, and S. J. Scherr. 2000. *Agroecosystems: Pilot analysis of global ecosystems*. Washington, D.C.: International Food Policy Research Institute and World Resources Institute.
- World Bank. 1995. *Mexico: Resource conservation and forest sector review*. Washington, D.C.: World Bank, Natural Resources and Rural Poverty Operations Division, Country Department II and Latin American and the Caribbean Regional Office.
- _____. 2000a. Towards a revised forest strategy for the World Bank Group. Washington, D.C.: The World Bank.
- _____. 2000b. Implementation completion report—Madhya Pradesh forest project. Washington, D.C.: The World Bank.
- _____. 2001. Recommended revisions to OP 4.36: Proposals for discussion. Washington, D.C.: The World Bank.
- _____. 2003. *World development report 2003*. Washington, D.C.: The World Bank.
- Wunder, S. 2000. Poverty alleviation and tropical forests—What scope for synergies? *World Development* 29(11): 1817-1833.
- Yin, R., and W. F. Hyde. 2000. Trees as an agriculture-sustaining activity: The case of Northern China. *Agroforestry Systems* 50: 179-194.
- Young, C., and D. Nepstad. 2002. Pro-ambiente: An agricultural and environmental credit line for Amazon farmers. Presented at The Katoomba Group Workshop IV, Teresopolis, Brazil.
- Zeller, M., and M. Sharma. 1998. *Rural finance and poverty alleviation*. Food policy report. Washington, D.C.: International Food Policy Research Institute.
- Zeller, M., and R. L. Meyer. 2002. *The triangle of micro-finance: Financial sustainability, outreach and impact*. Baltimore: Johns Hopkins University Press.
- Zhang, B., and S. Zhu. 1997. Trends and outlook for forest product consumption, production and trade in the Asia-Pacific region. FAO Working Paper Series. Rome, Italy: Food and Agriculture Organization.

ANNEXES

ANNEX 1.

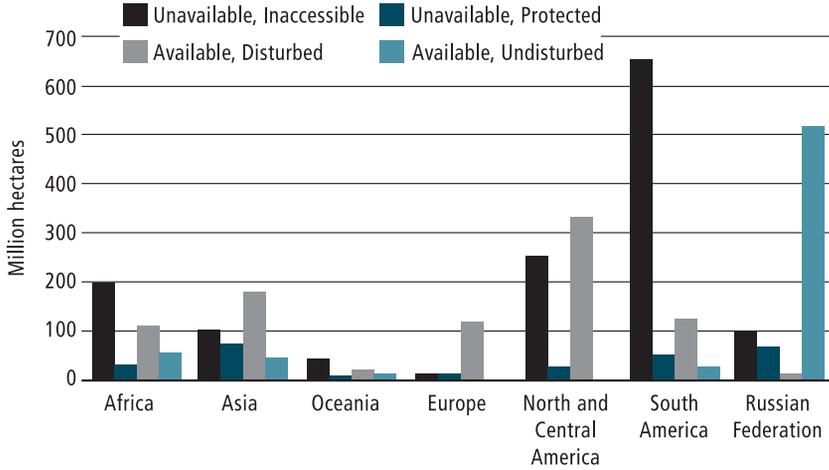
Official Forest Ownership in 24 of the 30 Most Forested Countries

Country (by descending area of forest cover as identified by FAO 2001)	Area in Million Hectares (Percentage of Country Total)			
	Administered By Government	Public Reserved for Community and Indigenous Groups	Community/ Indigenous	Private Individual/ Firm
Russian Federation	886.5 (100)	0 (0)	0 (0)	0 (0)
Brazil	423.7 (77.0)	74.5 (13.0)	0 (0)	57.3 (10)
Canada	388.9 (93.2)	1.4 (0.3)	0 (0)	27.2 (6.5)
United States	110.0 (37.8)	17.1 (5.9)	0 (0)	164.1 (56.3)
China	58.2 (45.0)	0 (0)	70.3 (55.0)	0 (0)
Australia	410.3 (70.9)	0 (0)	53.5 (9.3)	114.6 (19.8)
Democratic Republic of Congo	109.2 (100)	0 (0)	0 (0)	0 (0)
Indonesia	104.0 (99.4)	0.6 (0.6)	0 (0)	0 (0)
Peru	n.d.	8.4 (1.2)	22.5 (33.0)	n.d.
India	53.6 (76.1)	11.6 (16.5)	0 (0)	5.2 (7.4)
Sudan	40.6 (98.0)	0.8 (2.0)	0(0)	0(0)
Mexico	2.75 (5.0)	0 (0)	44.0 (80.0)	8.3 (15.0)
Bolivia	28.2 (53.2)	16.6 (31.3) ⁱ	2.8 (5.3) ⁱⁱ	5.4 (10.2)
Colombia	n.d.	n.d.	24.5 (46.0)	n.d.
Tanzania	38.5 (99.1)	0.4 (0.9) ⁱⁱⁱ	0 (0)	0 (0)
Argentina	5.7 (20.5)	0 (0)	0 (0)	22.2 (79.5)
Myanmar	27.1 (100)	0 (0)	0 (0)	0 (0)
Papua New Guinea	0.8 (3.0)	0 (0)	25.9 (97.0)	0 (0)
Sweden	6.1 (20.2)	0 (0)	0 (0)	24.1 (79.8)
Japan	10.5 (41.8)	0 (0)	0 (0)	14.6 (58.2)
Cameroon	22.8 (100)	0 (0)	0 (0)	0 (0)
Central African Republic	22.9 (100)	0 (0)	0 (0)	0 (0)
Gabon	21.0 (100)	0 (0)	0 (0)	0 (0)
Guyana	30.9 (91.7)	0 (0)	2.8 (8.3)	0 (0)
Total	2,803.2	131.4	246.3	443.0

Source: White and Martin (2002), Table 1.

ANNEX 2.

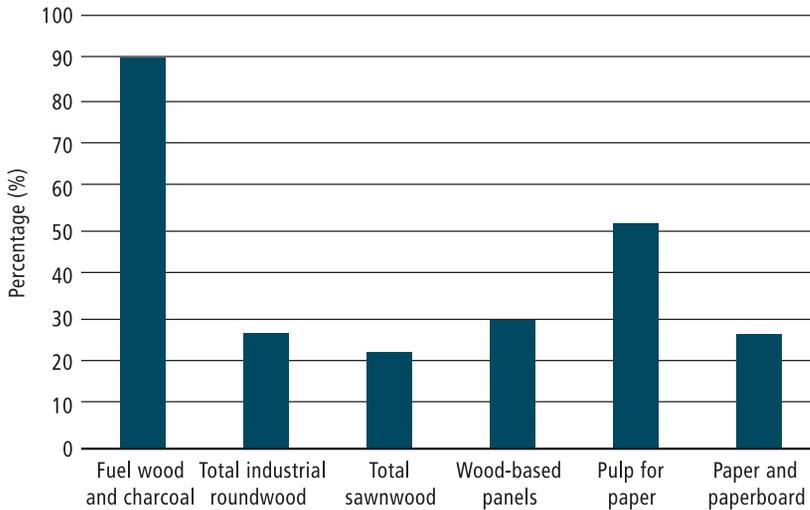
Global Forest Area Available for Production.



Source: Bull et al. (1998).

ANNEX 3.

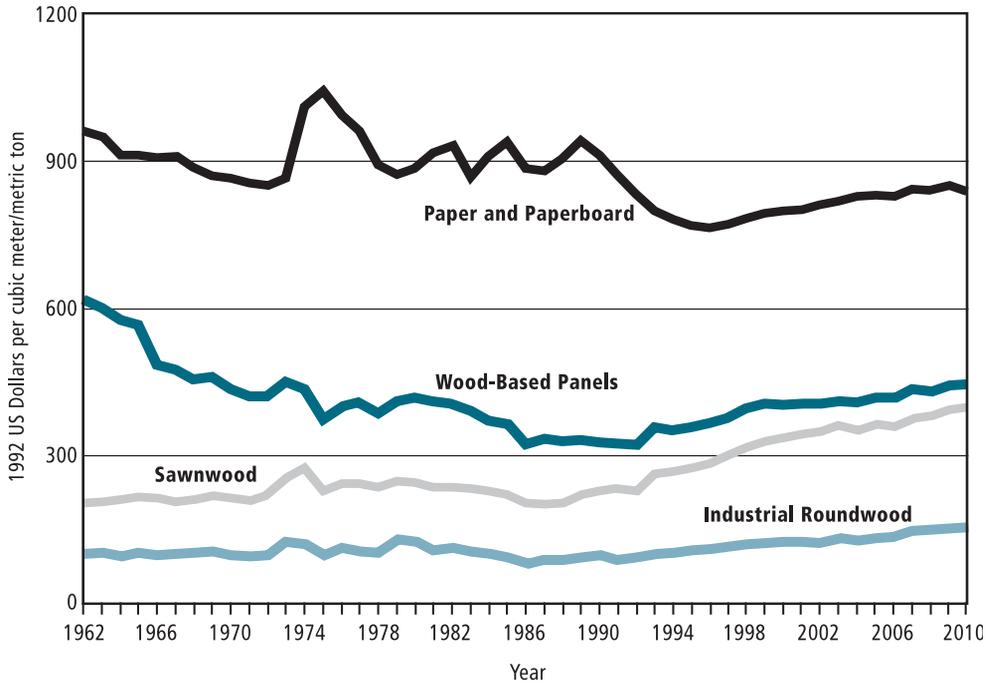
Role of Developing Countries in Supply of Forest Products By Portion of Total World Production.



Source: FAO (2003).

ANNEX 4.

Trends in Real World Prices of Wood Products, 1962-2010.



Source: Zhang and Zhu (1997).

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INDEX OF GEOGRAPHIC REFERENCES

REGIONS

Africa *19, 20, 50, 60, 67, 77, 107, 117, 129, 154*
Amazon Basin *7, 11, 22, 32, 33, 43, 50, 59*
Asia *60, 65, 66, 77, 99, 105, 127*
Australia *6, 42, 52, 99, 130, 153*
Caribbean *75*
Central America *19, 39, 75, 126, 154*
Congo Basin *7, 16, 25, 153*
East Africa *10, 62*
Europe *5, 26, 32, 53, 60, 61, 67, 75, 96, 105*
Latin America *17, 20, 40, 51, 60, 77, 93, 95, 96*
North America *60, 76, 77, 84, 154*
South America *154*
South Asia *19, 20, 94, 111*
Southeast Asia *10, 19, 20, 25, 65, 98*
Southern Africa *6, 10, 49, 55, 60, 62, 67, 75, 83, 89, 100*
West Africa *8, 19*

COUNTRIES

Angola *54*
Argentina *16, 153*
Austria *22*
Bangladesh *19, 20, 21, 46*
Belgium *59*
Belize *22*
Bolivia *16, 47, 48, 52, 54, 60, 75, 110, 122, 123*
Brazil *6, 10, 12, 16, 22, 38, 40, 48, 51, 53, 54, 59, 61, 63, 65, 70, 75, 76, 96, 99, 105, 107, 115, 153*
Burkina Faso *11*
Cameroon *11, 16, 53, 55, 65, 77, 130, 153*
Canada *35, 40, 43, 59, 61, 72, 85, 90, 92, 96*
Central African Republic *16, 153*
Chile *6, 13, 35, 75, 110, 130*
China *7, 12, 13, 16, 20, 21, 22, 37, 53, 54, 61, 65, 75, 76, 94, 105, 111, 122, 153*
Colombia *16, 52, 103, 105, 153*

Costa Rica *37, 42, 52, 75, 77, 101, 126, 130*
Democratic Republic of Congo *16, 54, 153*
Ecuador *52, 70, 112*
El Salvador *75*
Gabon *16, 53, 153*
Ghana *10, 47, 125*
Guyana *16, 153*
Haiti *75*
Honduras *37, 75, 79, 101, 105, 115*
India *5, 7, 9, 12, 16, 19, 38, 39, 40, 44, 46, 51, 53, 54, 55, 56, 65, 75, 77, 85, 95, 104, 111, 112, 115, 126, 128, 129, 130, 153*
Indonesia *12, 16, 19, 44, 53, 61, 63, 65, 67, 75, 76, 97, 104, 108, 110, 112, 117, 121, 122, 126, 127, 129, 130*
Japan *26, 153*
Kenya *11, 15, 19, 67, 129*
Laos *15, 19*
Madagascar *105, 129*
Malaysia *12, 19, 53, 59, 61, 63, 65, 75*
Mali *11, 44, 75, 110, 121*
Mexico *2, 11, 12, 16, 38, 39, 46, 47, 50, 52, 54, 61, 62, 63, 72, 75, 84, 85, 87, 93, 96, 98, 100, 104, 105, 111, 125, 130, 134, 153*
Morocco *31, 32*
Myanmar *16, 75, 153*
Nepal *2, 10, 15, 19, 40, 46, 69, 75, 95, 111, 116, 126*
Netherlands, The *5, 59*
New Zealand *35, 49, 85, 99*
Niger *44, 121, 122*
Pakistan *19, 47, 75*
Papua New Guinea *16, 39, 44, 46, 47, 49, 63, 78, 80, 84, 89, 153*
Peru *16, 54, 153*
Philippines, The *19, 46, 47, 55, 61, 103, 107, 108, 126, 127*
Puerto Rico *26*
Russia *22, 153, 154*
Senegal *15*

South Africa *6, 49, 55, 60, 67, 75, 83, 89, 100*
 South Korea *26*
 Sri Lanka *19*
 Sudan *15, 16, 54, 153*
 Sweden *153*
 Switzerland *96*
 Tanzania *16, 19, 39, 40, 153*
 Thailand *19, 20, 22, 61, 63, 65, 103, 126*
 Uganda *19, 40, 112*
 United Kingdom (UK) *5, 100*
 United States of America (USA) *5, 33, 57, 101, 119*
 Vietnam *19, 20, 52, 109*
 Zambia *11*
 Zimbabwe *8, 9, 12, 44, 69, 129*

PROVINCES AND STATES

Andhra Pradesh (India) *44, 49, 51, 64*
 Bali (Indonesia) *67*
 Bihar (India) *15*
 British Columbia (Canada) *40, 61, 90, 103, 118, 129, 130*
 California (USA) *6*
 Chihuahua (Mexico) *46*
 Durango (Mexico) *46*
 Guanacaste (Costa Rica) *104*
 Himachal Pradesh (India) *15*
 Java (Indonesia) *126*
 Kalimantan (Indonesia) *44, 121*
 Karnataka (India) *11, 19, 44, 55*
 Kentucky (USA) *101*
 KwaZulu (South Africa) *55, 89*
 Lempira Sur (Honduras) *101, 105*
 Madhya Pradesh (India) *9, 15, 44, 56*
 Michoacán (Mexico) *38, 72*
 Mindanao (Philippines) *55*
 Montana (USA) *119*
 New South Wales (Australia) *52*
 Northwest Province (Pakistan) *19*
 Oaxaca (Mexico) *39, 47, 50, 87, 93, 104, 125, 130*
 Orissa (India) *9, 15, 39, 44, 51*
 Pará (Brazil) *51, 96*
 Queensland (Australia) *104*
 Siaya (Kenya) *19*
 South Nyanza (Kenya) *19*
 Sumatra (Indonesia) *112*
 Uttar Pradesh (India) *46*
 West Bengal (India) *10, 114, 115, 128*
 Virginia (USA) *57*

SUB-NATIONAL REGIONS AND LOCALITIES

Angahuan (Mexico) *72*
 Bankass (Mali) *44*
 California Floristic Province (USA) *6*
 Cape Floristic Province (South Africa) *6*
 Cerrado (Brazil) *6*
 Cherán (Mexico) *72*
 Clayoquot Sound (Canada) *90*
 Eastern Cape (South Africa) *49*
 Huertar Norte (Honduras) *101*
 Jakarta (Indonesia) *1*
 Kolar (India) *11*
 Lachivaa (Mexico) *104*
 La Máquina (Guatemala) *77*
 Lomerío (Bolivia) *48*
 Madang (Papua New Guinea) *49*
 Maradi (Niger) *44*
 New York City (USA) *52*
 Northwest Brazil *105*
 Nuevo San Juan (Mexico) *12, 72, 104*
 Pacific Northwest (USA)
 Purépecha (Mexico) *36*
 Scolel-Té (Mexico) *52, 100*
 Southern USA *57, 101*
 Tharaka (Kenya) *15*
 Zancudo (Ecuador) *52*

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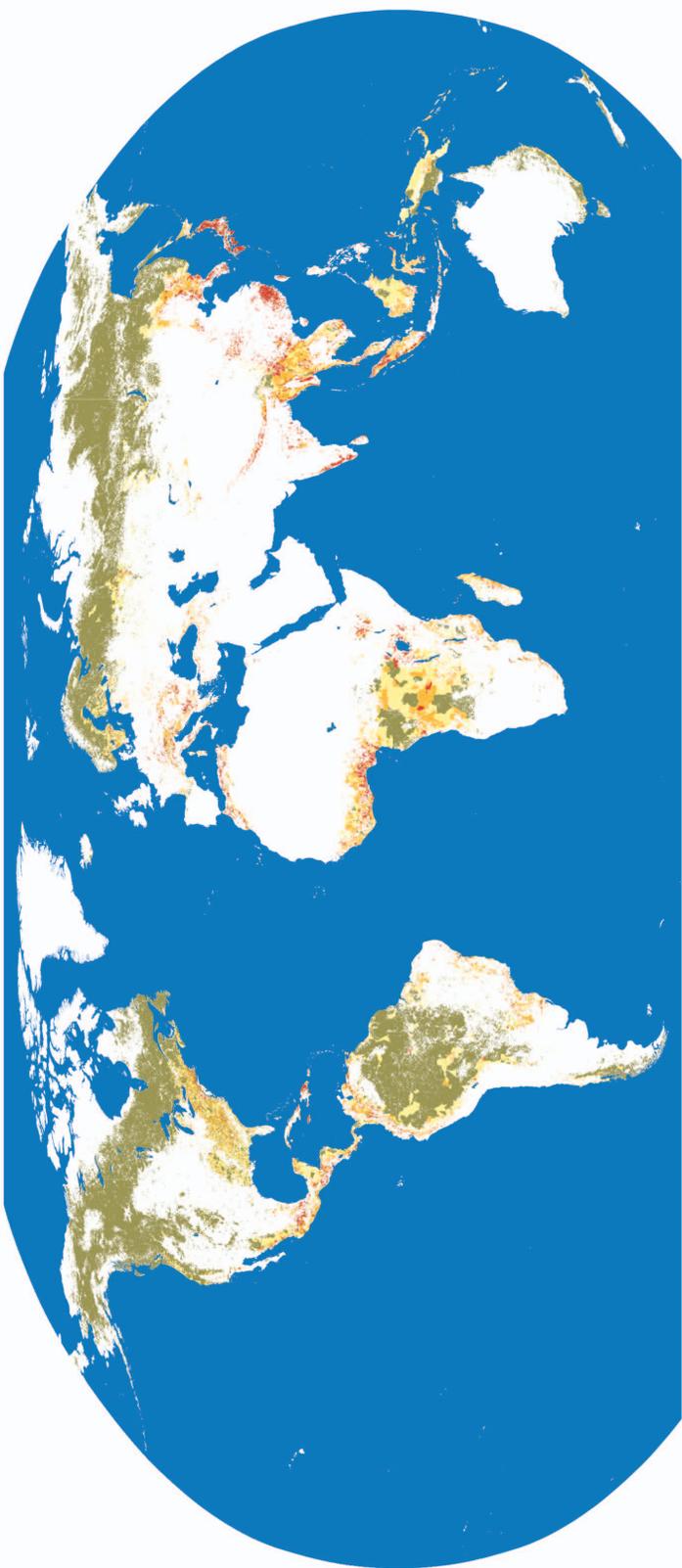
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