A USAID/Economic Growth, Agriculture & Trade Seminar Series

Poverty Reduction & Natural Resources Management

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USAID Seminar Series:
Natural Resource Management and Poverty Reduction
Approaches to Poverty Reduction

Prepared by: Victoria Rames and Jon Anderson (USAID)

I. An Overview of an Asset-Based Approach to Poverty Reduction

Poverty is a multi-dimensional phenomenon that requires both diverse approaches to reduce and a range of methods to measure. The poor themselves often have a broad view of poverty that includes not only income, consumption and asset levels but security, voice and control over factors that affect their livelihoods.

The USAID Poverty Analysis and Social Safety Nets Team (PASSN) utilizes an asset-based approach to poverty reduction. The asset-based approach is multi-dimensional and focuses on reducing the risk and vulnerability facing poor households and on enhancing their ability to participate in and benefit from new economic opportunities. The asset-based approach also underscores the importance of the active participation of the poor in the social, cultural, and political aspects of their communities to ensure that their interests are reflected in decisions affecting their lives.

Assets within this framework are broadly defined, including not only physical capital and financial assets, but also the knowledge and skills of individuals, their social bonds and community relations, and their ability to influence decisions that affect their lives. Low asset levels and the inefficient use of these assets are both a cause and a consequence of poverty.

The asset-based approach to poverty reduction focuses on developing the stock of wealth available to the poor to achieve sustainable long-term improved well-being. Financial, human, natural, physical and social assets are all an important part of this wealth and provide a source of investment for improvements in well-being. Briefly, these five asset categories can be described as follows:

- ***Financial assets*** include cash, savings, stocks, and bonds that people use to make purchases and to accumulate liquid wealth.

- ***Human capital*** refers to the skills, knowledge, and health status of household members that enable them to pursue livelihood objectives. Human capital is required to make use of the other four asset categories.

- ***Natural capital*** describes natural resources such as land, forests, water and air quality. Natural resources can be both renewable and non-renewable. Natural capital includes both public and private goods[1] and is central to the livelihoods of many poor rural households that are closely dependent on a natural resource base. Resources are dynamic, changing greatly in value over time and are socially embedded. Human institutions often define these resources and their use.

- ***Physical capital*** includes tools and equipment owned by households and businesses, as well as infrastructure such as roads, power and communications networks, and water and sanitation systems. Housing, livestock, and jewelry are other forms of physical capital important to many poor households.

- ***Social capital*** refers to the social resources, such as kinship systems and community organizations, which people draw upon in their livelihood strategies. Social capital facilitates cooperation across households,

[1] Goods that are difficult to keep nonpayers from consuming (excludability), and use of the goods by one person doesn't prevent use by others (rival consumption). Examples include clean air, water, and other environmental goods and roads.

often providing an informal safety net for the poor. It can also help households maneuver around market imperfections by facilitating information flows necessary for the completion of market transactions.

The asset-based approach recognizes that the poor are strategic managers of their complex asset portfolios, using calculations of the feasibility, relative costs, and expected returns in considering each option. It also recognizes the powerful complementarities across various assets: investing in education when future returns in wage labor appear significant; seeking out secure savings mechanisms and investing in social capital as hedges against future risks; and using their homes to generate revenue by renting out rooms or to run micro and small enterprises.

The asset-based approach also recognizes that the importance of natural capital – within the total stock of capital available to households – tends to vary inversely with their level of income. More specifically, the poorer the country or the population, the more significant the role of natural capital will be in determining the overall distribution of wealth. At the household level, the importance of natural capital tends to diminish as households move out of poverty.

Risk and Vulnerability. Though the five asset categories are the core of the asset-based approach to poverty reduction, a focus on the "vulnerability context" is also of critical importance. The vulnerability context refers to the external environment in which households pursue their livelihood objectives. Factors that typically are included in the "vulnerability context" include trends, shocks, and seasonality. **Trends** may or may not be benign and may include a wide array of variables such as population growth, improved governance, and natural resource degradation. **Shocks** are not benign and place household assets and their utilization at risk. Examples include natural disasters, conflict and economic crisis. **Seasonality** takes into account the dependency of many poor households on the seasonal fluctuations in prices, employment opportunities and production.

Understanding the vulnerability context highlights the fragility of poor households and the limited resources available to them to respond to stresses of one kind or another. Illness or injury can suddenly place an entire family in economic jeopardy. Harvest failure, fluctuations in the prices of basic commodities and job loss can each destroy a family's efforts to expand its asset stocks and improve the life chances of its children. Conflicts and pandemics such as HIV/AIDS can rapidly erode the familial networks and other relationships the poor depend upon to withstand shocks.

With extremely limited access to insurance or other formal mechanisms, poor households have little choice but to pursue livelihood strategies that limit their exposure to risk. Perhaps the most common means for reducing risk is livelihoods diversification. Having alternatives for income generation can make the difference between minimally viable livelihoods and destitution. Migration in particular plays a central role in many livelihoods strategies.

Diversification and other risk minimization strategies are quite rational given the options poor households have available to them. These strategies, however, often slow the accumulation of productive assets by poor households and in effect perpetuate their poverty. This is due to the fact that many of these risk management strategies are built upon low- risk, low-return activities.

Institutions. In addition to broadly defined assets and the vulnerability context, institutions also play an important role in shaping livelihood strategies. Effective institutions have long been recognized as integral to poverty reduction. The "rules of the game" that institutions define determine a country's rate of economic growth, how that growth is distributed, and how quickly poverty can be reduced. Bad economic policy at the micro, meso, and macro levels can not only slow growth and poverty reduction, but can also reduce the value of assets held by the household via inflation and alter household livelihood strategies away from wealth creation to wealth protection. In the asset-based approach, the emphasis is placed on the role of institutions in influencing the access of poor households to assets, the benefits they derive from their assets, and their incentives for the development of assets.

Institutions affect access to assets in a variety of ways. For example, if the rules controlling asset ownership and use are weak, thus increasing the risk of confiscation, households will adopt strategies that emphasize short-term, often low-return asset uses, ignoring longer-term investments that may be more productive, but more risky. Institutions affect returns on assets and incentives to accumulate them as well. For instance, bad government policies that foster high inflation tax household assets, reduce their market value, and shift household livelihood strategies away from asset accumulation to asset protection. In addition, complex government regulations that discourage the poor from obtaining property titles limit their ability to make full use of this asset (e.g., using it as collateral for a bank loan) and weaken their commitment to improve their natural resource holdings (e.g., adopting soil conservation measures).

The ability of the poor to influence their institutional surroundings is important. In general terms, the relationship of the poor to public institutions reflects their position in society - one of limited power and influence. Their limited power and influence often results in a series of related problems: 1. Poor people have little trust and low expectations of the institutions that shape their livelihood options; 2. Public institutions provide inadequate services, the bulk of which are seized by those with greater power and wealth; and 3. The poor are unable to make the most productive use of their assets, thus remaining unable to get ahead economically.

Inequality, Poverty and Growth. Social, economic, and institutional exclusion are important factors in both creating and maintaining poverty. Efforts to map poverty consistently show that households that live in pockets of poverty are subject to some form of economic, political, or social exclusion based on such factors as ethnicity, race, language, custom, etc. Though economic growth is a necessary means for reducing these pockets of poverty, it is not sufficient. To ensure that the benefits of economic growth reach the poor, it is important to address underlying issues of exclusion, as well as those of inequality that often accompany it.

One way to ensure that the benefits of economic growth reach the poor is to explore the close interaction between natural resources, economic growth, poverty reduction, governance and rights[2]. More specifically, a focus on the promotion of better functioning natural resource markets and secure property rights is essential. Markets do not work well where property rights are not clear and enforced. Moreover, a lack of resource rights for local people diminishes their ability to take advantage of economic opportunities available to them.

II. Practical Implications of an Asset-Based Approach to Poverty Reduction

Empowering Poor Households. Unlike other development approaches, the asset-based approach starts and ends with poor households. Understanding what poor households need to succeed, how local institutions and markets need to be restructured to facilitate the participation of these households, and how macro and micro policy can be used to adjust the incentives in these markets are key questions that drive the design of asset-based development.

Fostering Resilience. Fostering resilience, or reducing risk and vulnerability, is a relatively new concern in poverty reduction programs. Research by Michael Carter and Chris Barrett in particular has highlighted the importance of fostering resilience (Barrett and Carter, 2000). Their findings lead us to conclude that though poverty breeds insecurity, the inverse is also true.

There are many programs in the Americas, Europe, Asia and Africa that attempt to address the insecurity of poor households. Emergency food aid programs are one example. Though these programs help the poor to survive, they do not provide a way for the poor to get ahead; they do not foster resilience.

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[2] See the USAID publication "Nature, Wealth and Power: Emerging Best Practice for Revitalizing Rural Africa, 2002

There are many options to consider in an effort to promote resilience of poor households. Access to life insurance and health insurance, participation in pension funds and access to secure savings instruments are a few examples. Less direct measures, such as protecting access to the commons[3] may also be considered. Such efforts enhance the security of poor households and reduce their vulnerability to external shocks. With increased security and reduced vulnerability, poor households have a stronger foundation for building a better future.

Increasing Economic Benefits. In addition to protecting assets, steps need to be taken to enable poor households to enhance the returns they earn from assets they currently control and to acquire new assets.

Pro-poor policies and an effective institutional environment are central to ensuring that the poor optimize returns on their assets. Pro-poor policies can range from sound macro-economic policies to incentives for poor households to invest in the education of their children. Given the importance of natural capital in the economic portfolio of the poor, both economic growth and poverty reduction programs must focus on improving the poor's access and use of natural resources. They must also concentrate on the redistribution and better sharing of growth. For example, increasing local access and control of the poor over forest or wildlife resources or instituting a land reform process will increase the speed of poverty reduction. Reformation of property systems will also offer the potential for increasing the economic benefits poor households derive from their assets. Currently, many poor households lack formal titles to their property and for this reason, operate their businesses outside the formal economy. Without access to the formal economy, the poor lack access to financial services and contractual mechanisms that would allow them to exchange goods and gain access to services in the expanded market. Hence, an integral component of an effective poverty reduction framework is to ensure that poor households have access to expanding economic opportunities through greater access to formal markets. This access will allow poor households to make better use of their assets and receive improved economic returns from their investments. Clear property titles can provide this opening.

Increasing Social Benefits. In addition to fostering resilience and increasing economic benefits, an asset-based framework for poverty reduction also improves social benefits. It encourages the social relationships – such as those with extended family members, neighbors, community members and colleagues in professional associations – to which the poor turn in times of economic crisis and growth and which are essential to the livelihood strategies of most poor households. In addition, efforts should focus on the poor's participation in local decision-making processes. This can sometimes be as simple as making information on local public expenditures available to the public but often requires a more concerted effort to engage the poor in local, regional and national processes and provide them with the ability to articulate their interested in these processes.

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[3] The Commons is everything that a community shares and usually refers to natural resources like land, air and water. It also refers to all things we share, from culture to ideas to security to DNA.

POVERTY REDUCTION AND NATURAL RESOURCES MANAGEMENT SEMINARS

Do your activities and strategic plans cross over into the areas of improving livelihoods and protecting the natural resources that sustain those livelihoods?

Have you thought about the critical links between poverty and natural resources conflicts and degradation?

This seminar series will address these multidimensional issues and concerns. EGAT's Offices of Poverty Reduction and Natural Resources Management are hosting the cross-sectoral seminar series, which will explore the links between natural resource management and poverty reduction in developing and transitional countries. Experts from both within and outside USAID will share knowledge and tools for understanding the complex role that wise natural resource management plays in reducing poverty. The seminars will explore the conflicts and barriers to improving the livelihoods of the poor, and ways of assisting them with both improving their immediate standard of living and ensuring a sustainable future. Our ultimate goal is to build strong and successful Agency programs that alleviate poverty while maintaining the natural resource base so critical to sustaining wealth.

The nine-part seminar series will be sequential, with each session building on the discussions and knowledge base of those that have preceded it. Each seminar will consist of an invited presentation followed by a panel discussion to share complementary viewpoints and approaches. Supplementary readings will provide opportunity for further exploration of the topic.

The poverty-natural resources management thematic area will be developed further in EGAT's competency-based training course scheduled for the summer of 2005, and this seminar series will provide a terrific opportunity to begin considering the ways that these sectors can be integrated into the Agency's work plans and strategy-setting activities.

General Seminar Information

POVERTY REDUCTION AND NATURAL RESOURCES MANAGEMENT SEMINARS

SCHEDULE

2004	
Oct.28	Why an interest in the Links between Natural Resources Management & Poverty? *Jan Bojö (World Bank), Sara Scherr (Forest Trends), Andrew Warner (Millennium Challenge Corporation)*
Dec.2	Power & the Social Dimensions of Poverty & Natural Resource Management *Ruth Meinzen-Dick (IFPRI), Margaret Sarles (USAID)*
Dec.9	Assets, Poverty Traps & Rights *Chris Barrett (Cornell University), Marilee Kane (USAID)*

2005	
Jan.6	Markets, Trade & Poverty Reduction *Aaron Cosbey (International Institute for Sustainable Development), Augusta Molnar (Forest Trends), John Lamb (Abt Associates)*
Jan.20	Macro/National Level Issues *Kadi Warner (Winrock International), Asif Shaikh (International Resources Group), David Reed (World Wildlife Fund), Peter Veit (World Resources Institute)*
Feb.3	Migration, Marginal Lands & Least-Favored Areas *Kevin O'Neil (Migration Policy Institute), John Pender (IFPRI), Dennis Weller (USAID/DCHA)*
Feb.17	Programmatic Issues & Tools (in preparation) *(Panelists to be confirmed)*
Mar.3	The Impacts of Conflict, Corruption & Shocks on Poverty & Natural Resources Management (in preparation) *(Panelists to be confirmed)*
Mar.10	Lessons Learned & Applications to USAID Case Studies (in preparation) *(Panelists to be confirmed)*

USAID Poverty Reduction & Natural Resources Management Seminar Series

SPEAKER BIOSKETCHES

Chris Barrett is International Professor of Applied Economics and Management in the Department of Applied Economics and Management at Cornell University. Professor Barrett teaches and conducts research in the areas of international development, environmental and resource economics, international trade, markets and price analysis, agricultural production and distribution, and applied econometrics. His research program has three principal foci: (1) poverty, hunger, food security, economic policy, and the structural transformation of low-income societies; (2) issues of individual and market behavior under risk and uncertainty; and (3) the interrelationship between poverty, food security, and environmental stress in developing areas. Professor Barrett is Editor of the *American Journal of Agricultural Economics*, an associate editor of *Environment and Development Economics* and the *Journal of African Economies and World Development*, and is co-director of the Cornell African Food Security and Natural Resources Management Program.

Jan Bojö is an advisor in the World Bank's Office of the Vice President for Environmentally and Socially Sustainable Development. This unit oversees and coordinates work in departments for Agriculture and Rural Development, Environment, and Social Development. Since joining the World Bank in 1991, Dr. Bojö's operational work has focused on project management in Sub-Saharan Africa, particularly South Africa and Eritrea. He was one of the principal authors of the Africa Region Environment Strategy for the World Bank in 1996, and contributed actively to the overall Bank Strategy for Environment in 2001. His most recent publications revolve around enhancing the environment in the context of poverty reduction.

Ruth Meinzen-Dick is a senior research fellow in the Division of Environment and Production Technology at the International Food Policy Research Institute (IFPRI). IFPRI is one of 15 Food and Environmental Research Organizations known as the Future Harvest Centers. The Centers, located around the world, conduct research in partnership with farmers, scientists, and policymakers to help alleviate poverty and increase food security while protecting the natural resource base. Dr. Meinzen-Dick's research deals with water resource management, property rights, and collective action. Much of her field work has been conducted in South Asia and Southern Africa.

Margaret Sarles is the Director of the Democracy and Human Rights Office in USAID's Latin America and Caribbean Bureau.

Sara Scherr is an agricultural and natural resource economist specializing in land and forest management policy in tropical developing countries. She is Director of Ecosystem Services for Forest Trends, an NGO that promotes forest conservation through improved markets for forest products and ecosystem services. She also serves as Director of Ecoagriculture Partners, an international partnership to promote increased productivity jointly with enhanced natural biodiversity and ecosystem services in agricultural landscapes. She is a member of the United Nations Millennium Project Task Force on Hunger, and a member of the Board of Directors of the World Agroforestry Centre. She has published numerous papers and 11 books, including Ecoagriculture: Strategies to Feed the World and Save Wild Biodiversity (with Jeff McNeely) and A New Agenda for Forest Conservation and Poverty Reduction: Making markets work for low-income producers (with Andy White and David Kaimowitz). Dr. Scherr's current work focuses on policies to reduce poverty and restore ecosystems through markets for carbon sequestration, watershed protection and biodiversity protection services; strategies to promote ecoagriculture; and development of local institutions for natural resource management.

Asif Shaikh is the President and Chief Executive Officer of International Resources Group, an international professional services firm based in Washington, DC. He is a widely recognized authority on issues relating to natural resource economics, food security, energy planning, environmental policy, and population. Mr. Shaikh is co-author of the acclaimed publication Nature, Wealth and Power, which is being used as a framework for rural development in Africa and elsewhere. He has extensive experience in over 35 countries in Africa, Asia, the Caribbean, North America, and Europe, and is an internationally respected lecturer on sustainable development, environmental policy, economics, and natural resources. Mr. Shaikh was recently elected President of the Washington Chapter of the Society for International Development, an association of individuals and organizations concerned with sustainable economic, social, and political development.

Peter Veit is Regional Director for Africa in the Institutions and Governance Program at the World Resources Institute. World Resources Institute is an independent nonprofit environmental think tank that goes beyond research to find practical ways to protect the earth and improve people's lives. Dr. Veit's recent work has focused on a range of

environmental governance matters, particularly environment/democracy and environment/human rights links. For over 15 years he has conducted research and written on community-based natural resource management, environmental decentralization, environmental advocacy, and other environmental accountability matters. He has undertaken long-term field research in a number of African countries, and has held a range of research and teaching positions at the University of California campuses at Santa Cruz and Davis.

Andrew Warner is the senior economist at the Millennium Challenge Corporation, a new US foreign assistance corporation established by an act of Congress in January 2004. Previous to this he was a research fellow at Harvard University's Center for International Development and prior to that, at the Harvard Institute for International Development. He was also a visiting scholar at the National Bureau of Economic Research and the Center for Global Development in Washington, DC. he has written numerous research articles on economic growth, international economics and the economics of developing countries. He was also a primary author of the World Economic Forum's Global Competitiveness Report between 1996 and 2002.

Katherine "Kadi" Warner is the Managing Director of the Forestry & Natural Resource Management Unit at Winrock International, a nonprofit organization that works with people around the world to increase economic opportunity, sustain natural resources, and protect the environment. Ms. Warner is responsible for directing Winrock's long-term strategic programs in forestry and natural resources. She previously was Senior Forestry Officer and head of the Community Forestry Unit for the Food & Agriculture Organization, and has also served as Deputy Director and Head of Program Development for the Regional Community Forestry Training Center in Bangkok, Thailand. She has had extensive experience in Africa and Asia. She has published a range of articles and books focusing on community forestry and natural resource management, and has made presentations at international fora, such as the World Conservation Congress and the World Forestry Congress.

1. NRM / Poverty Links

SEMINAR ONE: WHY THE INTEREST IN LINKS BETWEEN NRM & POVERTY?
October 28, 2004

Presenters

- Emmy Simmons, USAID Assistant Administrator, Bureau of Economic Growth Agriculture & Trade
- Jan Bojö, World Bank
- Sara Scherr, Forest Trends
- Andrew Warner, Millennium Challenge Corporation

Seminar Themes & Learning Objectives

Seminar 1 will introduce the 9-part series with a presentation by USAID Assistant Administrator Emmy Simmons on definitions and links between poverty reduction and the effective management of natural resources in developing countries. She will discuss emerging lessons from community-based natural resource management, and the role of gender in natural resource management and poverty reduction/prevention. She will be followed by a panel of experts who will speak to various aspects of the linkages.

Presentations

- Defining Poverty and Natural Resources Management, Emerging Lessons - *Emmy Simmons*
- Linking Poverty & Natural Resource Management - *Jan Bojö*
- Multiple Choice: (a) Poverty Drives Degradation, (b) Degradation Drives Poverty, (c) All of the Above, or (d) None of the Above? - *Sara Scherr*
- The Natural Resource Curse: Natural Resources & Economic Development - *Andrew Warner*

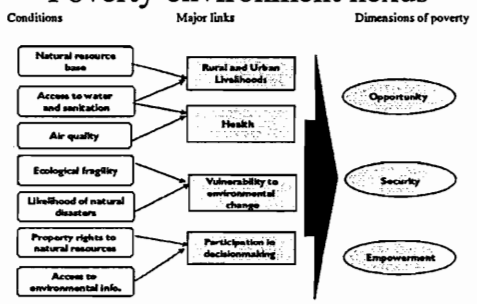
Poverty & Natural Resources Management

USAID
October 28, 2004
Jan Bojö
Adviser, World Bank

Storyline

- Most poverty rural & dependence high on NR
- What sustainable pathways out of poverty?
  - Economic growth?
  - Public/donor policy & spending re-alignment?
  - Payment for ecological services?

Poverty-environment nexus



NR Dependence among Poor

- Vedeld et al (2004)
- Objectives:
  - Investigate extent of rural poor dependence on environmental income
  - Recommend good practice methodology

  54 studies reviewed

"Environmental Income"?

- Definitions: EI = Rent (value added) captured through consumption, barter or sale of natural capital within the first link in a market chain
- Study focused on forest EI

Study results

- Wild food & fuelwood most important
- About 1/5 of income FEI
- Cash about half of FEI

Study results (2)

- Within communities, relative dependence on FEI higher for the most poor
- Across communities, FEI grows in proportion to total income
- Poorer hh more diversified

Caveats

- Not random sample
- Studies "typical" of large populations
- Methodological problems:
  - Unclear use of "EI"
  - Omissions of sources
  - Dubious valuation
  - Sustainability unclear

FEI – a poverty trap?

- Functions often as gap-filling, safety net
- Poverty trap only if external restrictions
- Pathway out of poverty – rarely
- Regional differences

Are we missing FEI in Poverty Assessments?

- Survey coverage varies
  - Fuelwood: little detail
  - Wild foods: often missing
  - Fodder: often missing but captured as livestock output
  - Cash FEI: in consumption measure if missed as income
  - We will try to assess the omissions!

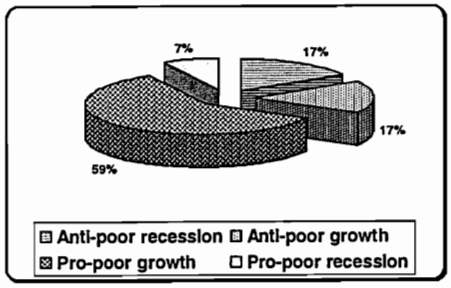
Drivers of change?

- Economic growth? (GDP/poverty)
- Align public/donor policy & spending (PRSPs)
- Markets for NR values (PES)
- *Align asset rights (not incl. here)*
- *Build capacity (ditto)*

Growth & Poverty

- Source: Cord et al (2003)
- 54 countries
- Data availability varies; 1950s to current
- Average per capita growth vs. growth of income p.c. among 20% poorest

Pro-poor growth?



Poverty Reduction Strategy Papers & NRM

- PRSPs are
  - Country-owned
  - Requested by WB/IMF for concessional lending
  - Outcome focused
  - Tools for donor coordination

NRM in PRSPs

- Environmental review shows great variance
- More attention to poverty - environmental health links than NRM links
- Interventions focus on growth promotion, public sector reform, social spending
- Good NR mainstreaming: Mozambique

PRSP implementation

- Almost 60 PRSPs
- 21 Progress Reports
- Rated both with nominal scores
- Correlation coefficient 0.15
- Weak link in mainstreaming environment

Payment for environmental services (PES)

- Biodiversity
- Carbon sequestration
- Watershed protection
- Landscape beauty

Poverty impacts?

- Poor often low opportunity cost for participation
- Labor impacts ambiguous
- Title could be problem
- Credit for investments
- Transaction costs high
- Tradeoff environmental efficiency vs. poverty targeting

Summary points

- EI among poor often significant and underestimated
- Pathways out of poverty:
  - Economic growth necessary, not sufficient
  - PRSPs: important, but indirect instruments
  - PES: limited but promising, some tradeoffs environment vs. poverty reduction

Group Work Questions

1. In your experience in the field and in Washington, what have been the most successful drivers of poverty reduction and the enhancement of NRM?
2. Given your experiences, what are the linkages between poverty and environmental degradation?

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COMMON **GROUND** **COMMON** FUTURE

HOW ECOAGRICULTURE CAN HELP FEED THE WORLD AND SAVE WILD BIODIVERSITY

By Jeffrey A. McNeely and Sara J. Scherr

IUCN
The World Conservation Union

FUTURE HARVEST

IUCN - The World Conservation Union was founded in 1948 and brings together 78 states, 112 government agencies, 735 NGOs, 35 affiliates, and some 10,000 scientists and experts from 181 countries in a unique worldwide partnership. Its mission is to influence, encourage, and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable. Within the framework of global conventions, IUCN has helped over 75 countries to prepare and implement national conservation and biodiversity strategies.

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Future Harvest is a non-profit organization that builds awareness and support for food and environmental research for a world with less poverty, a healthier human family, well-nourished children, and a better environment. Future Harvest supports research, promotes partnerships, and sponsors projects that bring the results of research to rural communities, farmers, and families in Africa, Latin America, and Asia. It is an initiative of the 16 food and environmental research centres that are primarily funded through the Consultative Group on International Agricultural Research. The interpretations and findings of this research represent the views of the authors and not necessarily those of Future Harvest or its sponsors.

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COMMON GROUND, COMMON FUTURE

HOW ECOAGRICULTURE CAN HELP FEED THE WORLD AND SAVE WILD BIODIVERSITY

By Jeffrey A. McNeely and Sara J. Scherr

MAY 2001

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More People Means More Agriculture in Many Threatened Regions 8

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Strategy 1: Reduce habitat destruction by increasing agricultural productivity and sustainability on lands already being farmed 12

Strategy 2: Enhance wildlife habitat on farms and establish farmland corridors that link uncultivated spaces 13

Strategy 3: Establish protected areas near farming areas, ranch land, and fisheries 14

Strategy 4: Mimic natural habitats by integrating productive perennial plants 15

Strategy 5: Use farming methods that reduce pollution 16

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PREFACE

Today, humanity faces a serious challenge. Much of the Earth's biodiversity- the richness of its many species of flora and fauna- is at risk. The areas that are home to the greatest numbers of at-risk species are also home to large numbers of rural people, many of them desperately poor. Local agriculture, as the chief provider of food and livelihoods to these people, must expand to meet rapidly growing world demand, keep up with burgeoning populations, and prevent hunger. Yet agriculture, as currently practiced, is a chief cause of the destruction of valuable habitats, pushing species towards extinction. Agriculture cannot be curtailed, but if policies are not changed, large numbers of endangered species of all types will be lost in the next fifty years.

There are solutions. Around the world, farmers, scientists, and environmentalists are finding methods to conserve habitats and preserve species while boosting food production and improving the incomes of the poor. These innovations are based on the belief- borne out by empirical evidence- that humans and wild species can share common ground and prosper in a common future. Productive farming and effective conservation can occur on the same land through sound science and policy. It is to those innovators, whose stories are told here, that this report is dedicated.

This report was commissioned by Future Harvest, an initiative of 16 food and environmental research centres around the world that work to promote food security, protect the environment, and eliminate poverty. Future Harvest commissions scientific studies on agriculture and its relationship to the environment, economic growth, peace, public health, and world population.

The full study on which this report is based was commissioned from IUCN-The World Conservation Union by Future Harvest as part of its research programme to examine the relationship between agriculture and the environment. This report, and the full study from which it is drawn, mark the beginning of an international effort to raise awareness about the importance of improving food production in order to preserve the environment upon which all life on Earth depends. Working with IUCN and other partners, Future Harvest will bring the results of this study to scientists, policymakers, farmers, and the general public through outreach efforts that include seminars, international meetings, and educational materials. The full study, *Common Ground, Common Future: Ecoagriculture Strategies to Help Feed the World and Save Wild Biodiversity*, by Jeff McNeely and Sara Scherr, will be published during the next year. ■

INTRODUCTION

Today, the world is poised on the brink of the largest wave of extinctions since the disappearance of the dinosaurs 65 million years ago.[1] Some experts calculate that if present trends continue, at least 25 percent of the world's wild plants and animals could be extinct or vastly reduced in number by the middle of this century, with further losses coming at an accelerating pace.[2]

Farming to feed the growing human population is one of the chief causes of extinction. In much of the tropics and other parts of the world where people share the land with wild plants and animals, agriculture, as currently practiced, represents a profound threat to wild biodiversity. More than 1.1 billion people now live within the world's 25 biodiversity "hotspots," areas described by ecologists as the most threatened species-rich regions on Earth. Population in tropical wilderness areas is, on average, growing at an annual rate of 3.1 percent- over twice the world's average rate of growth.[3] Millions of hectares of forests and natural vegetation have been cleared for agricultural use and for harvesting timber and wood fuels. The misuse of pesticides and fertilisers often poisons water and soil, and pollutes coastal areas. Agriculture also fragments the landscape, breaking wild species populations into smaller units that are more vulnerable to extinction. Farmers have generally sought to eliminate wild species from their lands in order to reduce the negative effects of pests, predators, and weeds.

In an effort to protect wild animal and plant species from the threats posed by human development and agriculture, many nations have created protected areas that limit activities such as hunting and farming. Globally, protected areas cover nearly 10 percent of the Earth's land surface.[4] However, research shows that these reserves alone are not sufficient to protect wild biodiversity. Protected areas inevitably lose species when surrounded by landscapes that bring invasive alien species, pollution, and development pressure. According to projections based on accepted ecological principles, if only the currently protected land areas remain as wildlife habitat, between 30 and 50 percent of the species will still be lost, because the reserves do not contain populations large enough to maintain the species.[5]

Environmentalists concerned about wild biodiversity and agriculturalists focused on producing food have often worked at cross-purposes. Environmentalists seek to protect wildlife by expanding protected areas and reducing the intensity of input use in farming. Agriculturalists strive to increase agricultural production in order to meet growing market demand and, in developing countries, to provide livelihoods and protect people from starvation and malnutrition. In order to accomplish all these important goals, both sides will have to recognize that endangered species, essential farmlands, and desperately poor humans often occupy the same ground.

Almost half of the areas currently protected for biodiversity are in regions where agriculture is a major land use, and food production will need to increase in coming decades to keep up with population growth and increasing demand.[6] In fact, some experts predict that the world's demand for food will grow by 50 to 60 percent by 2030.[7] Nearly half of the world's most threatened species-rich areas contain human populations plagued by extreme malnutrition, with one-fifth or more of local populations undernourished. Instead of working to alleviate hunger or increase sustainability, agricultural policies and research have often focused on designing high-productivity systems to produce surpluses for export, with little or no regard for resulting pollution or habitat destruction that threaten wild species. Unless agricultural practices are improved- among smallholders and large-scale agribusiness alike- habitats and species will continue to disappear at an alarming rate. Unless agricultural production in the tropics increases, poverty will deepen. The challenge is to protect wild species and conserve habitat while *increasing* agricultural production.

(continued)

"ECOAGRICULTURE" CAN HELP PRODUCE MORE FOOD AND PROTECT WILD BIODIVERSITY

This report analyses the links between agriculture and biodiversity. It highlights the findings of a major new study that- for the first time- brings together successful methods from around the world that are being used to increase food production and save wild species. These innovative farming and land management techniques are elements of what the authors see as a new type of agriculture: "ecoagriculture." These success stories- brought together from six continents- demonstrate that, while agriculture now presents the greatest threat to species diversity, improvements in agriculture through research can reverse this trend and enable agriculture to help conserve wild biodiversity.

The study from which this report was drawn breaks exciting ground with new information on the relationships between agriculture and biodiversity, farming methods for environmentally sensitive areas, and ways that environmentalists and agriculturalists can work together to manage farms and wildlife areas. Most of the methods can be used by poor as well as rich farmers and will, in many cases, actually raise their incomes. The study documents several dozen cases of ecoagriculture systems from diverse farming systems around the world, of which 18 are summarized below.

This report identifies six key ecoagriculture strategies that can help farmers grow the food they need- without destroying the habitats of the wild species that live on or near their land.

Strategy 1: Reduce habitat destruction by increasing agricultural productivity and sustainability on lands already being farmed
Strategy 2: Enhance wildlife habitat on farms and establish farmland corridors that link uncultivated spaces
Strategy 3: Establish protected areas near farming areas, ranch lands, and fisheries
Strategy 4: Mimic natural habitats by integrating productive perennial plants
Strategy 5: Use farming methods that reduce pollution
Strategy 6: Modify resource management practices to enhance habitat quality in and around farmlands

The research compiled here shows that there are ways to manage the coexistence of wildlife and agriculture and that previously unrecognised synergies can lead to increased food productivity and conservation gains. Much remains to be done to study, perfect, and disseminate ecoagriculture strategies. These next steps include research, public education, the development of markets, the creation of incentives, implementation of local projects, and investment in ecoagriculture by governments, international development agencies, civil society, and the private sector.

Throughout history, humans have shown a tremendous capacity to adapt to changing conditions. While today's wild biodiversity is under unprecedented pressure from humans and the ever-increasing numbers of people who will need more food, promising strategies used in various parts of the world show that ecoagriculture can be productive and profitable while protecting biodiversity. The research described in this report can help the people and endangered species that share common ground to also share a common future. While the principles of ecoagriculture are widely relevant around the world, this report focuses special attention on impoverished areas of the biodiversity-rich tropics. ■

WILD BIODIVERSITY AT RISK AROUND THE WORLD

Biodiversity is important wherever it is found. Biodiversity helps maintain the essential balance of the Earth's atmosphere, protects watersheds, renews soil, and recycles nutrients. In areas with little biodiversity, such as deserts, the relatively few species that survive are each particularly important for the people who live there.

***BIODIVERSITY** refers to the variability of life on Earth, the living species of animals, plants, and microorganisms; the genes they contain; and the ecosystems they help form.*[8]

***AGRICULTURE** here refers to the wide variety of ways that natural ecosystems are modified to provide goods and services for people through the nurturing of domesticated species of plants and animals, including modern and traditional farming, ranching, aquaculture, fishing, and forestry.*

Relatively few species live in extreme environments, such as sand dunes, hot springs, and deep oceans. Tundra and open seas also have relatively low numbers of species. Higher concentrations of species reside in grasslands and coniferous forests of temperate latitudes; and even more survive in tropical savannas, marshes, and swamps; rivers and lakes; ocean tidal zones; and nutrient-rich marine shoals. The largest concentrations of biological diversity are found in the rainforests of the tropics. Comprising only 2.3 percent of the entire surface of the Earth, lowland and mountainous tropical rainforests probably hold more than 50 percent of all species.[9] The warm tropics are also home to nearly 60 percent of the world's poorest people. Increasing global demand for products from the tropics and growing human populations in these areas pose the greatest threats to wild biodiversity.

The 25 most threatened species-rich regions were coined "biodiversity hotspots" by the conservationist Norman Myers. Working with Conservation International, Myers identified hotspots based on the number of endemic species- species found nowhere else- and the degree of threat to the area and its species. Within the 25 hotspots live more than 1.1 billion people- more than 20 percent of the world's population.[10] In the three major tropical wilderness areas that are still relatively sparsely populated (the Upper Amazonia and Guyana Shield in South America; the Congo River Basin in Africa; and the New Guinea-Melanesia complex of islands in the South Pacific), the population is growing at 3.1 percent- double the rate of the rest of the world.[11] These areas could soon become hotspots, if population growth continues at its current rate (see map 1 at end of this report).

THE "THIRD WAVE" OF SPECIES EXTINCTIONS IS NOW UNDERWAY

Since pre-historic times, humans have caused three major waves of species extinctions. The first wave resulted primarily from over-hunting as people moved into new regions, such as the Americas and Australia, for the first time. The second wave of extinctions was associated with human settlements of oceanic islands within the past 3,000 years.[12] The third wave of extinctions is much more recent.

Expansion of people into new areas caused the first two waves of extinctions. In the few millennia after humans first arrived on the Australian continent some 50,000 years ago, the continent lost 86 percent of its marsupial mammals, plus some egg-laying mammals and large lizards. Similarly, in the thousand years after human hunters migrated into North America 12,000 years ago, the continent lost at least 57 species of large mammals- 73 percent of all large mammals on the continent. These included horses and camels, giant

NO SUCH THING AS PRISTINE

"Natural" or "wild" biodiversity does not mean "pristine," or untouched by humans. People have profoundly affected virtually all ecosystems. Nearly all tropical forests have been cleared for crops at least once- and probably several times- over the past 10,000 years.[13] Many of the dominant tree species in tropical rainforests were protected or planted when the land was cleared.[14] The difference today is the speed and scale of destruction.

sloths, glyptodonts (animals that resembled giant armadillos), mammoths, and mastodons. Europe suffered roughly comparable losses.

The second wave of extinctions- notable for the loss of bird species- was associated with human settlements of oceanic islands within the past 3,000 years. Nearly all of the diverse and often extraordinary flightless bird species of New Zealand were lost by the mid-1700s, a result of over-hunting and the introduction of pigs, dogs, and rats. More than half a million skeletons of the huge flightless birds known as moas have been found in ancient Maori settlements in New Zealand. Similar processes occurred in Madagascar, Cyprus, the Azores, the Caribbean, and Polynesia, where more than 1,000 bird species- more than 10 percent of the birds then alive on Earth- became extinct after people first arrived on these islands.[15]

The third wave of extinctions has been building over the past 400 years and is underway today. Unlike the early waves, it is affecting species of all evolutionary forms and sizes, in every region of the world, and in every kind of habitat. The current wave is not yet catastrophic- just 1 percent of birds and 1.8 percent of mammals have become extinct thus far. But far higher numbers are poised at the precipice of extinction. These species include nearly 24 percent of mammals, 12 percent of birds, and almost 14 percent of plants.[16] Many experts believe that biodiversity is more threatened now than at any time since the extinction of the dinosaurs 65 million years ago.[17]

CLEARING FORESTS TO CREATE FARMLAND CAUSES MOST EXTINCTIONS TODAY

The destruction of habitat is the primary cause of the current wave of extinctions. Over the last four centuries, about half of all tropical forests- home to as much as two-thirds of terrestrial species- have been cleared for agriculture and other human activities. Conversion of land from forest to farm resulted from both industrial farming and logging by large corporations and subsistence farming by poor families. Experts predict the damage to land already cleared will ultimately eliminate 15 percent of the species contained in the forests. Some of these species have already disappeared, while others will be lost over the next generation. However, the rate of extinctions increases more quickly as habitat areas continue to decline. Thus, if forest clearing continues at 1990s rates, the forests will lose many of their remaining species by the middle of the 21st century.[18]

The loss and fragmentation of native habitats caused by agricultural development and conversion of agricultural lands into urban sprawl are widely recognized as the most serious modern threats to the conservation of biodiversity.[19] Habitat loss and degradation is the most pervasive threat to species, affecting 89 percent of all threatened birds, 83 percent of threatened mammals, and 91 percent of threatened plants.[20]

With agricultural expansion, highly diverse forests and other natural habitats are converted into much simpler pastures or cropping systems. Some habitat types have been converted much more extensively to agriculture than others. Nearly half of the entire global area of temperate broadleaf and mixed forests and tropical and sub-tropical dry and monsoon broadleaf forests have been converted to crops and pastures. More than a third of temperate grasslands and savannas are occupied by agriculture, as are more than a quarter of tropical and sub-tropical conifer forests and mangroves.[21]

While the global trend in crop land use appears to be roughly constant- with abandoned or fallow lands roughly equalling new agricultural fields- some parts of the world with high concentrations of biodiversity are suffering egregious losses of species due to the rapid conversion of habitats to agricultural uses. In Southeast Asia, cropland has increased by some 11 million hectares from the early 1980s to the early 1990s, with most cropland claimed from land that was previously forest. Since

WILD SPECIES AID AGRICULTURE

The destruction of biodiversity by agriculture creates a vicious cycle that actually undermines agriculture, because wild species are essential to agricultural productivity. Insects and other animals help plants reproduce, contribute to soil fertility, and regulate pest populations. Trees and plants help ensure clean water resources and control floods. Many domestic animals feed on wild plants and grasses for at least part of the year. Wild microorganisms just underground break down organic matter; build soil; help move air, water, and nutrients within soil; and destroy pests.

1972, more than 500,000 square kilometres of Amazon rainforest- some 13 percent of the entire Amazon region- has been converted to crops and pastures.[22]

Land conversion can split up large habitat systems into separated fragments in which populations are too small to sustain themselves. In addition, the need for large amounts of water to irrigate farmlands- more than 70 percent of all fresh water used globally- often leads to the draining of species-rich wetlands and rivers.[23] In more than half of the nearly 1,000 Wetlands of International Importance listed under the Ramsar Convention, agriculture is considered to be a major cause of change to wetlands.[24]

Farmers over the centuries have made a conscious effort to reduce wild biodiversity, fearing pests, diseases, dangers to livestock, and competition with crops for water, nutrients, and space. To be a "good" farmer meant clearing the wild. Later, clearing of natural vegetation and creating uniform fields was further encouraged by mechanization and the management cost savings from monocultures.

RUN-OFF OF CHEMICAL PESTICIDES, FERTILISERS, AND LIVESTOCK WASTE ALSO HARM WILD SPECIES

In large areas of the developing world, low-intensity farming systems use little chemical fertilisers and pesticides. In many cases, crop yields are much lower than they could be, causing unnecessary conversion of more and more habitat to farmland. By contrast, in both developed and many developing countries, surplus staple foods, high-value fruits and vegetables, and export crops are produced using intensive farming systems. There, the overuse of fertilisers and pesticides- whose run-off poisons land, water, plants, and animals- is a significant problem. Globally, application of chemical fertilisers has increased from 14 million tons in 1950 to 137 million tons in 1998.[25] Availability of this low-cost nutrient source for crops is one of the key factors behind historically high growth in crop yields across the world. Meanwhile, the explosive growth in intensive livestock operations in industrialized countries and near big cities in developing countries has led to large accumulations of organic waste materials such as used bedding straw and manure.

Unfortunately, excessive nutrients from inorganic fertilisers and animal waste often flow into lakes, rivers, and coastal zones, where they can cause serious harm to wild biodiversity. For example, in 1,785 bodies of water in 39 states of the United States, livestock waste has been identified as the principal pollutant.[26] Excessive growth of aquatic plant life resulting from overly abundant nutrients (known as "eutrophication") can destroy wetland ecosystems. The resulting long-term increase of aquatic plant life can deplete oxygen over large areas and dramatically alter ecosystems, leading to species extinctions and stress on fisheries. One oxygen-depleted "dead zone" near the outlet of the Mississippi River in the United States covers 18,000 square kilometres, an area larger than Kuwait.[27] Even larger dead zones are reported in the Baltic and Black seas.[28]

In 1990, world sales of pesticides amounted to US$50 billion. Many of these pesticides have made a significant contribution to crop yields. For example, it is estimated that global wheat losses to pests are half what they would be without any pesticide use.[29] Unfortunately, many pesticides have had a disastrous impact on biodiversity, both through direct ingestion of poisonous chemicals by individual animals and through pollution of freshwater and coastal habitats.[30] Pesticide residues can disrupt the nature of aquatic freshwater and coastal ecosystems, including coral reefs, mangrove forests, and seagrass beds. ■

BATS, BEES, AND OTHER POLLINATORS: CRITICAL TO AGRICULTURE, THREATENED BY POLLUTION

Many plants require pollen from other individuals to set seeds and regenerate. Bats, wild bees, and other insects are the principal pollinators of fruit trees and major staple food crops. These crops include potato, cassava, yams, sweet potato, taro, beans, coffee, and coconut.[31] Declines in populations of wild bees and other pollinators caused by pollution and habitat loss now threaten both the yields of major food crops and the survival of wild plant species. Due to an epidemic of mites, a quarter of North America's wild and domestic honeybees have disappeared since 1988, with a cost to American farmers of US$5.7 billion per year.[32]

MORE PEOPLE MEANS MORE AGRICULTURE IN MANY THREATENED REGIONS

Global population continues to grow, especially in developing nations. The global population in 2000 was approximately 6 billion, up from under 1.4 billion in 1900. By the year 2020, global population is likely to reach around 7.7 billion, with well over 80 percent of this growth occurring in developing countries. More people will need more food. The poor spend a high proportion of their incomes on food- somewhere between 50 to 80 cents of every dollar. In addition, as incomes rise around the world, people add protein-rich meat and fish to their diets, which compounds the problem. These foods, as well as other agricultural products bought by high-income consumers, such as cocoa, flowers and vegetables, and raw materials for industrial products, require more natural resources, labour, and land to produce. As a result, some experts predict that the world's people will demand 50 to 60 percent more food by 2030.[33]

The largest population increase will take place in the biodiversity-rich countries of the tropics. More than 70 percent of the world's extreme poor (those who live on less than US$1 a day) live in rural areas.[34] In 19 of the world's 25 biodiversity hotspots, population is growing more rapidly than in the world as a whole.[35] Population in the relatively sparsely populated tropical wilderness areas is, on average, growing at an annual rate of 3.1 percent- over twice the world's average rate of growth. The hotspots are also rapidly urbanizing. Currently, 146 major cities are located in or directly adjacent to a hotspot. Of those cities, 62 have more than 1 million inhabitants.[36]

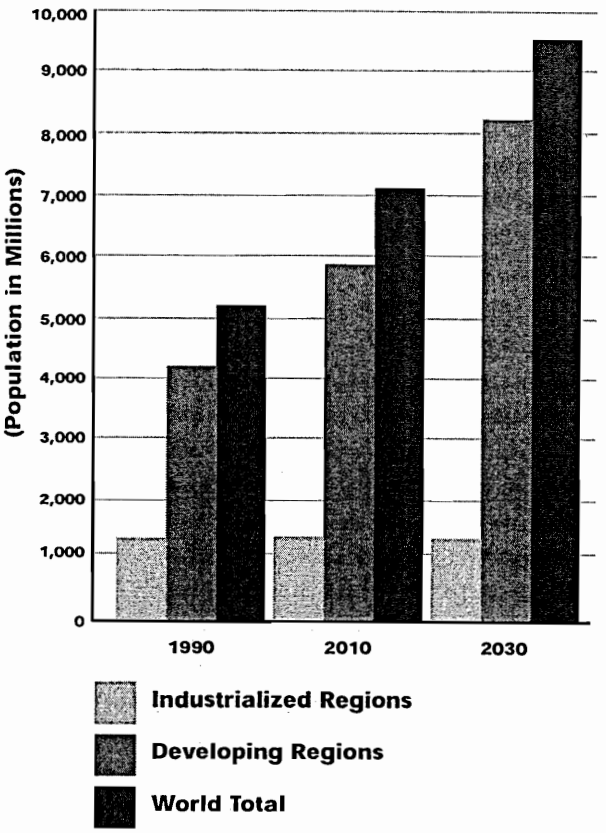
In 19 of the world's 25 biodiversity hotspots, population is growing more rapidly than in the world as a whole.

Rural poverty is concentrated in many of the areas of richest or most threatened biodiversity, especially in the warm tropics. Of the 955 million poor people living in rural areas of developing countries in the mid-1990s, an estimated 630 million lived on marginal agricultural, forested, and arid lands.[37] Some 300 million people live in forested areas and another 200 million live around them, most of them poor.[38] Indigenous ethnic groups, often among the most impoverished and marginalized groups, frequently live on lands where extensive wild biodiversity remains. The rural poor will require additional land to meet their food needs, to grow crops and raise livestock to sell, and for settlements and infrastructure. Most will continue to rely on agriculture as their livelihood. Of the 1.2 billion people worldwide who earn a dollar a day or less, 75 percent work and live in rural areas; projections suggest that over 60 percent will continue to do so in 2025.[39]

Many of the poor are malnourished. In 1990, nearly half of all children living in the warm, semi-arid tropics and sub-tropics were malnourished, as were more than a third of those in the warm sub-humid and humid tropics. A quarter of children in the cool tropics and sub-tropics with summer rainfall suffer from malnutrition, as do nearly a fifth in the humid sub-tropics. Globally, 59 percent of all malnourished children in the developing world reside in the warm tropics, 27 percent in the warm sub-tropics, and 15 percent in the cool tropics and sub-tropics.[40]

At least 16 of the 25 biodiversity hotspots are located in areas with very high malnutrition; they encompass fully one quarter of all the undernourished people in the developing world.[41] Countries that include biodiversity hotspots and in which more than a fifth of their total population is undernourished include: India, Nepal, Thailand, Laos, Cambodia, the Philippines, Papua New Guinea, Democratic Republic of Congo, Republic of Congo, Kenya, Madagascar, Namibia, Cameroon, Bolivia, Haiti, Dominican Republic, Honduras, and Nicaragua. Under-nutrition rates in several large countries- including Mexico, Guatemala, Brazil, Peru, Ecuador, China, Indonesia, and Vietnam- are much higher in the vicinity of biodiversity hot spots than for the country as a whole.[42]

Instead of working to alleviate local hunger or increase sustainability, agricultural policies and research have often been focused on narrow commercial interests. The agricultural systems on which the rural poor most depend have often received the least attention from governments and researchers. In the 1990s, many developing countries cut public spending on agriculture, as donors pressed for smaller government. As a result, during 1990-96, agriculture grew less than 3 percent annually in low-income countries (excluding India and China) and 2 percent annually in Africa- not enough to keep up with population growth.[43] At the same time, increased concentration of wealth has meant that fighting obesity and other problems of excess food consumption is now a preoccupation in Western countries and among urban elites in developing countries. ■



The world's population will grow fastest in the developing world, home to many of the world's richest areas of biodiversity (Lutz, W., C. Prinz, and J. Langgassmer. 1993. World population projections and possible ecological feedbacks. POPNET 12: 1-11; United Nations, 1994 estimate).

ECOTOURISM AND PROTECTED AREAS ALONE CANNOT SAVE WILD BIODIVERSITY

There are those who argue that tropical countries with rich biodiversity should stop trying to use agriculture as the primary means to feed and employ people. They point out the ecological challenges of farming in the tropics and recommend instead relying on food imports and ecotourism. But this view ignores some basic facts. Agriculture must be promoted to feed people in tropical nations for three main reasons:

First, while tropical farmlands are not always economically competitive with heavily subsidized temperate farms (especially maize and wheat farms), they do have great productive potential for many crop types, including rice, coffee, cocoa, oils, fruits, and spices that are valued in international markets.

Second, most countries in the developing world cannot afford to purchase much of their food from the international market. While agricultural trade has grown dramatically in recent decades, the share of food that is traded- 10 percent- has remained relatively constant since 1960. Most food is grown and consumed within national borders, and this is likely to remain the case in most countries.[44]

Third, agriculture is the chief employer and creator of wealth in these areas. For many of the poorest, biodiversity-rich countries, non-agricultural economic options do not appear to be able to generate enough food or income, or to employ enough people to alleviate widespread poverty in the short and medium term. Agriculture is the "engine of growth" for poorer countries. Research in Africa, for example, has shown that despite the growing importance of non-farm activity, prosperity depends on economic linkages with farming. In West Africa, because of multiplier effects, adding US$1 of new farm income resulted in a total increase of household income ranging from US$1.96 in Niger to US$2.88 in Burkina Faso.[45]

At the same time, it is unrealistic to expect isolated protected areas to carry the full responsibility for conserving wild biodiversity. Globally, some 44,197 protected areas cover 13,279,127 square kilometres- nearly 10 percent of the Earth's land surface.[46] Of the 17,229 major reserves, 45 percent (encompassing nearly a fifth of total globally protected areas) are themselves heavily used for agriculture.[47] Map 2 at the end of this report shows that many more protected areas are situated within regions of agricultural production. The challenge to protect these areas effectively, in the face of future demands for food and rural livelihoods, seems daunting.

If only the existing protected land areas were to continue as wildlife habitat, about 30 to 50 percent of the species would still be lost, according to projections based on accepted ecological principles. This is because the isolated protected areas do not contain large enough populations to maintain the species.[48] Protected areas can become islands of dying biodiversity. Many animals need the ability to migrate seasonally or travel between separated populations in order to avoid extinction. Limited reserve areas cannot fulfil this need, and the lands that would be needed for the massive expansion of protected areas that would be required to avoid high extinction rates are already being used to feed local people and fuel local economies. ■

LAND OF THE LIVING DEAD: BIODIVERSITY CHANGES IN A SINGAPORE FOREST RESERVE

The fact that nature reserves alone cannot protect wild biodiversity is clearly shown in the experience of the Singapore Botanic Garden, founded in 1859. This small, protected fragment of lowland tropical rainforest has lost 50 percent of its 448 recorded plant species over the 100 years since it was surveyed in the 1880s. Worse, half of the tree species present in the most recent survey were represented by only one or two individuals. Those species may not be reproducing and, in fact, may be among the "living dead" - living out the last generation before extinction.[49] Other species extant but not reproducing include the Javan rhinoceros, the golden Vizcacha rat, and the Hawaiian po'ouli black-masked honeycreeper.[50]

ECOAGRICULTURE: MEETING THE CHALLENGE

As currently practiced in much of the world, agriculture represents a profound threat to wild biodiversity. Yet growing human populations and increasing demand for agricultural products mean that agricultural output must necessarily expand, especially in the tropics, for at least several more decades until the human population begins to stabilize.

ECOAGRICULTURE refers to land-use systems managed for both agricultural production and wild biodiversity conservation.

Under existing technical, economic, and policy conditions, many rural farmers, especially those in intensive farming systems, face a difficult trade-off between agricultural production and biodiversity. If they want to protect a little more biodiversity, they must sacrifice a lot of production; if they want a little more production, they must sacrifice a lot of biodiversity. The challenge is to expand the amount of food that can be produced on a continuing basis without negative effects on biodiversity- to find better farming technologies and natural resource management practices, better institutions, and better policies, so that the farmers' trade-offs are less stark.[51] Among poor agricultural producers in the developing countries, a lack of advanced technologies often leads to biodiversity loss- more land and resources are used for agriculture than would be needed using more sustainable and productive techniques. In more highly capitalized farming, it is often an excess of modern techniques- methods that create too much pollution or compact the soil- that leads to the loss of biodiversity.

Ecosystems must be managed as a whole, with protected areas as reservoirs of wild biodiversity within a "matrix" of land managed to protect its habitat value, while also providing food and income to people. Because agriculture- including annual crops, tree plantations, grazing lands, and forestry- is such a dominant user of land, and because its potential influence on wild biodiversity is so extensive, it needs to have a much higher profile in biodiversity planning. When farmers, conservationists, and policymakers manage landscapes with both food production and species conservation as essential values, dramatic progress can be made on both fronts. Managing entire ecosystems or entire landscapes with a unified strategy to feed people and protect wild inhabitants simultaneously can be a cost-effective approach to biodiversity conservation.

ECOAGRICULTURE CAN SAVE WILD SPECIES WHILE INCREASING AGRICULTURAL PRODUCTION

Effective approaches to preserving biodiversity recognize the realities of life in developing nations. Rapid population growth means more hungry mouths to feed. Consumer demand for higher-value foods, as incomes grow, offers real livelihood opportunities for poor farmers. Even farmers who appreciate biodiversity will do what they must to grow enough food to provide for their families, and some will seek to maximize short-term profits even if long-term environmental costs are high. It is thus imperative that biodiversity be saved without sacrificing agricultural production. In fact, the real challenge is to protect wild species and conserve habitat while *increasing* agricultural production and farmer incomes- what we call "ecoagriculture." Innovators around the world are meeting the challenge through successful ecoagriculture strategies, with measurable benefits to farmers and wild biodiversity. Obviously, the potential to integrate different types of wildlife into agricultural landscapes will vary according to the type of farming system. The study on which this report is based documents several dozen cases of ecoagriculture practices in diverse farming systems around the world, 18 of which are summarized in this report.

In these cases, we have identified six successful ecoagriculture strategies, which follow herein.

STRATEGY 1: REDUCE HABITAT DESTRUCTION BY INCREASING AGRICULTURAL PRODUCTIVITY AND SUSTAINABILITY ON LANDS ALREADY BEING FARMED

Natural habitats are sometimes converted to agricultural uses simply to take advantage of new market opportunities. But often conversion takes place when existing farms cannot produce enough food to meet subsistence demands, when not enough local jobs are available, or when degradation from unsustainable farming practices leads to land abandonment. Two-thirds of the rural population in developing countries live and farm in lower quality "marginal" lands. If productivity can be increased in the more productive areas of these farms, pressure could be eased on marginal lands, which otherwise can be quickly degraded and become useless for both farming and wildlife. Under some circumstances (not all), increasing productivity on lands already being farmed can help prevent farmers from destroying natural habitats in search of better cropland.[52]

MOST SPECIES-RICH COUNTRIES: MAMMALS

Country	No. of species
1. Indonesia	515
2. Mexico	449
3. Brazil	428
4. Dem. Rep. of Congo	409
5. China	394
6. Peru	361
7. Colombia	359
8. India	350
9. Uganda	311
10. Tanzania	310

McNeely, Jeffrey A., et al. 1990. Conserving the World's Biological Diversity. *Washington: IUCN, World Resources Institute, Conservation International, World Wildlife Fund-U.S., and World Bank.*

Replacing slash-and-burn techniques with higher yield methods in Honduras

As rural population has grown and croplands have degraded in the hillsides of central Honduras, farmers have cleared large areas of pine forest habitat each year as they seek more land for low-productivity crop production. The loss of forest habitat has sharply reduced wild populations of deer, agouti, raccoon, and squirrels (which have traditionally provided an important source of animal protein for local diets), and other native fauna and flora have declined sharply. Working with local farmers, scientists introduced improved varieties of coffee and vegetables, as well as new methods of fertilizing, irrigating, rotating, and mixing crops that significantly boosted crop yields and employment on the farmers' enhanced land. Higher cash incomes from vegetables and coffee enabled farmers to purchase fertiliser to replenish soil nutrients both in their commercial fields and in fields growing subsistence staple food crops, thus nearly doubling maize yields on permanent fields. This allowed them to abandon marginal fallowed fields, which reverted to forest. Aerial photograph analysis shows that the net area under forest cover remained largely stable in communities that implemented the improved practices. In contrast, communities using traditional methods saw forest cover decline by at least 13 percent and, in some cases, by as much as 20 percent over 20 years.[53]

Increasing lowland rice yields to reduce hillside farming in the Philippines

In the Philippine province of Palawan, rising numbers of people have required more food than traditional farming could provide. Population growth has been 4.6 percent per year. Because the best lands for farming- lowland farms that receive their water from rainfall- were already under cultivation, farming expanded into environmentally sensitive areas, promoting acute upland deforestation in areas where farm yields are marginal. To increase agricultural production, the Philippine National Irrigation Administration constructed numerous small-scale communal irrigation systems and upgraded others to supply the lowland farms with a regular supply of water. The lowland farms were then able to produce more food, while employing many workers who had previously been involved in lower-paying upland farming and forest product extraction (such as hunting, charcoal making, and resin collection) in the environmentally sensitive upcountry. As a result, annual forest clearing by upland households declined by 48 percent.[54]

Saving Brazil's Atlantic Forest through improved dairy farming

Brazil's Atlantic Forest, a unique type of humid subtropical forest, is one of the most threatened habitats in the world. The forest is home to lion tamarin monkeys found nowhere else, as well as hundreds of endemic bird species and a rich flora including rare orchids and bromeliads. As a result of five centuries of population growth, land-clearing, and uncontrolled fire used in

pasture "management," only 7 percent of the original forest cover remains. Today, small-scale dairy farming is one of the most important economic activities in the area, but the practice has put farmers at odds with conservationists because the cattle require ever-expanding areas of low-quality pasture. Since the mid-1990s, the non-governmental organization Pro-Natura has provided technical assistance to poor dairy farmers to improve farm productivity and incomes. In exchange, the farmers have committed to reforest and regenerate part of their land. Pro-Natura helped farmers to invest in genetic improvement of their dairy herds, use mineral supplements, improve fodder, and produce silage. As a result, participating farmers saw their milk yields triple and their incomes double. The improved pastures were able to feed more cattle, so the area in pasture could be reduced. More than 60 hectares of pasture on 16 farms have already been converted back to forest, and many additional pastures are now candidates for reforestation. In addition, over 50,000 tree seedlings raised by Pro-Natura and municipal governments have been planted on farms and in rural communities.[55]

AGRICULTURAL LANDS INCLUDE MANY NON-CULTIVATED AREAS THAT ARE POTENTIAL HABITAT FOR WILD BIODIVERSITY. THESE INCLUDE THE FOLLOWING:

- **Riverbanks and natural waterways**
- **Irrigation canals**
- **Farm, road, and other drainage ways**
- **Uncultivated strips within crop fields**
- **Windbreaks**
- **Border plantings or live fences between plots**
- **Little used or low-productivity croplands and grasslands**
- **Farm or community woodlots**
- **Farm, community, government, or private natural woodlands or forest**
- **Private industrial plantations**
- **Homesteads**
- **Roadsides**
- **Public or private recreational parks**
- **Special sites conserved for cultural value to indigenous people**

STRATEGY 2: ENHANCE WILDLIFE HABITAT ON FARMS AND ESTABLISH FARMLAND CORRIDORS THAT LINK UNCULTIVATED SPACES

The many unused spaces in farmlands can provide habitat for migratory animals or connect species populations in different protected areas, increasing the likelihood of species survival. Even species that do not require large territories can find nesting areas, food, and protective cover in these spaces.

Planting windbreaks to connect forest patches in Costa Rica

In a wet, mountainous region of northeast Costa Rica, wild parakeets damaged farmers' coffee trees, and high winds limited dairy productivity and increased calf mortality. In 1989, the Conservation League of Monteverde worked with farmers in 19 communities to create 150 hectares of windbreaks by planting a mix of indigenous and exotic tree species. The windbreaks have increased the herd-carrying capacity of the pastures and have resulted in higher coffee and milk yields. Damage to coffee from wild parakeets has been reduced, because the parakeets prefer the fruit of colpachi, one of the species used in the windbreaks. The windbreaks serve as important biological corridors connecting remnant forest patches in the area. One study found seeds of 174 different plant species in the windbreaks. Birds dispersed 95 times more seeds (mainly wild tree species) in the windbreaks than in the surrounding pastures.[56]

MOST SPECIES-RICH COUNTRIES: FLOWERING PLANTS

Countries	No. of Species
1. Brazil	55,000
2. Colombia	45,000
3. China	27,000
4. Mexico	25,000
5. Australia	23,000
6. S. Africa	21,000
7. Indonesia	20,000
8. Venezuela	20,000
9. Peru	20,000
10. Russian Fed.	20,000

McNeely et al., 1990

Creating wild bird habitat on farms in Britain

Farmers have come to the rescue of endangered wildlife with the help of payments for environmental services offered by European governments to farmers who create habitat for wild species on their farms. Under one effective approach, farmers plant specially designed seed mixtures to create wild bird habitat in small strips and plots distributed strategically around the farms. This provides valuable winter-feeding and nesting habitat for farmland birds.[57] In Britain, the 600,000 hectare set-aside has become the third largest land-use type in the lowlands, after grass and cereals.[58]

STRATEGY 3: ESTABLISH PROTECTED AREAS NEAR FARMING AREAS, RANCH LAND, AND FISHERIES

Creating more protected areas within agricultural regions can keep marginal lands out of production and create habitats where wild species populations can grow. Farmers will support these reserves especially where wild species, such as pollinator bees, have beneficial effects for the productivity of the remaining farms in the area, where they can benefit economically from the reserves, or where they recognize the value of environmental services such as watershed protection.

Protecting rhinos and tigers: Nepalese farmers become conservationists

In the early 1990s, many of the 275,000 people in the villages around Nepal's Royal Chitwan National Park were hostile to the conservation efforts there. The park is home to the endangered rhinoceros (population around 450) and tiger (now estimated at 107). Every year, the rhinos and tigers caused three to five human deaths, large numbers of cattle losses, and significant damage to crops. Meanwhile, poor villagers wanted to harvest some of the park's resources. The relationship between the park and its neighbours needed to change.

In 1993, pioneering legislation created a buffer zone of wild land around the park and dedicated 30 to 50 percent of park revenues for investment in local villages. Local villagers began a community-run elephant-back safari project in the buffer zones, making the area one of most popular tourist destinations in Nepal, attracting 83,000 visitors per year. The park and safari revenues help preserve the park, manage community forests, and improve the lives of local villagers. In its first six months of operation, the safari project provided money to refurbish three schools and a health clinic. Buffer zone forests have also helped to protect villagers from floods and provide shelter against rhinos raiding their crops. Villagers are benefiting from jobs in the buffer zone, and the populations of many wild species are increasing.[59]

Creating new spaces for wild animals in Australia

In Australia, farming in many sensitive areas has destroyed habitat and degraded soil and water. Working together in a Landcare group, farmers in one community have been able to produce more wheat and feed more sheep- while creating new wild spaces. The farmers have planted over 35,000 trees and have fenced a large area of their land as protected areas to conserve wild animals. Two marsupial species have been reintroduced to the area- the threatened brush-tailed bettong and the endangered Bridle nail-tailed wallaby. To date, around 4,500 active community Landcare groups are working in partnership with government, non-governmental organizations, and corporations to address soil, water, and biodiversity degradation through cooperative ecosystem management.[60]

Helping both fish and fishers with marine reserves in the Philippines

In the Philippines, over-exploitation of coral reef fisheries has become a major problem. In order to help the fisheries recover, one community created three "no-take" reserves where fishing was banned completely. Each protected area has a fishery breeding sanctuary and a surrounding buffer area for ecologically sound fishing. In the first three years after the creation of the no-take zones, species diversity and abundance significantly increased for many families of fish, especially the favourite targets of fishers. Species diversity increases ranged from 20 to 40 percent, while increases in the numbers of all food fishes ranged from 42 to 293 percent over the three sites. The fishers themselves, initially sceptical, were happy with the results, as total fish yields increased significantly in the areas around the reserves.[61] A survey of 100 "no-take" reserves around the world with complete bans on fishing found average increases of 91 percent in the number of fish, 31 percent in the size of fish, and 23 percent in the number of fish species present around the reserve.[62] The model has now spread through the Philippines and Indonesia.

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McNeely et al., 1990

STRATEGY 4: MIMIC NATURAL HABITATS BY INTEGRATING PRODUCTIVE PERENNIAL PLANTS

As agriculture has expanded into wild lands, complex natural habitats have been simplified, eliminating many native plants and animals. Farm and forest landscapes can be "designed" to produce food, while providing habitat that is similar in both form and function to wild habitats, mixing perennial and annual crops in ways that conserve natural water systems and provide the types of habitat preferred by wild species.[63]

MOST SPECIES-RICH COUNTRIES: AMPHIBIANS

Countries	No. of Species
1. Brazil	516
2. Colombia	407
3. Ecuador	358
4. Mexico	282
5. Indonesia	270
6. China	265
7. Peru	251
8. Dem. Rep. of Congo	216
9. USA	205
10. Venezuela/Australia	197

McNeely et al., 1990

Trees in pastures help forest birds in Central America

Interspersing trees in pastures has provided a boon to both farmers and wild species. On more than 9 million hectares of pasture lands in Central America, scattered trees provide shade to cattle, as well as timber, firewood, and fence posts to farmers. In addition, the trees retain rich communities of plants that would otherwise not be present in the agricultural landscape. A study of trees in pastures on 24 farms in Costa Rica found that primary forest trees accounted for 57 percent of all species and a third of all individuals.[64] The trees provide food for migratory birds, such as three-wattled bellbirds, resplendent quetzals, and keel-billed toucans, as they migrate from the Monteverde Reserve down to the Pacific lowlands, as well as to bats and other animals that live on or near the farms.[65]

Creating "agroforests" to provide profits to farmers and homes to wild species in Indonesia

In Indonesia, the need to preserve wild species in its forests has been in conflict with the economic need to produce food and farm income. Local people have developed a solution: the creation of "agroforests". Agroforests are complex, multi-storey mixtures of planted trees, shrubs, and food crops widely found in the humid tropics that resemble the structure of natural rainforests. About 4 million hectares of agroforests are found today in Indonesia. Agroforests are sustainable, profitable to farmers, and economically important in Indonesia and worldwide. Rubber from agroforests (a quarter of the world's natural rubber) is valued at US$1.9 billion. While reducing the economic pressure on protected forest reserves, agroforests also support significant biodiversity. Rubber agroforests, for example, may contain 250 to 300 plant species other than rubber trees.[66]

Making biodiversity-friendly coffee plantations profitable in Central America

Shade coffee plantations, in which coffee plants grow in the shade of a wide variety of native tropical trees, are close to moist tropical forests in their species diversity. However, coffee breeds that grow in direct sunlight have been widely promoted and adopted because they have higher yields- despite costing nearly 50 percent more to produce, using more agricultural chemicals, and reducing the usable lifespan of plantations. In Central America, wild animals and plants have lost habitat as trees have been cleared to grow fields of sun coffee bushes. Researchers looking for ways to help shade coffee plantations compete have found that adding a fast-growing native tree species, *Cordia alliodora*, has minimal impact on coffee yields and can be harvested for profitable timber.[67] Other researchers and non-government organizations have actively promoted marketing that provides a financial premium to shade coffee growers.

STRATEGY 5: USE FARMING METHODS THAT REDUCE POLLUTION

In intensive farming systems, pesticides and fertilisers have led to great gains in farm output- but overuse and mismanagement can lead to run-off of chemical by-products and livestock waste that poison water and land. Innovative solutions have been developed to reduce pollution while still controlling pests and enhancing production. Examples include:

Using "buffer strips" to stop pollution in the Chesapeake Bay

The Chesapeake Bay is one of the richest natural fisheries in the world. Over the past century, pollution- about a third of which comes from agriculture- has led to dramatic declines in fishing harvests, health problems for wildlife and humans, and extinctions of local wildlife. In 1992, the state of Maryland committed to restore the Chesapeake to its former health and productivity. To help heal the bay, farmers along the shore began using "buffer strips"- land allowed to grow wild around their farms- to filter out surplus fertiliser and livestock waste from water that runs off their fields. The strips also provide habitat for many species of wild flora and water birds. By 1995, almost half of Maryland farmers used buffer strips.[68] As a result of these and other innovations, point-source emissions of phosphorus were cut by 56 percent from 1985, while emissions of nitrogen were cut by 35 percent. Many threatened aquatic species have begun to recover.

Reducing the need for chemical pesticides in China

The rice fields of East Asia have some of world's highest levels of pesticide use. Pesticide pollution has wiped out many species in and around irrigated rice fields and affected the entire food chain, from microorganisms to insects to frogs and other species, even causing the virtual disappearance of vultures and some hawks from many parts of Asia. In Yunnan Province in southern China, farmers have reduced the need for pesticides by mixing diverse rice varieties to control rice blast disease. An unusual research trial involving thousands of farmers found that planting more than one variety of rice helped prevent the spread of the disease throughout the entire crop and increased rice yields by 89 percent. Because the rice blast declined by 94 percent, the fields of rice need less costly chemicals and are friendlier to wild biodiversity. In 2000, 42,500 hectares of rice fields were being planted with this method, and 10 other provinces in China are beginning to test the technique.[69]

Reducing pesticide overuse through public education in Vietnam

Farmers in Vietnam were applying more pesticide to their fields than was necessary to control pests, creating pollution that harmed local habitats. Research led to new recommendations for farmers to reduce pesticide use without sacrificing yields. Disseminated by radio dramas and leaflets, the recommendations have spread to about 92 percent of the Mekong Delta's 2.3 million farm households. Within five years, insecticide applications have decreased 72 percent, and rice production increased 27 percent. Reducing pesticide use benefits the many species of frogs and fish that also inhabit the rice fields, the people who depend on these species as a source of protein, and the farmers who wish to increase the profitability of their rice.[70]

Reducing erosion with "natural vegetative strips" in the Philippines

In the Philippines, erosion is a major problem for farms on hilly lands. Contour hedgerow systems have been widely promoted in the Philippines to reduce erosion and produce organic matter for soil improvement, but Filipino farmers were unwilling to take on the expense of planting these land- and labour-intensive hedgerows. Researchers in the Philippines found that "natural vegetative strips"- rows left uncultivated during contour ploughing so that natural vegetation could grow there- were not only far less expensive, but also controlled erosion nearly as effectively as planted hedgerows.[71] The natural vegetative strips also provide important habitat for wild flora and small fauna.[72] Further research showed how to enrich the natural vegetative strips with high-value fruit trees from which farmers could earn cash income. Since natural vegetative strips were first introduced, thousands of farmers have adopted this low-cost technology in the densely populated, steep farmlands of northern Mindanao.

STRATEGY 6: MODIFY FARM RESOURCE MANAGEMENT PRACTICES TO ENHANCE HABITAT QUALITY IN AND AROUND FARMLANDS

Improvements in the way that farmers manage their natural resources can allow many different wild species to flourish, with no reductions- and sometimes with increases- in crop yields. Good logging practices can prevent much of the damage caused to forests and increase long-term production. Reduced tillage can lower farming costs while protecting the microorganisms that live in the soil. Improved irrigation efficiency can make more water available for wetlands. Methods can be adapted to labour or capital-intensive farming systems.

Providing habitat for songbirds in flooded fields in California

In the Sacramento and San Joaquin Valleys of California, the conversion of wetlands to rice fields destroyed the habitats of many species of birds. Now, rice farmers have discovered that by flooding their fields during the fallow season, their farms can become habitat for many species of endangered songbirds, ducks, and cranes without reducing profits. Flooded rice fields are also serving as habitat for millions of migratory birds, such as Canadian geese, that live in fields during part of their annual migration. Researchers have found that fallow rice fields provide habitat nearly as good as natural wetlands for finding food. Because there are few predators in the rice fields, the rice farms actually may be a safer habitat for waterbirds. Some rice farms are now being managed jointly with restored natural wetlands to provide year-round wildlife habitats. The system also accomplishes the growers' objectives of decomposing waste straw and controlling weeds and diseases.[73]

Preserving wetlands through traditional irrigation in Zimbabwe

In Zimbabwe and other parts of Africa, irrigating fields with conventional systems is prohibitively expensive and drains tons of water from rivers and wetlands that are home to many wild species of plants, animals, and fish. Farmers have developed a promising alternative: irrigated gardens in shallow, seasonally waterlogged depressions called "dambos". They fence a plot and hand-dig water channels between the beds. Researchers studying dambos in Zimbabwe found that yields per unit of land and water were approximately twice as high as in mechanical irrigation systems. They were also much less expensive than formal irrigation systems. Dambo fields often retain some native vegetation and often contain a wide variety of crop species. Cultivation on the dambo with indigenous methods is environmentally sustainable. It does not dry up the dambo, mine the groundwater, or reduce downstream flows, and it does not interfere with preserving wetland habitats rich in biodiversity. Approximately 15,000 to 20,000 hectares of dambo gardens are already under productive cultivation in Zimbabwe, and the potential is for up to 80,000 hectares, mainly in the poorer communal areas. Similar wetland landforms are found in Malawi, South Africa, Rwanda, Sierra Leone, and Nigeria.[74]

ORGANIC FARMING AND ECOAGRICULTURE

Organic farming is a type of ecoagriculture that relies on the Earth's own natural resources to grow and process food. Organic practices include cultural and biological pest management and prohibit use of synthetic chemicals in crop production and antibiotics or hormones in livestock production. The primary benefits of organic farming for wild biodiversity are the decreased release of agro-chemical pollutants and improved soil husbandry. Though organic agriculture was previously considered "low yield", advances in research and farming practice have led to large and sustainable yield increases in some systems, even without agrochemicals. While organic farming is an important ecoagriculture approach, it is not the only one. In many cases, farms where agrochemicals are used can still protect precious habitat through careful management (such as using filter strips to prevent excess nutrients from entering waterways), supplemented with other strategies, such as increased crop diversity or establishment of wildlife corridors. In impoverished soils, such as many found in Africa, some chemical fertiliser is often needed in combination with organic nutrients to build up soil organic matter for sustainable production. Strategic, but limited, use of non-persistent pesticides is part of many integrated pest management systems.

Providing space for wild species by rotating fields out of production in Kenya and Zambia

In Africa, farmers in search of increased crop yields have often been encouraged or forced by land scarcity to give up traditional farming methods that support more biodiversity. Traditional fallows- fields left aside from production and allowed to grow wild for a year or longer- have been disappearing in Africa and around the world. Researchers have worked with farmers to develop improved fallows, in which fast-growing trees or shrubs are planted in fallow fields. These increase farm productivity and food security by reducing the need for purchased fertilisers and by improving soils with low organic matter. Improved fallows also support a far wider range of wild species than continuous annual planting. Shrub and tree canopies provide protected nesting areas and protection for birds and small mammals. Over the past decade, researchers have developed short-duration fallows that reduce farmers' needs for fertilisers and produce a range of valuable products, such as wood for building poles and fuel. The practice has spread rapidly, even on small farms. In eastern Zambia, 3,000 farmers began to use improved, two-year tree fallows that nearly tripled annual net farm income from maize, their most important crop.[75] In western Kenya several thousand farmers increased yields 21 percent by using one-season shrub fallows that gave better economic returns than continuous cropping.[76] ■

ECOAGRICULTURE CAN HELP FEED THE WORLD'S PEOPLE AND PROTECT BIODIVERSITY

The challenge of future landscape management is to simultaneously help preserve wild species, increase the productivity of the land, and empower the rural poor. As the examples of innovators show, ecoagriculture can help to meet this challenge. Successes have been made possible by creative, on-the-ground experimentation and by major advances in science, in areas such as ecology, genetics, agronomy, microbiology, wildlife biology, remote sensing, ecosystem modeling, and inexpensive resource monitoring methods. The ecoagriculture innovations presented in this report resulted from integrating agricultural and ecological research with local farming practices. Interestingly, many of these positive results were achieved serendipitously. The main concerns of innovators (at least initially) were to improve agricultural productivity or sustainability, rather than conserve wild biodiversity. Programs that intentionally pursue these goals together should be capable of achieving even more significant benefits, and achieve these more quickly.

The successful spread of ecoagriculture still has many barriers to overcome. Too few farmers, environmentalists, governments, and non-governmental organizations are aware of the need for ecoagriculture, or of the existence of methods that fulfil that need. A major constraint to progress is the lack of production technologies, conservation practices, and resource management systems that can achieve more biodiversity-friendly agriculture while still maintaining desired production levels. In many cases, fundamental information is lacking about ecological interactions between agricultural and wild species that would allow for the design of better systems.

As scientific understanding deepens, researchers will find more general principles to aid in the design of new land management systems that produce more food while protecting biodiversity. However, agricultural research institutions have not pursued biodiversity preservation aggressively, preoccupied as they are with the many conventional production challenges that still face the agricultural sector. Universities and other institutions doing ecological research have remained focused on non-agricultural ecosystems. Many government policies and market mechanisms reward farming techniques that create too much waste, use too many harmful chemicals, and use more land than is needed. A global effort is needed to mobilize research and innovation. Ecoagriculture can be encouraged through concrete steps in research, public policy, and public education. Research can continue to shed new light on the complex relationships between wild biodiversity and agriculture. Using advanced ecological and agricultural methods, as well as on-farm research, ecoagriculture techniques should be sought to help preserve wild species, increase the productivity of the land, and empower farmers, including the rural poor, to be good stewards of the land. Universities, governments, and non-governmental organizations can develop and test new ecoagriculture practices to determine specific solutions to the differing challenges in developing and industrialized nations. This effort will include the search for new crop breeds, fertilisers, and pest controls, as well as new farm and landscape management techniques that can boost agricultural yields while allowing more wild species to survive on and around farms and fisheries. Practical, usable solutions can be found when farmers, researchers, and conservationists work in close cooperation.

Public education can make farmers, environmentalists, and policymakers aware of best practices and encourage ecoagriculture. An important first step will be to bring conservationists and agriculturalists together to learn more about the interrelationship of wild biodiversity and agriculture and to develop strategies for promoting scientific research and public policies that advance ecoagriculture. Extension programs in developing countries can help organize local people to work together to manage their landscapes and ecosystems for both biodiversity and production goals. Markets can be developed for food products that are grown through ecoagriculture, so farmers will be motivated to take up biodiver-

sity-friendly methods. Markets for sustainably grown products- like the certified "Salmon Safe" label currently in use in the Pacific Northwest of the USA, certified organic produce, certified wood, or "conservation beef"- can be expanded. "Emissions markets" can be created to control agricultural pollutants such as fertiliser, pesticides, and livestock waste run-off. In these markets, legal permission to pollute is traded as a controlled commodity, leading those who can most cheaply curtail pollution to do so in order to sell their permits at a profit to those who face the highest costs to improve their practices. Agroecotourism can be developed, following on the lines of popular educational tours of organic farms now given in Italy. Sustainable development investment portfolios can be created to support ecoagriculture ventures. Transferable development rights can be established to limit total development in a biodiversity-rich area, while allowing landowners to trade development rights with each other. This would ensure that the most economically beneficial development occurs and benefits all stakeholders. Special efforts are needed to ensure that poorer producers can participate in these markets and that their land and resource rights- including informal rights- are respected.

Payments to farmers may be made where biodiversity is particularly high risk, to provide an incentive for them to adopt ecoagriculture. In some cases, biodiversity-friendly farming simply does not yet produce enough income for local people to afford major land use changes. But the value of protected habitat to other users in the region or to the global community may indeed be much greater than its agricultural use. When this is the case, payments for environmental services can be used to compensate local people for practising ecoagriculture or removing tracts of land from agricultural production for management as wildlife habitat. Tax credits or deductions may be given based on certification of "biodiversity-rich systems." In Chiapas, Mexico, for example, farmers are given assistance payments to shift from unsustainable, low-income land use patterns- mainly extensive fallow systems that involve regular forest clearing- to sustainable forestry, agroforestry, and agricultural systems that support more biodiversity, while sequestering carbon from the atmosphere to reduce global warming. The payments come from revenues derived from an international greenhouse gas mitigation agreement with the International Federation of Automobiles, which is committed to offsetting the carbon emissions resulting from sponsored car races.[77]

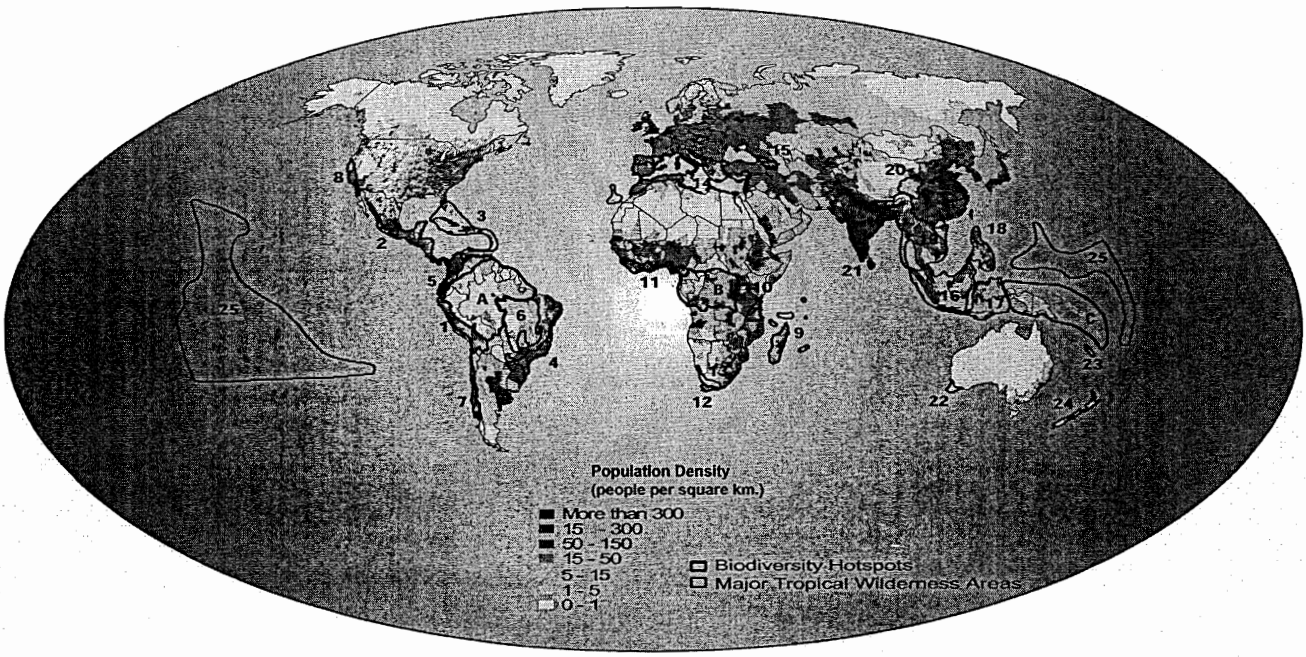
Governments, international development agencies, civil society, and the private sector should make investments in ecoagriculture. In relation to their agricultural production, developed countries spend five times as much as developing countries on agricultural research and development.[78] International aid to developing-country agriculture has declined dramatically for 10 to 15 years. Reversing these trends, and focusing some of the investment in ecoagriculture, would benefit both developing and developed countries. For example, experts estimate that every dollar invested by the United States in international wheat research from 1960 to 1993 returned up to 200 times that amount to US farmers and consumers, for a total of up to US$13.4 billion.[79]

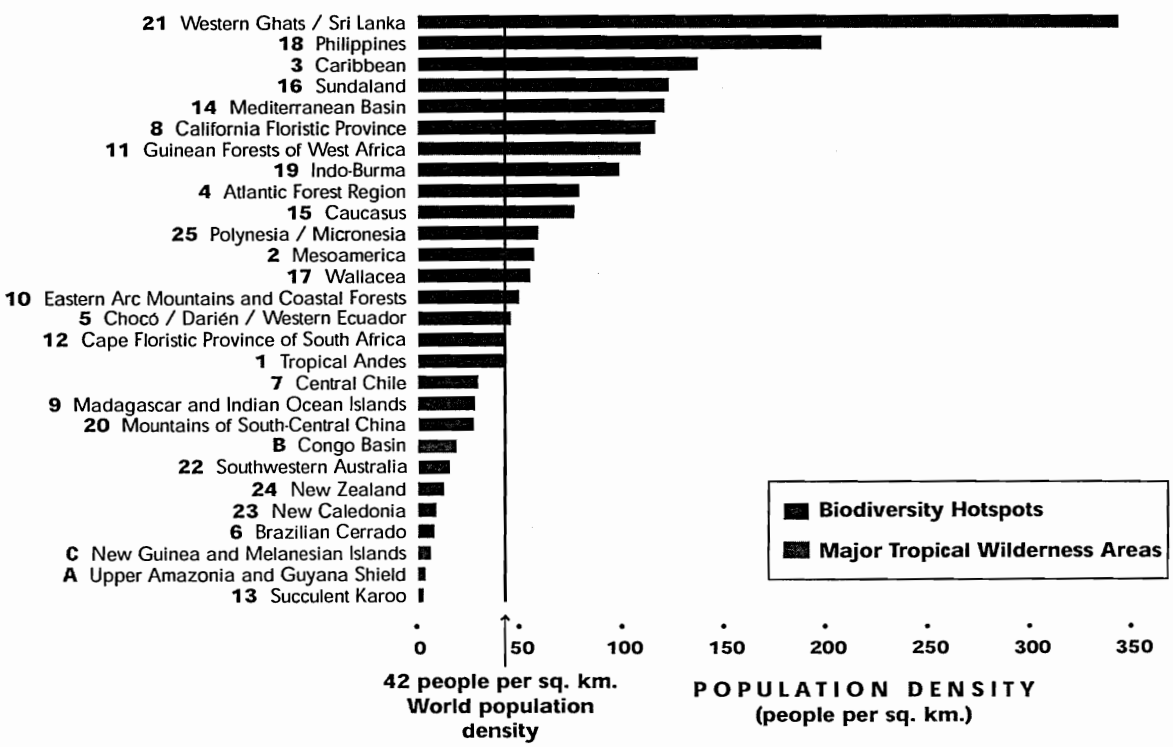
Over the long term, with considerable research and experimentation, most agriculture could become ecoagriculture in both developed and developing countries, for farmers rich and poor. For the immediate future, ecoagriculture should be promoted where it is needed most urgently. Ecoagriculture should be further developed and instituted quickly in important centres of wild biodiversity in the tropics, around wildlife reserves where agricultural systems are under greatest threat of degradation, and in poor farming areas where people are especially dependent upon wild biodiversity for their livelihoods.

Throughout history, humans have shown a tremendous capacity to adapt to changing conditions. While today's wild biodiversity is under unprecedented pressure from humans- whose ever-increasing numbers of people will need and demand more food- promising strategies used in various parts of the world show that ecoagriculture can be productive and profitable while protecting biodiversity. The research described in this report can show the way to significant innovations in resource management and agriculture- enabling people and wild species to prosper far into the future. ■

MAP 1- GLOBAL BIODIVERSITY HOTSPOTS

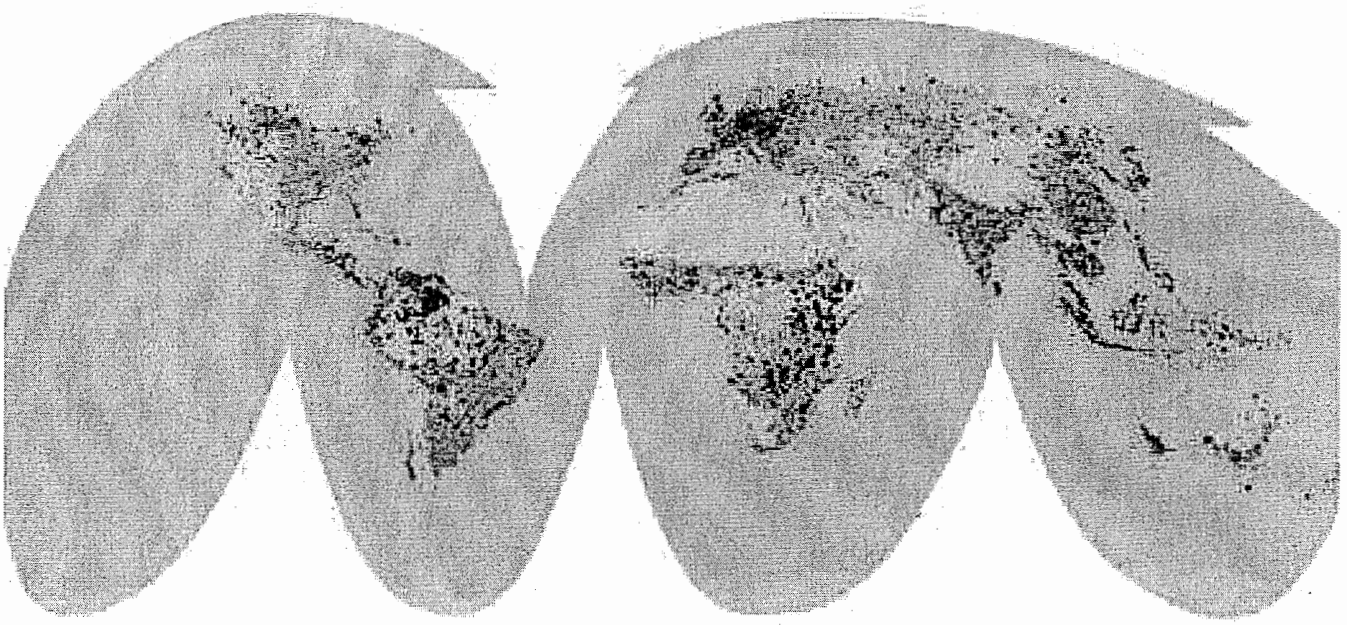
Humans and wild species share the same land in many areas where biodiversity is richest- and most at risk. Agriculture is the biggest cause of species extinctions today. Ecoagriculture is one of the greatest hopes for preserving biodiversity for the future (Cincotta, Richard P., and Robert Engelman. 2000. *Nature's Place: Human Population and the Future of Biological Diversity.* Washington: Courtesy of Population Action International).





MAP 2- GEOGRAPHIC RELATION BETWEEN PROTECTED AREAS AND AGRICULTURAL LAND

Nearly half of the areas currently protected for biodiversity are themselves heavily used for agriculture, and many of them are located in regions where agriculture is a major land use. Neither fencing off wildlife nor restricting farming can save the world's threatened species from extinction (Wood, Stanley, Kate Sebastian, and Sara J. Scherr. 2000. *Pilot Analysis of Global Ecosystems: Agroecosystems.* Washington: International Food Policy Research Institute and the World Resources Institute).



Agricultural share of protected area (percent)

- **1-5**
- **5-30**
- **30-100**
- **Within the extent of agriculture**
- **Outside the extent of agriculture**

NOTES: The extent of agriculture estimate from Pilot Analysis of Global Ecosystems (PAGE) (Wood et al., 2000) includes areas with greater than 30 percent agriculture, based on a reinterpretation of GLCCD, 1998 and USGS EDC, 1999, plus additional irrigated areas based on Doell and Siebert, 1999. The protected areas within the extent of agriculture were derived from *Protected Areas Database* (WCMC, 1999). For protected areas represented only by points, a circular buffer was generated corresponding to the size of the protected area. The share of protected areas that is agricultural was calculated for each protected area using the PAGE agricultural extent.

PROJECTION: Interrupted Goode's Homolosine

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POVERTY-ENVIRONMENT INTERACTIONS IN AGRICULTURE: KEY FACTORS AND POLICY IMPLICATIONS

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POVERTY-ENVIRONMENT INTERACTIONS IN AGRICULTURE:

KEY FACTORS AND POLICY IMPLICATIONS

Executive Summary

As environmental concerns and political mobilization to address them have risen in recent decades, rural poverty is increasingly seen as both a major cause and result of degraded soils, vegetation, water and natural habitats. Observers have conceptualized the link between rural poverty and environment as a "downward" spiral associated with population growth and inadequate resources for resource management, or as the result of economic marginalization of the poor leading to their migration to ever more environmentally-fragile lands. This simplistic model has sometimes led to policies which reduce poverty at the expense of environment, or reduce degradation at the expense of poor people.

Recent micro-scale empirical research has challenged this model. Studies have found a striking degree of heterogeneity in the experience of the rural poor in relation to environmental management, the success of their adaptations to environmental change, and the efficacy of different policies in influencing outcomes. A "rural livelihoods" perspective and an analytical framework emphasizing household and community adaptation processes have helped to make sense of this variation.

Researchers have identified eight key factors which appear to condition poverty-environment interactions and outcomes in relation to agriculture:

* The characteristics of the natural resource base and farming systems of the poor;

* Farmers' awareness and assessment of the importance of environmental degradation;

* Availability of sustainable production technologies and their suitability for the poor;

* Farmers' capacity to mobilize investment resources through own assets and networks;

* Economic incentives for conservation management or investment;

* Security of tenure and rights of access to resources by the poor;

* Institutional capacity within communities to support adaptive response by the poor;

* Degree of political inclusion of the rural poor in decisions affecting resource policies.

Macroeconomic and sectoral policies influence poverty-environment interactions by shifting these factors; thus macro policy typically has diverse impacts on different groups of poor people, the environments they use, and their scope for positive adaptation.

By understanding these factors, it is possible to design policies and programs that jointly address rural poverty and environment objectives. Promising strategies, which can be adapted to a variety of local conditions linking poverty and environment, include:

1) Co-invest in on-farm natural resource assets of the poor;

2) Employ the poor in projects to improve the agricultural resource base;

3) Develop and promote agricultural technologies with environmental benefits;

4) Promote low-risk perennial production in poor and marginal farming areas;

5) Compensate the poor for conserving or managing resources of value to others;

6) Facilitate access of the poor to natural resources essential for farm livelihoods.

To undertake these strategies successfully will require change in rural development institutions to integrate perspectives of poor farmers and the environment.

1. INTRODUCTION

Agriculture accounts for most land use in the developing countries, and as such is probably the single most powerful influence on environmental quality. Characteristics of agricultural production systems, such as location in the landscape, type and timing of cultivation, agrochemical input use, field burning and fallow use, and livestock practices, affect many environmental variables, particularly water quality and flow, soil quality and movement, natural vegetative cover and biodiversity, at local, regional and international scales. At the same time, agriculture remains the principal livelihood of poor people in developing countries, and particularly the rural poor, and is the major "engine" of economic growth in a majority of developing countries (Malik 1998). Projections of rural population growth, agricultural expansion and intensification, and poverty in the next few decades suggest a potentially serious conflict

between environmental quality and poverty reduction in agricultural regions (Pinstrup-Andersen, Pandya-Lorch, Rosegrant 1997; Scherr 1997).

Indeed, assumptions about the relationships between poverty, agriculture and environmental degradation have driven major policy initiatives in both the agriculture and environment sectors during the last century. Yet these assumptions are often not empirically supported and there is continued debate among academics, development practitioners, and advocates for the poor and for the environment, about directions and nature of causality and appropriate policy response.

The objective of this paper is to highlight key elements of this debate, assess current evidence and experience, and draw from this implications for design of agriculture- and related policies which can reduce the impacts of resource degradation on poverty, reduce the impacts of poverty on resource degradation, and contribute jointly to poverty reduction and environmental rehabilitation. The following section defines poverty and environment issues related to agriculture. The third section describes different aspects of their relationship, and presents a framework for assessing change processes and policy action. The fourth section discusses eight factors which explain why, under some circumstances, negative poverty-environment linkages occur and in others they are avoided or positive adaptations are made. Based on this evidence, the fifth section suggests a number of policy strategies which could jointly address poverty and environment objectives in the agriculture sector. The final section discusses remaining gaps in our knowledge about the poverty-agriculture-environment nexus and general challenges that deserve particular attention as the new century begins.

2. AGRICULTURE, THE POOR AND ENVIRONMENTAL DEGRADATION

Environmental Issues Related to Agriculture and to the Poor

Discussion in this paper is confined to environmental issues associated with agriculture. Concerns relate mainly to the sustainability of the resource base for agricultural production (e.g., soil quality, access to irrigation water), the protection of biodiversity and related habitats, and environmental services of resources influenced significantly by agricultural land use (e.g., watershed function, carbon sequestration).

These concerns are not trivial. Degradation of soil and vegetative resources already threatens agricultural productivity, biodiversity and water quality and availability in many "hot spots" in the developing world (Scherr and Yadav 1995). Soils in approximately 16 percent of developing country land area, and a higher proportion of cropland and drylands, have degraded moderately or severely since mid-century, mainly through soil erosion, nutrient depletion and salinization (Scherr 1999). At least 28 countries with a total population exceeding 300 million people face water stress today, and demand is growing rapidly even as water contamination due to agriculture and rural domestic uses increases (Pinstrup, Pandy-Lorch and Rosegrant 1997). Declines in agrobiodiversity increase disease and pest problems (Thrupp, 1998). Agricultural expansion and intensification is the leading cause of species loss and depletion of natural vegetation, including bamboos, palms, and grasses harvested for human and domestic animal use.

The poor are implicated in only a part of this degradation and its consequences. Wealthier farmers, agricultural investors, and multinational corporations typically control much more total land area than the poor, and have played a prominent role in large-scale clearing of natural vegetation, over-use of agro-chemicals, large-scale degradation of grazing lands, over-exploitation of soils for export production. However, the poor do play an important role in unsustainable agricultural intensification, expansion of farming into marginal lands, and over-exploitation of vegetation. The consequences of degradation for the poor also tend to be more serious, because they lack assets to cushion the effects.

Who are the Poor?

"Poverty" is a concept which indicates absolute or relative welfare deprivation. It may be defined in terms of private consumption alone, or extended to include access to common property resources and state-provided commodities, personal assets or wealth, and even subjective assessments of "dignity" and "autonomy" (Baulch 1996).

IFAD (1992) identified five types of rural poverty which have different links with agriculture and the environment. Material deprivation and alienation cause "interstitial poverty", or pockets of poverty surrounded by power and affluence. "Peripheral poverty" is similar, but found in isolated, marginal areas. "Overcrowding poverty" is material deprivation arising from population pressure and limits on resources. Vulnerability to natural calamities, labor displacement and insecurity produces "traumatic or sporadic poverty", which can be transitory. Isolation, alienation, technological deprivation, dependence and lack of assets are signs of "endemic poverty."

Reardon and Vosti's (1997) typology of poverty is explicitly linked to environment. They examine the asset portfolio of the rural poor, in terms of (1) natural resources, such as water, ground cover, biodiversity of wild and domestic fauna and flora, and soil; (2) human resources, such as education, health, nutrition, skills, number of people; (3) on-farm resources, such as livestock, farmland, pastures, reservoirs, buildings, equipment, financial resource); (4) off-farm resources, including local off-farm physical and financial capital; (5) community-owned resources such as roads, dams and commons; and (6) social and political capital. Where assets are not completely fungible (markets are absent, underdeveloped or constrained), asset-specific poverty can influence livelihood activities and investment decisions. They note that "welfare poverty" criteria can miss a potentially large group of households that are not "absolutely poor" by the usual consumption-oriented definition, but are too poor--in that their surplus above the minimum diet line is still too small to make key conservation or intensification investments necessary to prevent their land use practices from damaging the resource base or leading them to push onto fragile lands. They prefer use of a measure of "conservation-investment poverty", the cut-off for which is site specific, a function of local labor and nonlabor input costs and the types of investment that are needed for the particular environmental problems or risks faced.

Geographic Distribution of the Poor in Relation to Agriculture and Environment

Some data have recently become available on the geographic distribution of the rural poor by region, by ecoregion, by land quality and by incidence of degradation.

In the late 1980's IFAD calculated rates of rural poverty (Jazairy, Alamgir and Panuccio1992). They found that 69 percent of the rural population in the 42 least developed countries were living in poverty. There were sharp regional differences, with the incidence of rural poverty highest in Sub-Saharan Africa (SSA, 60 percent) and Latin America and the Caribbean (LAC, 61 percent); and lowest in the West Asia and North Africa (WANA, 26 percent). The overall incidence in Asia was 31 percent, but rose to 46 percent if India and China were excluded. The largest absolute number of rural poor were in Asia (633 mln), then SSA (204 mln), with much lower figures in LAC (76 mln) and WANA (27 mln). By 2020, regional patterns are expected to shift, with high incidence and total number of rural poor highest then in SSA (Pinstrup-Andersen, Pandya-Lorch and Rosegrant 1997).

Sharma et al (1996) calculated rates of child malnutrition, a good indicator of poverty, by region and by agro-ecological zone. In 1990 the average share of underweight pre-school children was by far the highest in South Asia (60 percent). High rates were also found in SSA (31 percent) and Asia and the Pacific outside South Asia (25 percent). In WANA the rate was 19 percent, and in LAC 10 percent. Because of their much larger total population, the South Asia and Asia-Pacific regions accounted for

most malnourished pre-school children in developing countries: 53 and 24 percent respectively. The share in Africa was 15 percent, and in WANA and LAC only 5 and 3 percent respectively of the total.

Malnutrition varies significantly by agroecological zone. Nearly half of children are malnourished in the warm, semi-arid tropics and sub-tropics; and over a third are malnourished in the warm sub-humid and humid tropics. A quarter of children suffer from malnutrition in the cool tropics and subtropics with summer rainfall, while less than a fifth of all children do in the warm/cool humid sub-tropics and the cool subtropics with winter rainfall. (See Figure 1). There is wide variation within zones. Globally, 59 percent of all malnourished children in the developing world reside in the warm tropics, 27 percent in the warm sub-tropics, and 15 percent in the cool tropics and sub-tropics (Sharma, et al., Table 5). In Africa, stunting (low height-for-age) is much higher in the highlands than the lowlands. Agricultural productivity has a variable relation with malnutrition; the highest prevalence of malnutrition is in the warm semi-arid tropics and sub-tropics, where agricultural productivity is generally low; however, malnutrition is also widespread in the warm, humid zones with the highest productivity.

Nelson, et al. (1997) analyzed the distribution of the poor among favored and marginal lands in developing countries. "Favored lands" were defined as rainfed and irrigated cropland in areas which are fertile, well-drained, with even topography and with adequate rainfall, which are in comparatively intensive use, with low risk of degradation. Marginal agricultural lands were identified as those currently used for agriculture, grazing or agroforestry, often characterized by variable topography, poor fertility, inaccessibility, fragility and heterogeneity, and at risk of degradation. Forests, woodlands and arid lands were also included in marginal lands.

To assess whether countries with a high proportion of population on marginal lands also had a high incidence of rural poverty, the authors first compared national figures available for the rural poor, as a percent of total population, with the percent of rural population on marginal lands. No correlation was found. Other studies for India found either no correlation (Kelley and Rao 1995) or higher absolute numbers and incidence of the poor on more favored lands (Fan and Hazell 1996). Thus, they decided to approximate rural poverty in the two areas by applying national percentages to the respective areas. The resulting estimates were 325 million poor on favored lands and 630 million on marginal agricultural, forested and arid lands (Table 1).

Few available data explicitly link poverty with environmental degradation. A pilot effort of GRID/Arendal (1997) used geographic information systems to examine the correlation of key poverty indicators for West Africa with the GLASOD estimates of soil degradation and with agroclimatic zones. The proportion of children who died before the age of five was highest (over 30 percent of children) in areas with "high" soil degradation; a little over half of all mortality occurred in areas of high or very high degradation. Other variables, such as adult female literacy, rate of primary school enrollment, and incidence of children with stunted growth, showed no clear relation with soil degradation. Poverty indices are correlated more with agro-climatic zones.

Data Limitations

Debates about poverty-environment linkages have been difficult to resolve in part due to data limitations. There have been few longitudinal studies linking poverty and resource quality in agricultural system. Most of those which exist have been reconstructed from oral history and from archival, remote sensing or time series survey data originally collected for other purposes, which do not examine poverty and agricultural production systems in a geographically explicit context (Scherr and Vosti 1994). Emphasis has been more on measuring poverty, than explaining why people are poor and the relative importance of environmental conditions or environmental degradation (Malik 1998:14). Most assessments have used aggregate, macro-scale data, when the key questions in fact require micro-level

analysis (Marquette and Bilsborrow, 1994:29). Fortunately, there has been a notable increase in the past decade in both micro-scale and longitudinal studies, which will form the basis of discussions in section 4.

3. ANALYSING THE POVERTY-AGRICULTURE-ENVIRONMENT NEXUS

The nexus of poverty, agricultural production and environment poses some of the most controversial development policy challenges for international institutions, national policymakers, non-government development agencies, and local communities. Our "mental models" of the relationships between those three points of what Vosti and Reardon (1997) call the "critical triangle" of development objectives drive policy and program design (Figure 2). Depending on their understanding of those relationships, people who share common goals for poverty reduction, environmental protection and economic change may yet come to very different conclusions on such policy questions as:

* Shall we focus greater investment in scientific research on development of technologies for marginal or more favored lands?

* Shall we work with poor farmers to make their agricultural practices in critical watersheds more sustainable, or help them find other, non-farming livelihoods?

* Shall we build more roads to help poor farmers earn funds for conservation investment, or restrict road-building to minimize economic activities in vulnerable habitats?

Researchers have focused considerable attention on analyzing, both theoretically and empirically, poverty-agriculture-environment interactions on an aggregate scale, typically for selected dyads of the triangle.

Agriculture-Environment Interactions

Celebration of the successes of the Green Revolution in raising agricultural production in developing countries has been tempered by recognition of both environmental problems related to the new technologies widely adopted in more favored agricultural regions and the relative neglect of serious problems associated with agricultural expansion and intensification in areas for which the new technologies were not well-suited (Pretty 1997).

By the late 1980's, there was widespread acceptance of the notion that agricultural production technology design needs to consider environmental effects explicitly, an approach dubbed the "doubly-Green Revolution". Continued agricultural intensification is still seen as essential--either because it is inevitable in areas with high and increasing rural populations, or because it is desirable to protect natural habitats in sparely-populated areas (Pinstrup-Andersen, et al. 1997; Reardon and Vosti 1997; Scherr 1997). Yet this dialogue has focused largely on achieving solutions through new technology, together with agricultural policy reform to make more explicit the environmental costs of production (e.g., Juo and Freed 1995) . The link with poverty reduction has often been missing in these discussions and resulting policy.

Poverty-Agriculture Interactions

This gap is unfortunate, since nearly all studies agree that agricultural growth (especially growth and stabilization of food staples production) is likely to benefit poor people, although initial inequality of incomes and of assets often determines the degree to which growth is translated to reduction in poverty (Malik: 17-18). A comparative study of seven Asian developing countries in the late 1980's showed that

the rural poor depended more on agriculture than the rural non-poor did (Quibria and Srinivasan 1991). Delgado, Hopkins and Kelly (1998) concluded from a series of detailed household and market studies in Africa that despite growing importance of non-farm activity, the prosperity of people depended substantially on the forward and backward production linkages--and even more on consumption linkages--from farmers. Because of these multiplier effects, adding $1 of new farm income resulted in a total increase of household income ranging from $1.96 in Niger to $2.88 in Burkina Faso. Income derived from common property resources is much more important to the rural poor than to the non-poor, especially in arid and semi-arid regions (Jodha 1991; Hopkins, Scherr and Gruhn 1995).

At the same time, poverty itself can be a significant constraint on agricultural growth, because of poor people's need to concentrate resources on lower-value food crops to ensure subsistence security, and their difficulties in mobilizing production and investment resources.

Poverty-Environment Interactions

The most controversial side of the critical triangle has been poverty-environment interactions, in part because of the weak empirical base of information. Much literature on this relationship posited a "downward spiral" of poverty and environmental degradation, in which poor people placed increasing pressure on the natural resource based--as a result of population growth, limited access to land or access only to poor quality or fragile lands, or limited resources for investment and sustainable resource management--and in turn experienced declining consumption, human health and food security as a result of environmental degradation (Forsyth, Leach and Scoones 1998). Some studies have documented increased land-clearing and deforestation related to a decline in wage rates and employment for the poor and landless.Yet, while there are many rural areas where this type of negative relationship has indeed been documented (e.g., Grepperud 1996; Mink 1993; Kumar and Hotchkiss 1988; Casey and Paolisso 1996), research has in fact found a wide range of environmental outcomes under management by the poor, and of welfare outcomes following environmental degradation:

Some longitudinal studies of resource management by poor farmers, in areas perceived to be undergoing the "downward spiral", have found instead that: observed degradation was the result of natural forces, rather than human mis-management; that indigenous technology had developed to control degradation; that local communities had implemented land use controls to stabilize vegetative cover; or that farmers diversified farm and off-farm activities to reduce degradation while maintaining incomes (Forsyth, Leach and Scoones 1998).

A review of over 70 empirical studies of the relationship between local population growth and land quality in poor hill and mountain regions, concluded that the effects of population growth were indeterminate (Templeton and Scherr forthcoming). As the cost of land relative to labor increased, people often changed their methods of managing plants and animals and made land improvements to offset initial declines in productivity that result from more intensive use of land. Thus the relationship between environmental degradation and population density often resembled an inverted 'U'. Halting population growth or removing people from densely-settled areas might improve neither productivity nor resource quality.

Rural Livelihoods and Adaptive Strategies of the Poor

One result of this new understanding of the variability in poverty-environment interactions has been an emerging focus on "rural livelihoods". This approach considers natural resource and agricultural policy from the perspective of poor people in their struggle to make a living, and highlights the need for location-specific interventions targeted to the livelihood needs of the poor (Chambers 1988). Sustainable livelihoods are defined as: "the capabilities, assets (including both material and social resources) and

activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining the resource base." (Chambers and Conway 1992).

Studies of livelihood strategies have revealed that while the rural poor may have limited resources, they still have considerable capacity to adapt to environmental degradation, either to mitigate its effects on their livelihoods or to rehabilitate degraded resources. A wide variety of coping mechanisms has been identified to deal with environmental stress. Some of these responses imply further impoverishment, such as reducing consumption, depleting household resources (liquidating assets or taking out credit for immediate consumption), or moving (dividing the family or migrating). Still other strategies may offset the welfare effects of resource degradation, but without improving the natural resource base, such as hoarding (accumulating land and other assets), increasing off-farm employment, exploiting common property resources, and making claims on others (borrow or receive gifts, exploit kinship and friendship ties; exploit patron/client relationships, seek state support). Finally, some strategies both improve natural resources and reduce household poverty, by protecting and preserving the asset base, diversifying and improving on-farm production systems, or taking out credit to invest in future production or resource protection (Masika, Table 3; Davies 1996).

Over time, local people develop technical and institutional innovations in natural resource management to reduce risks and adapt to or reverse degradation even as pressures increase. A large case study literature documents innovations in many farming systems and ecozones (Forsyth and Leach 1998; Scherr 1994; Tiffen, Mortimore, Gichuki 1994; Templeton and Scherr 1996; Reij, Scoones and Toulmin 1996; IBSRAM 1998).

These findings suggest a phenomenon of local innovation in natural resource management comparable to that of welfare-enhancing agricultural intensification and innovation described by Ruthenberg (1980), Boserup (1965), Pingali and Binswanger (1984), Binswanger and Ruttan (1978); Binswanger and McIntire (1987); and North (1990). As population or market pressures increase, farmers first experience degradation and its welfare effects, but not sufficiently to trigger response. As effects become more pronounced, however, farmers will seek innovations to stabilize or improve the resource base, or to compensate for their welfare impacts by depending less on the degrading resource. Such a positive adaptive response is not assured, however; resources may eventually be destroyed, or a delayed response may permanently reduce resource conditions; consumption may decline (Figure 3).

The central question in exploring poverty-agriculture-environment interactions, therefore, is: What factors determine when farmers will respond to environmental pressures in ways that improve livelihood security and natural resource quality? And how can policies encourage those positive responses?

Conceptual Framework

The conceptual framework shown in Figure 4 considers these questions within the broader dynamic of rural change (Scherr, et al. 1996). Pressures from population growth, markets, new technology or other external factors induce change in local markets, prices and institutions within individual communities. The local impacts of these shifts are conditioned by community characteristics, such as their human and natural resource endowments, infrastructure, asset distribution, market linkages and local knowledge base and culture. Resulting community-level changes may induce responses in agriculture and natural resource management strategies at both household and collective levels, such as changes in land use, land investment, use intensity, input mix, conservation practices and investments, and collective action. These responses are similarly conditioned by community characteristics and may thus be path-dependent. Subsequent changes in natural resource management then affect environmental conditions, agricultural production and human welfare, and these in turn have feedback effects on local conditions,

institutions and NRM decisions.

Public policies can influence poverty-agriculture-environment dynamics at various levels. For example, agricultural research and price policies affect shift factors. Resource regulations and infrastructure investment affect community conditions. Land titling and credit programs affect local markets and institutions. Technical assistance influences response patterns. Nutrition or watershed management programs directly affect outcome variables. The most effective types and consequences of policy action in a given place will depend on the dynamics of the local change process and the relative importance of key factors influencing poverty-environment interactions.

4. KEY FACTORS EXPLAINING POVERTY-ENVIRONMENT LINKAGES

The evidence now available from research and field experience suggests that the outcomes of this change and adaptation process are influenced most by eight key factors. Below, each of these eight factors is defined, its theoretical impacts on adaptive response by the poor are described, and some empirical examples contrast positive and negative outcomes on poverty-environment interactions. A brief discussion of the effects of macroeconomic and sectoral policy impacts then follows.

Characteristics of the Natural Resource Base and Farming Systems

Physical processes and impacts of natural resource change in agricultural environments are fundamentally determined by climate, soil type, ground and surface water resources, vegetation, topography, and the history of human resource use and abuse. These clearly condition both the challenges facing farmers and opportunities for response. Yet the conventional concept of "population carrying capacity" has fallen out of favor as a result of growing evidence that sustainable farming systems can be devised under quite diverse physical conditions and population densities, given favorable socioeconomic conditions.

Five broad pathways of agricultural land use change have evolved in this century in developing countries, reflecting different land resource endowments and settlement patterns (Table 2): expansion and intensification of irrigated agriculture; intensification of high-quality rainfed lands; intensification of densely-populated marginal lands; expansion of farming into sparsely-populated marginal lands, and the rise of urban and peri-urban farming with accelerated urbanization. Agricultural landscapes in the five pathways are typically quite distinct, and offer quite different risks of resource degradation, and opportunities and constraints for intensification, diversification, and land-improving investment. Further landscape differences and resource management challenges arise from variations in settlement history, past history of degradation, the mix of crop, perennial and livestock components, and the mix of commercial and subsistence enterprises (Turner, Kates, and Hyden 1993). For example, Templeton and Scherr (1997) found empirical evidence that the relationship between population growth and resource quality in hills and mountains was influenced by rainfall (mainly by affecting crop product choice, risks of soil degradation, and land use intensity), topography (affecting spatial distribution of production systems), and soil characteristics (through crop choice cropping frequency and input use). These factors also affected returns to conservation.

Farmer Awareness and Assessment of Environmental Degradation

Farmers are usually aware when degradation processes threaten resources critical to their own livelihoods. Where farmers do not appear concerned about such degradation, it is often because they do not yet consider degradation effects to be a serious threat (they are still on the left side of the curve in Figure 3) or the resources are only marginal to overall livelihood strategy (Enters 1998; Scherr and Hazell 1994).

In several situations, however, farmer awareness has been found to be an important constraint to positive adaptation. The first is when degradation effects or their causal factors are not observable to farmers without modern technology, such as may occur with soil acidification, micro-nutrient depletion, changes in micro-fauna, or spread of disease vectors. The second is the case of recent immigrants who are farming in unfamiliar agro-environmental conditions or with unfamiliar farming systems, where local knowledge may be inadequate to recognize the existence or nature of resource problems. External intervention in problem diagnosis, farmer education and demonstration of positive effects from resource management change may be needed in these cases to trigger adaptive response.

A third situation is when the type of resource degradation involved is simply not a local concern, but rather a concern to outsiders, as may be the case with some types of habitat loss or downstream sedimentation. Adaptive response is unlikely to be triggered without either a "carrot" or "stick" provided by these outside interests.

A fourth situation is when poor farmers fail to respond because of a short planning horizon or high discount rate. The empirical evidence on whether the poor really do have high rates of time preference is sketchy, however. Furthermore Pagiola (1995) argues that poor farmers will often have an even greater willingness to protect or invest their natural resource assets than do the non-poor, because of their relatively greater dependence on those assets for livelihood security.

Availability of Technology for Sustainable and Productive Management by the Poor

Technological change in agriculture and natural resource management is essential if rural livelihoods are to improve and resources protected or improved. Farmers adopt resource-conserving practices nearly always because they also contribute to increased productivity or output stability (Saín and Barreto 1996; Arnold and Dewees 1995). Farmer unwillingness to adopt introduced conservation practices has commonly been due either to technical ineffectiveness under farmers' conditions or poor economic returns as evaluated from the farmer perspective (e.g., Enters 1998; Pender, Scherr and Durón 1998).

Resource constraints of the poor, their small scale of production, and their exposure to high livelihood risks mean that the technologies they use must have certain key characteristics. These include: the potential for incremental adoption, protection of food security, low risk of crop failure, rapid return on investments, minimal use of purchased inputs (especially for subsistence production, for farmers distant from road networks or where input markets function poorly); amenability to local adaptation; good performance under adverse climatic conditions; and effective use of micro-niches to diversify production.

Recognition of these requirements is beginning to transform land management programs oriented to the poor. Vegetative barriers or contour strips using local materials are substituted for expensive terraces; organic inputs are promoted to complement or substitute for purchased fertilizer; conservation interventions stress good soil cover and crop husbandry as much as landforms; and short-cycle tree-growing for poles, rather than timber, are promoted on small farms. Scientists and extensionists have taken a new look at indigenous technologies for resource husbandry, and discovered many to be suitable for dissemination or to suggest componets or strategies on which to base technological innovations (Arnold and Dewees 1995; IBSRAM 1998; IFAD 1992; Partap and Watson 1994; Reij, Scoones and Toulmin, 1996; Kramer 1988). Many "success stories" of large-scale farmer adoption based on these approaches have recently been documented (Current, Lutz, Scherr 1995; IFAD 1992; Veit, Mascarenhas, Ampadu-Agyei 1995; Pretty 1997).

This reorientation is also driving fundamental change in the process of technology generation for sustainable agriculture, including more focused attention on diagnosing the nature of underlying

resource management problems, early involvement of farmers in technology design and evaluation, use of additional criteria in economic evaluation, integration of research and extension functions in large-scale pilot programs of technology introduction, and more participatory extension approaches (Scherr 1992; Scherr 1995; Franzel and Scherr forthcoming; Kumwenda, et al. 1996). These institutional innovations make it potentially far more economical to undertake adaptive technology research across many different agro-environments and farming systems, and to reflect farmer needs.

For many "problem" soils, vulnerable water sources, and sensitive habitats, however, neither indigenous nor scientifically-derived technologies are yet available which permit continuous production or use over extended periods of time without serious degradation. For example, Tengborg and Stocking (1997) conclude, based on comparative studies of erosion-agricultural productivity changes over time for different soil types and vegetative covers, that there are currently no low-cost technologies to maintain maize yields on certain deeply weathered and unresilient soils in Africa, such as Ferralsols (Figure 5), and that no sustainable cropping system is available for Acrisols.

Farmer Capacity to Mobilize Resources for Conservation Management

Reardon and Vosti's concept of "conservation investment poverty" highlights the limited capacity of the poor to mobilize critical cash, labor, machinery or other resources, even for highly profitable and effective investments. This results in part from weak institutional development and poorly functioning factor markets in many rural areas (de Janvry 1991). Numerous studies have documented such resource mobilization constraints. For example, Shepherd and Soule 1998 found soil nutrient depletion associated with household assets in western Kenya. Current, Scherr and Lutz (1995) found that adoption of agroforestry practices in Central America and the Caribbean was influenced more by factor availability than relative profitability, with labor-intensive technologies adopted more on small farms and land-intensive technologies on larger farm.

To undertake resource-improving investment and more careful land husbandry, farmers' and communities' will have to select technologies which most effectively utilize available factors and find alternative mechanisms to mobilize the necessary resources. For example, new sharecropping systems may be devised to mobilize labor.

Poor people often avoid formal credit, even where it is available, because of the risk involved and higher priority uses for borrowed money. Given small farm size, alternative strategies can often be effective, such as use of divisible technologies and multi-output systems which permit incremental self-financing; mobilizing labor through use of family or community groups rather than hired workers; or raising cash through off-farm employment. Nonetheless, access to credit (even at commercial rates) can clearly accelerate this process, and there have been promising responses to credit programs based on shared group risk, minimal collateral, and small amounts of credit.

Economic Incentives for Conservation Management and Investment

Even when farmers are clearly concerned about resource degradation, suitable technologies are available, and farmers are able to mobilize resources to invest in or improve environmental management, they are unlikely to do so unless likely economic returns are fairly attractive. Agricultural input prices, output prices, wages and interest rates facing farm households and communities influence their income and investment strategies, by altering returns from sustainable land and water management relative to the returns they might anticipate from other livelihood options (Vosti and Reardon 1998: 61-62). Those strategies will thus reflect the extent to which price and non-price incentives facing farmers internalize the negative and positive externalities of natural resource management practices and outcomes (Anderson and Thampillai 1990).

Because of this sensitivity to relative prices, conservation investments are sensitive to general conditions of economic growth, as well as the market distortions in the agricultural economy. Subsidized fertilizer prices, for example, may encourage nutrient replenishment for some farmers, but serve as a disincentive to longer-term strategies of organic matter management for others. Whether high agricultural wage levels and non-farm employment opportunities will reduce incentives for conservation investment, or provide a means to mobilize resources for such investment, depends upon the expected returns to farm activities. Templeton and Scherr (forthcoming) found that it was the microeconomic changes associated with population growth, rather than population growth *per se*, that determined natural resource management and outcomes, and that these factors were amenable to policy influence.

Security of Tenure and Access Rights to Resources

Property rights to resources such as land, water and trees have been found to play a fundamental role in the poverty-agriculture-environment nexus. On the one hand, they govern the patterns of natural resource management, and may either impede or facilitate sustainable use, protection or resource-improving investment. On the other hand, they determine important aspects of welfare of individuals, households, and communities who depend on those resources.

Property rights encompass a diverse set of tenure rules and other aspects of access to and use of resources--an individual's capacity to call upon the collective to stand behind his or her claim to a benefit stream (Bromley 1991). Natural resources (land, water, trees, vegetation), rather than having a single "owner", commonly involve diverse property rights which may be held by different people, including the right to access, withdraw, manage, exclude others from the resource, and to transmit or alienate rights (Schlager and Ostrom 1992). Men and women, people of different castes, local people or outsiders, individuals and the state, may have rights to use the resource in different ways: for different crops, grazing, and gathering on land; for irrigating, washing, drinking or other enterprises using water; for timber, fruits, leaves, firewood, shade or other products from trees. Property rights may be acquired through a variety of means: (i) market purchases; (ii) inheritance, inter-vivos transfers, or gifts; (iii) labor or other investment in improving the resource; (iv) use over a period of time ("squatters' rights); (v) receiving rights from the state; and (vi) membership in a community (especially in communal or common property regimes) (Meinzen-Dick, et al. 1997).

The bundle of property rights held by poor people represents key household and community assets, which may provide income opportunities, assure access to essential household subsistence needs (water, food, fuel, medicines), and/or insure against livelihood risk. Poorer groups tend to rely more heavily on customary or informal rights. Marginal users such as women and the poor thus often lose out as a result of policies and processes which privatize and reduce complex bundles of rights into a single unitary right (under many land and water reforms) (Baland and Platteau 1996; Otsuka and Quisumbing 1998).

Property rights also affect long-term agricultural productivity and incentives for resource conservation, and investment. For example, more equitable access to natural resources by women has been found not only to improve welfare outcomes for women, but also to raise agricultural productivity, economic returns to agroforestry, and use efficiency of water in irrigation projects (Meinzen-Dick, et al. 1997). Tenure security, though not necessarily formal titling, is associated with cropland conservation practices and improvements (Templeton and Scherr, forthcoming). Common property regimes may be more or less effective in resource protection, depending upon norms and rules agreed upon, and the ability of local people to protect their rights in the face of outsiders (Ostrom 1990).

Local Institutional Capacity to Support Positive Adaptive Response

Local institutions provide the social fabric within which poverty-agriculture-environment interactions

are determined. They play at least three different roles. First, effective resource management, whether for private, communal and public resources, often requires collective regulation (e.g., establishing access rights and timing to communal resources, use or management restrictions on privately-held resources to influence environmental externalities) or collective investment (e.g., establishment of community drainage systems or trees for public use). Veit, Mascarenhas and Ampadu-Agyei (1995) concluded that good local organizational and management skills underpinned successful resource management activities in 14 African case studies. Cultural, demographic, market and leadership factors ,and characteristics of the resource base and local government, may affect the emergence and success of local organization for natural resource management (Ostrom 1990; Pender and Scherr 1998; Rasmusson and Meinzen-Dick 1994). A key indicator and determinant of equity in NRM is whether the poor, including women, are included and have an effective voice in these organizations (Agarwal 1997).

A second role of local institutions is to provide community infrastructure (both physical and institutional) which complements and supports the development of non-farm activities, the commercialization of agriculture, and urban-rural links. Community social capital and institutions affect insurance and wealth distribution mechanisms available to the poor (Reardon and Vosti 1997:62).

Local institutions play a third role providing local support services for agricultural production and resource management. The availability and quality of technical assistance and training, credit, marketing information or assistance, resource quality monitoring influence the capacity of local people to respond positively to natural resource management challenges (Butcher, 1988; Pender, Scherr and Duron 1998). Whether these services are provided by the private sector, public agencies or non-governmental organizations, the critical question is the degree to which they are accessible to the poor.

Political Inclusion or Marginalization of Poor Farmers

The political disempowerment of the poor is reflected throughout rural development processes. Given this reality, efforts to combat poverty within the agriculture-environment nexus have tended to consider poor farmers mainly as passive beneficiaries of benevolent policies formulated and delivered by others. Yet the impacts of this model are inherently limited, as they depend upon the good will of policymakers who face a multiplicity of powerful, competing political pressures from the non-poor. The degree to which poor farmers are perceived and legitimated as an active political constituency is thus a critical factor in achieving adoption and effective implementation of policies favorable to the rural poor.

"Participatory planning", "farmer-first", "from the ground up" and similar strategies to combat poverty reflect the influence of broader movements to promote more democratic decision-making in developing countries, with active involvement by the poor. The approach is linked to the expansion of civil society, the proliferation of non-governmental development organizations, and the decentralization of government control over natural resources. It contrasts both with a policy environment that simply excludes the poor and one which depends upon "technocratic" decision-making on behalf of the poor, but fully controlled by others. In the democratic model, poor farmers are not only 'beneficiaries" of policies, but have "seats at the table" where policies are designed and the "rules of the game" are established (see examples in Veit, Mascarenhas and Ampadu-Agyei 1995).

Macroeconomic and Sector Policy Support

Local factors only partially determine changing poverty and environmental conditions. Macroeconomic and sectoral conditions and policies play a significant role in defining the range of available livelihood options for local people (Barbier 1997) and in shaping the key factors discussed above (Table 3). The roles defined for agriculture in national development strategies will shape initiatives and opportunities to exploit existing and potential future comparative advantages in farming, and participation of the rural

poor in such development.

National public investment policies will determine the distribution of physical and social infrastructure between rural and urban sectors, large- and small-scale farmers, and different agroecological regions, influencing their comparative and competitive advantage for economic activities and access to social services. Financial policies which influence the interest rate not only affect farmers' access to capital for production, but may nationally shift private and public incentives for long-term natural resource investments.

Tax policy in relation to agriculture and natural resources (whether designed purely to raise public funds or to achieve environmental or welfare objectives) provide differential incentives and disincentives for natural resource management and directly affects the level and distribution of rural incomes (e.g., Lopez 1991).

Agricultural price and input policies (through minimum or maximum prices, centralized collection and distribution, or other instruments) will influence farmers' choice of livelihood strategies and farm enterprise mix, and their incentives and capacity to improve agricultural resources. Pagiola (1996), Lopez (1998) and others have found that there is no simple relationship between price distortions created by government policies and farmers' incentives to adopt conservation practices; impacts depend upon site-specific conditions.

Trade and foreign exchange rate policies influence the composition of production and use of production technologies. The variety of location-specific conditions which result from micro-scale factors discussed above, however, means that there is rarely an unambiguous theoretical or empirical relationship between trade policies and environmental outcomes. Siamwalla (1997) concludes that resource problems are attacked more effectively through direct resource policies, rather than through trade.

National environmental policies commonly reflect urban and international priorities (e.g., protection of urban water sources or commercial timber supplies; global warming or protection of unique habitats), rather than local priorities of the rural poor (protection of local water supplies, agricultural land quality, natural flora and fauna collected for food or raw materials). Since resulting environmental policies often define resource use and management by the rural poor as the "problem", policy "solutions" (e.g., restrictions on farming steep slopes, harvesting trees or vegetation, eviction from critical watersheds or wildlife reserves) often exacerbate livelihood insecurity, deprive poor farmers of traditional rights of access, and reduce incentives for and capacity to undertake resource conservation (Forsyth and Leach 1998; other refs). Environmental policies which focus on helping local people solve local resource problems, can sometimes achieve more sustainable solutions and thereby indirectly alleviate some national- and international-scale problems (Veit, Mascarenhas, Ampadu-Agyei 1995; Kramer 1998).

Conclusions

Perhaps the most significant finding of recent research and experience on poverty-agriculture-environment interactions is their multi-dimensionality. Intervention strategies that focus on only one of the above factors will not often succeed. Indeed, integrated (rather than independent) analysis of these factors is needed to identify those sets of conditions which call for different combinations and sequences of interventions to address poverty and resource degradation problems. One such integrated analysis of community-scale resource management in the hillsides of Honduras 1970s-1990s found clear distinctions among six "development pathways" in the causes and directions of resource quality change and household and community responses, depending upon natural resource endowments, population density, access to markets and technologies, and local institutional development (Pender, Scherr and Durón 1998). This study demonstrated that, despite considerable site variability, it is feasible to develop

a fairly simple typology of situations which call for distinct interventions to support sustainable development.

5. DESIGNING AGRICULTURAL POLICIES AND PROGRAMS TO JOINTLY ADDRESS POVERTY AND ENVIRONMENT OBJECTIVES

Two general policy objectives address poverty and environment in relation to agriculture: to improve the well-being of the poor by improving the quality, quantity, productivity and value of the natural resource essential to their livelihoods; and to improve the environmental externalities associated with resource use and management by the poor. The evidence above suggests six strategies and associated policy instruments which could, in appropriate situations, address both objectives together. Each of these strategies involves some or all of the elements in the UNDP/EC "BRIDGE" policy matrix (Table 4).

1. Co-Invest in On-Farm Natural Resource Assets of the Poor

There are many opportunities for governments, NGO's and the private sector to co-invest in the rehabilitation or improvement of productive on-farm natural resources which are assets of the poor. Targeted access to financial credit, technical assistance, and organizational support can help to relieve constraints related to farmer awareness, technology, farmer capacity to invest, local institutional capacity, and general marginalization.

Co-investment with local communities or farmer organizations may be used to mobilize longer-term investments, such as soil conservation or improvement, irrigation and drainage infrastructure, grazing land rehabilitation, land-leveling, or micro-watershed re-vegetation, through group or micro-credit, labor mobilization or provision of key inputs which are provided inefficiently by markets. Such resource-improving investment should be considered, like feeder roads, as long-term development investments.

The allocation of more public resources for co-investment initiatives may serve to offset the continued urban bias in public investment. Some resources may be diverted from existing subsidies which currently benefit mainly wealthier farmers and commercial agricultural interests. Resources may also be mobilized from NGO's and international aid programs, through micro- and group credit, through private commercial sector investment to raise productivity in out-grower schemes, and by farmer self-financing through private and group savings mechanisms.

There is growing experience with this type of co-investment scheme, such as IFAD's numerous projects throughout Africa (IFAD 1994), watershed rehabilitation projects by all the international development banks and aid agencies (e.g., Fortin and Engelberg 1997 and White and Runge 1994), and large-scale national wasteland rehabilitation programs of China and India (Kerr, et al. 1998); and public and NGO development projects (e.g., Chambers, Saxena and Shah 1989). The World Bank Soil Fertility Initiative is proposing to invest in long-term components of soil fertility, such as organic matter and phosphorus application (World Bank 1997).

Special attention is needed in such projects to ensure participation by the poor, whose landholdings are limited in size and often scattered; transaction costs for local organization may be high relative to the area covered. Major advances have been made recently through well-organized local leadership and participation in project priority-setting, design and management (Kerr, et al. 1998; Agarwal and Narain1999). For this type of investment, the technical design must ensure clear short- to medium-term economic benefits for local people; thus financial subsidies beyond project management costs are neither necessary nor desirable in most such projects. Subsidies may be used in the earliest phase of the project to generate interest and wide participation in unfamiliar technologies (e.g., Scherr and Current 1999). Co-investment in improvement of productive resources of the poor appears most promising in

situations where there is secure tenure and favorable market conditions, and is most urgent in densely populated marginal lands and to improve efficiency, access and drainage in irrigated lands.

2. Employ the Poor in Projects to Improve the Agricultural Resource Base

Many landscape-scale environmental improvements are public goods whose benefits accrue only partially to poor local people or which involve public or shared landscape niches. Many of these activities are labor-intensive, and offer an opportunity for public and private-sector organizations to provide paid employment to the poor. Examples of such programs include the United States Civilian Conservation Corps during the Depression, which hired the unemployed as labor to build infrastructure in national parks and "Food for Work" projects using food aid (in kind or monetized) to fund soil conservation projects by the poor on public lands in developing countries (von Braun et al. 1992). Longer-term livelihood opportunities for the poor may be integrated into plans for environmental management, such as hiring the poor or landless as guards in community and national parks and forests; hiring the poor to establish and protect wildlife corridors in agricultural regions; or for local water quality monitoring. Projects may develop resources on public lands, with the explicit aim of providing access to water, fuel, fodder or food for the very poor. Such projects can also serve to enhance local awareness and valuation of environmental resources.

Employment of the poor for landscape-scale resource improvements may be financed through mechanisms similar to those for farm assets. Other important sources of financing may be municipal governments, which may be concerned to protect water resources, or through temporarily public works programs intended for relief or employment generation, which are already being funded, but for other activities. Costs may be reduced by transferring responsibility for activities to local governments or farmers' associations, who could plan and prioritize landscape interventions, together with workers being employed.

Success in implementation has been mixed. Direct employment projects appear most likely to be successful where there are well-established organizations to supervise, reliable funding arrangements, and where the people hired--and who will be using the resources over the long term--are involved in the process of landscape design and selection of interventions. They are most urgently needed in densely-populated areas of marginal and peri-urban lands.

3. Develop and Promote Agricultural Technologies with Environmental Benefits

Agricultural research and technology development can play a crucial role in relieving constraints related to a lack of technologies suitable for adoption by poor farmers. Such technologies and resource management systems must raise overall productivity, both increasing household income (to reduce poverty) and protecting or improving the natural resource (Saín and Barreto 1996; Vosti and Reardon 1997).

Innovations in soil nutrient management, livestock feeding strategies, and other farm resource flows are needed not only at the plot level, but at the landscape level. On larger farms, intensive and high-productivity systems in the least fragile farm and landscape niches may permit farmers to reduce cultivation in more fragile niches. On minifundia, intensive systems are needed even on fragile lands; sustainability requires investments to reduce vulnerability to degradation (e.g., building up organic matter, land leveling, conservation investments). Poor farmers require technologies that maximize returns to their scarcest resource. This is typically cash, meaning that total use of purchased must be limited. Where off-farm employment is a significant component of livelihood and household labor is the scarcest input, labor-enhancing technology is needed (Neidecker-Gonzales and Scherr 1997).

Research is needed to raise the productive potential of farm components through genetic crop, feed and livestock improvement; to lower per unit output costs of variable inputs (nutrients, labor for field preparation and management); and to lower costs of conservation investments. Priorities for international research are development of technologies for natural resource management in marginal, rainfed lands in the tropics, and for smallholder farmers in irrigated lands in Asia, using more participatory approaches (Scherr 1999).

Technologies need to be tailored for use on specific soil types and climates, requiring a heavy investment in on-farm adaptive research. New institutional strategies are needed to reduce the cost of this research, by linking with extension efforts and farmer organizations, and to reach the poor effectively (Franzel and Scherr forthcoming).

4. Promote Low-risk Perennial Production in Poor and Marginal Areas

One sub-set of new products and technologies is especially promising for the rehabilitation and sustainable productive use of fragile lands by low income farmers: perennial tree and shrub crops which provide year-round vegetative cover and do not need regular cultivation. These may produce a variety of income-earning products and/or products which substitute for less sustainable subsistence exploitation of natural vegetation, and have flexible harvest demands. Examples include biomass energy plantations, palms or bamboos for multiple purposes, shelterbelts or streamside plantings producing poles or timber products, fruit trees (relatively non-perishable if produced far from markets), and managed farm or community woodlots (Leakey et al 1996). Trees in agroforestry systems may also reduce environmental risks of annual cropping in such areas, as windbreaks, live fences, sources of organic matter, and erosion control (Arnold and Dewees 1995).

Establishment and economic operation of plantings on smallholdings requires some technical assistance, possibly targeted initial subsidies, and development of marketing channels. Subsistence food production must remain part of the system (possibly through agroforestry systems), to ensure household food security (Current, Lutz and Scherr 1995). Tree plot strategies seem most likely to succeed where there are active, high-volume markets for tree products, fairly good market access, and farm size of at least a few hectares. Agroforestry intercropping at low tree densities may be more suitable for very smallholders.

5. Compensate the Poor for Conserving or Managing Resources

In contrast to the four policy options above, this option addresses explicitly those situations under which poor farmers and agricultural workers have few economic incentives to manage their natural resources more intensively, but other groups have an abiding economic or environmental stake in maintaining or improving the resource. In such conditions, it may be possible for governments or other institutions to negotiate mechanisms for farmers to be compensated for the costs incurred in changing their management or use of resources (in contrast to punitive restrictions or large-scale re-location). These approaches explicitly internalize the externality costs of environmental degradation for resource users, and can thus achieve both poverty and environmental goals by changing local valuation of resources, local capacity to make necessary investments, and economic incentives, while confirming long-term tenure or access rights for the local people involved.

Examples include systems of tradeable rights to clear land on protected upper watersheds (Aylward, et al. 1997) and systems to pay local farmers to control agricultural burning to achieve national or international carbon emission or air quality targets (Lopez 1996). In many cases, the public sector may serve to facilitate, rather than finance, such operations. Municipal water companies may be be able to reduce costs by paying farmers to use water-conserving practices; owners of large private forests might

be willing to pay farmers to control agricultural burning practices.

Numerous institutional problems challenge these strategies, including fair negotiation of terms of trade, mechanisms for payment transfers, establishment of credible but low-cost monitoring systems, and fair distribution of payment (e.g., Smith 1998). However, the potential to achieve very large transfers of urgently needed resources to poor regions and poor groups, on the basis of recognized provision of valued goods and services, makes this strategy well worth further experimentation.

6. Facilitate Access of the Poor to Agriculture-Related Natural Resources

Access by the landless and rural poor to basic subsistence resources--farmed and gathered food, fodder, water, fuel, building materials, medicines, raw materials for tools and housewares-- can be addressed over the long-term and under favorable conditions of economic growth by improving wages or other income so these can be purchased from the most sustainable sources. Until this is achieved, however, consumption poverty for this group can be addressed only by facilitating their access to and more sustainable use of resources owned or controlled by or shared with others.

A comprehensive policy to secure broad resource access for the poor and landless would address five elements. The first is to reform provisions of rental, lease or harvest (gleaning) agreements for both private and public lands, in both urban and rural areas, to facilitate access and encourage resource conservation and management. This may require, for example, longer-term rental contracts, explicit agreements about the distribution of benefits from resource improvements, or the granting of formal tenure rights to individuals or groups currently squatting on hillside and other public lands, so that they can legitimately seek technical assistance, credit and other services and have incentives for conservation-oriented management. A second element is to reform systems of water rights to ensure more secure access by the poor and landless for both productive and consumptive uses, yet also value environmental uses of water.A third element is to involve different groups of poor people in longer-term land use planning efforts to ensure that their existing use patterns and future needs can be met without increasing poverty or resource degradation. A fourth element is development of insurance systems for poor farmers--cash payments, in-kind provisions, or public works employment--so that during periods of drought or major crop failure, they can provide for subsistence needs without over-exploitation of natural resources. A fifth element is to establish formal arrangements for access to critical environmental resources for the increasing numbers of temporary migrants (e.g., from drought or disasters) and refugees, to limit local over-exploitation and conflict.

Meinzen-Dick, et al.(1997) emphasize the need to explore alternatives to freehold tenure that allow more flexible, multiuser tenure arrangements, as a way to protect access rights for women and other marginal groups. Juma and Jowang (1996) propose constitutional innovations in Africa that would accommodate such multiuser systems. Any program to assign rights to resources should be checked for overt or implicit barriers to women [and the poor] obtaining rights, in both design and implementation (Otsuka and Quisumbing 1998). Chambers, Saxena, Shah (1989) propose many concrete sectoral policy measures to extend access by the poor, on a large scale, to lift irrigation and trees, in particular their access to electricity, and their the rights to harvest, transport and sell trees from private land. Modifications in local property rights were key elements in African "success stories" for land reclamation, forest management, local fisheries management, small-scale irrigation, resource protection, range management, and wetland cultivation (Veit, Mascarenhas,Ampadu-Agyei).

All of these strategies pose major institutional and political challenges, and are especially difficult to organize and manage in degraded environments and in regions with large poor populations. However, they should be considered essential features of any national "social safety net" for the poor, and for environmental protection in agricultural regions. Forsyth, Leach and Scoones (1998) recommend a

policy focus on "environmental entitlements", which includes the broad set of social structures and networks which allow poor people access to resources for sustainable livelihoods.

6. REMAINING ISSUES AND QUESTIONS

Our understanding of poverty-agriculture-environment interactions, and their importance to sustainable economic development, has advanced considerably in recent years. However, our capacity to respond effectively is still limited, in part by existing rural institutional weaknesses and remaining knowledge gaps, and in part by the limited power of agricultural interventions to address poverty and environmental issues which reflect much broader socioeconomic and policy realities.

Knowledge Gaps

Many poverty-agriculture-environment interactions remain poorly understood, or insufficiently documented to inform practical policy-making. International efforts are needed to collect inter-temporal datasets integrating poverty, environment and agriculture factors, at community and landscape scales, which would allow us to confirm and quantify key relationships under a range of agroecological and demograpic conditions. New policy interventions should be designed as pilots and tested under a variety of socioeconomic and policy environments. Monitoring can be done using indicators defined by local, as well as the scientific community, to determine their actual outcomes for the poor, agricultural production and the environment.

Weak Rural Institutions

Even where knowledge is sufficient to suggest which policies to pursue and how, the existing weaknesses of rural institutions are likely to limit the potential scale and success of implementation (Rees 1988). Most planning institutions remain sectorally-organized to address poverty, natural resource management and agricultural production separately, rather than to facilitate inter-sectoral solutions, and they are rarely organized to encourage input by poor groups into decision-making processes or negotiations. While decentralization of natural resource management is a sensible long-term strategy, few local governments in developing countries are yet staffed and trained to take on new responsibilities related to resource improvement. Projects financed externally are often inflexible in their design, rather than organized to exploit a variety of local conditions. Most public rural farm support institutions, such as agricultural extension, research, and credit systems, are not organized to serve the poor effectively, while the private sector institutions which increasingly replace them do not even consider the poor to be their clients. New planning and service strategies to include the poor are being developed and need wider dissemination.

Limits of Agricultural Intervention

The strategies discussed in section 5 have the potential to achieve major gains in poverty reduction and environmental quality. However, agriculture-related interventions alone will be insufficient to resolve poverty-environment linked problems. Generation of non-farm employment will necessarily be a major mechanism to reduce pressure on natural resources in fragile areas (Reardon, et al. 1992), as will out-migration, though it is unlikely that net out-migration will occur from many regions in the next few decades. Policy options to address poverty-environment problems related to agriculture must consider a range of livelihood options for the poor and potentials for diversification. Many poverty-environment linkages need to be addressed by better energy, infrastructure, water and forest policies.

Programs oriented to the needs of the poor may pose real trade-offs with policy efforts aimed at the non-poor. Because of their typically far greater control over land resources, large-scale farmers may present

a more attractive organizational and political challenge to policymakers concerned about halting environmental degradation or increasing agricultural production, even where private sector institutions may be better-placed to promote change among such groups.

Roles and Responsibilities of International Institutions

Policy decisions taken outside the developing countries may be far more influential in determining environment and poverty outcomes than are within-country policies related to price or technical assistance. Their impact is felt especially in establishing real long interest rates for long-term loans; world commodity price trends and fluctuations; and the pattern, emphasis and end-products of global applied agricultural research (Lipton 1997).

The priorities and resource allocation in international environmental rarely focus on the environmental issues of critical interest to the rural poor in developing countries. The Global Environmental Facility, for example, has only recently begun to consider issues of soil degradation. Meanwhile, some international programs have contributed to the marginalization and dispossession of the rural poor in order to achieve environmental goals, either inadvertently or sometimes intentionally, on the basis of simplistic views about poverty and environment. A greater awareness and commitment on the part of international actors to the dilemmas and potentials in combatting rural poverty in relation to environment could support greater progress in both arenas.

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Table 1. Geographic distribution of the poor (in millions)*

REGION (# countries)	TOTAL POPULATION	TOTAL RURAL POPULATION	RURAL POP'N ON FAVOURED LANDS	RURAL POP'N ON MARGINAL LANDS	RURAL POOR O MARGIN LANDS
Sub-Saharan Africa (40)	530	375	101	274	176

Asia (20)	2840	2044	755	1289	375
Central and South America (26)	430	117	40	77	48
West Asia and North Africa (19)	345	156	37	119	35
TOTAL (105 countries)	4145	2693	933	1759	633

* Based on Nelson, et al. 1997, Table 2.4.

Table 2. Pathways of agricultural change and environmental impacts

Land type	% arable land	% pop.	Changes in recent decades	Common problems of on-site soil degradation
Irrigated lands	7.5		60% increase in irrigated area, 1961-90; increased multi- cropping; HYVs, high agro-chemical use	* Salinization and waterlogging * Nutrient constraints under multiple cropping * Biological degradation (chemicals)
High quality rainfed lands	23	35 of rur. pop.	Transition from short fallow to continuous cropping,HYVs mechanization, high agro-chemical use	* Nutrient depletion * Physical degradation from over-cultivation, machinery * Acidification * Removal of natural vegetation, perennials * Biological degr.(chemicals)
Densely				* Soil erosion

populated marginal lands			Transition from long to short fallows/continuous cropping; use new landscape niches, low input use	* Soil fertility depletion * Removal of natural vegetation, perennials from landscape * Soil compaction, physical degradation from over-cultivation * Acidification
Lightly populated marginal lands	69	65 of rural pop.	Immigration and land-clearing for low input agriculture	* Soil erosion from land-clearing * Soil erosion from ag'l. pdn. * Soil nutrient depletion * Weed infestation * Biological degrad. (topsoil loss)
Urban and peri-urban land	No data	33-80 of urb. HH's	Rapid urbanization; expansion and diversification of urban food markets; urban poverty, unemployment	* Soil erosion from poor agricultural practices * Soil contamination from urban pollutants * Over-grazing and compaction

Scherr 1999

Table 3. Macroeconomic and sectoral policies: Potential effects on poverty-agriculture-environment linkages

IMPACT ON:

POLICY	Farmer aware-ness	Economic incentives	Capacity to mobilize resources	Avail-able tech-nology	Secure tenure/access	Local instit. capa-city	Political inclusion of the poor
MACRO							

Interest rates		X	X				
Foreign exch. rate, capital controls		X					
Trade policies		X	X	X			
SECTORAL							
Environ. education	X						
Land taxation		X	X		X		
Public lands management		X	X		X	X	X
Agricultural research		X	X	X			X
Rural infrastructure investment	X	X	X			X	X
Community development	X	X	X			X	X
Economic diversification			X				

		X				X	
Agricultural prices		X	X				
Input subsidies	X	X	X	X			
Technical assistance	X		X	X		X	
Agricultural credit		X	X				
Land use planning	X	X	X		X	X	X
Agric. land markets		X	X		X		
Water markets		X	X			X	
Water rights			X		X	X	X
Wage or employ-ment policies		X	X				
Voting rights	X				X	X	X
Social safety nets						X	X

			X		X		
Subsidized land improvement	X	X	X	X		X	
Farmer cooperatives	X	X	X			X	X
Rural enterprise development		X	X			X	

Table 4. Recommendations for Policy Action on Agriculture-Poverty-Environment: Integration with the "BRIDGE" Policy Matrix.

Recommen-dations	Build Trust with the Poor	Access Natural and Financial Resources	Improve Physical Infrastructure	Decentralize Institutions	Promote (Governan
1) Co-Invest in Farm Assets of the Poor	✓	✓	✓	✓	✓
2) Employ the Poor to Improve Resources	✓	✓	✓	(✓)	(✓)
3) Develop and Promote Agricultural Technology		✓		(✓)	(✓)
4) Promote Low-Risk Perennials		✓			(✓)

5) Compensate the Poor to Manage Resources	✓	✓		(✓)	✓
6) Improve Access of the Poor to Natural Resources	✓	(✓)	(✓)	(✓)	✓

A NEW AGENDA FOR FOREST CONSERVATION AND POVERTY REDUCTION

MAKING MARKETS WORK FOR LOW-INCOME PRODUCERS

Sara J. Scherr | Andy White | David Kaimowitz

FOREST TRENDS

CIFOR
CENTER FOR INTERNATIONAL FORESTRY RESEARCH

FOREST TRENDS

Forest Trends is a non-profit organization that advances sustainable forestry and forestry's contribution to community livelihoods worldwide, focusing particularly on market mechanisms. It analyses strategic market and policy issues, catalyses connections between forward looking producers, communities and investors, and develops new financial tools to help markets work for conservation and people. Forest Trends works to advance markets for ecosystem services provided by forests such as watershed protection, biodiversity and carbon storage - and expand the focus of forestry beyond timber. It was created in 1999 by an international group of leaders from forest industry, environmental NGOs and investment institutions. Forest Trends has three program areas: Accelerating Markets for Ecosystem Services; Markets and Finance for Sustainable Forestry; and Making Markets Work for Forest Communities.

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The Center for International Forestry Research (CIFOR) is an international organization established in response to global concerns about the social, environmental and economic consequences of forest loss and degradation. By forming strategic and applied research partnerships throughout the developing and industrialized worlds, CIFOR promotes the use of new technologies and new social organization models to enhance the well-being of people in developing countries who rely on tropical forests. CIFOR also strives to ensure that forest-dependent populations will continue to access forest resources in the future. CIFOR is one of 16 food and environmental research organizations known as the Future Harvest Centers. The centers, located around the world, conduct research in partnership with farmers, scientists and policymakers to help alleviate poverty and increase food security while protecting the natural resource base. The Future Harvest Centers are principally funded through the 58 countries, private foundations and regional and international organizations that are members of the Consultative Group on International Agricultural Research.

A NEW AGENDA FOR FOREST CONSERVATION AND POVERTY REDUCTION:

MAKING FOREST 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 their 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 25 percent of the forests in developing countries are now owned or actively managed 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, and 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 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.

Michael Jenkins,
President,
Forest Trends

David Kaimowitz,
Director-General,
Center for International Forestry Research

[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."

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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
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 International Aid Organization
ICRAF	International Center for Research in Agroforestry
IFRI	International Forestry Resources and Institutions
IFF	Inter-governmental Forum on Forestry
IPF	Inter-governmental 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
Mln	Million
NGO	Non-governmental Organization
NTFP	Non-timber Forest Product
OSB	Oriented Strand Board
PAI	Population Action International
PICOP	Paper Industries Corporation of the Philippines
PROCYMAF	Forest Conservation and Sustainable Management Project (Mexico)
R&D	Research and Development
SEAF	Small Enterprise Assistance Funds (Bolivia)
SFM	Sustainable Forest Management
UK	United Kingdom
USA	United States
USAID	United States Agency for International Development
WRI	World Resources Institute
WWF	World-wide Fund for Nature (or World Wildlife Fund in the United States)

PART I. WHY FOCUS ON FOREST MARKETS? THE CONTEXT

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 whole approach was based on governments claiming ownership of forests, extensively depriving poor communities or 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 usually 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 1980's 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 1980's and 1990's 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 1980's, 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,

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. Of these 25, 19 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.

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. September 19, 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 (UN 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 to go to local people rather than central governments or private 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. More than 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 market 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 is 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 have outside logging companies and concessionaires 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 (e.g., 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 provide the necessary business services to enable them to participate profitably in forest markets.

There is renewed interest in the international community in the potentials of forestry to address poverty, as indicated by the World Bank's (2002) and Asian Development Bank's (ADB 2002) new forestry strategies, FAO's community forestry initiatives (Warner 2000), poverty and natural resource management programs of bilateral aid agencies like as the U.K., the Netherlands, and the U.S. (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) to address poverty issues. Greater efforts are needed to make the private industrial sector, as well as national leaders in the developing world concerned with rural development and poverty reduction, 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, many are 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).

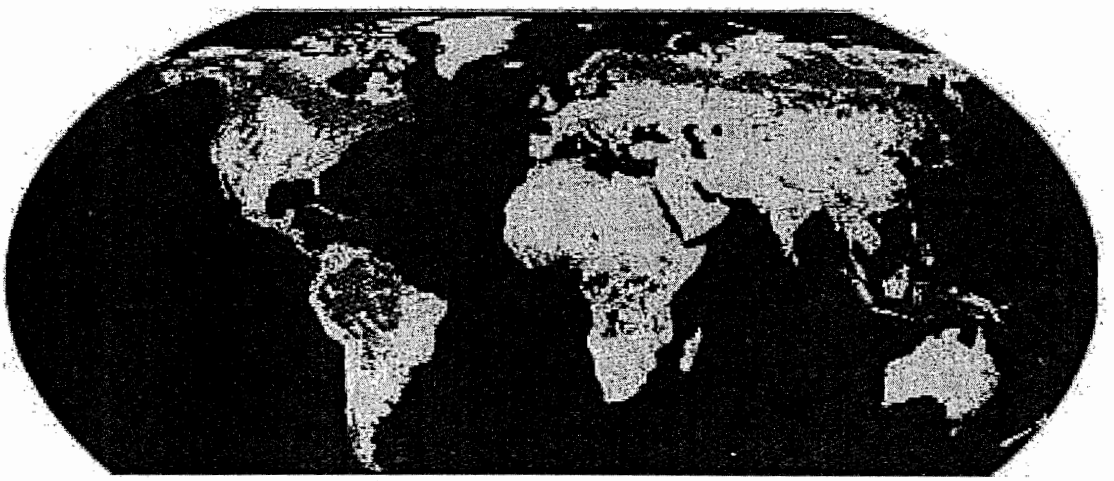
- Low-income producers have competitive advantages in certain forest markets and can pursue management strategies that reduce both livelihood and conservation risks (Chapter 4).
- A preliminary market assessment suggests significant income potentials for large numbers of low-income producers in selected 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 encourage the development of community forest enterprises and business service providers who meet their needs (Chapter 6).
- Policy reforms are essential to expand 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).

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, and in many locations, densities are over 50 people per square kilometer (Map 1). About two thirds of rural people in developing countries live in so-called "marginal agricultural lands" (such as 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 are malnourished in the warm humid and sub-humid tropics and sub-tropics where most closed canopy tropical forests are found, and more than half of children are malnourished 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 among the 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. 2000). 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).



people per square kilometer

No forest <2 2-10 10-50 50+

Map 1. Human population density in the world's forests
Source: World Bank 2002.

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).

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 very roughly estimated.[3]

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 (and their health impacts), 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 critically low levels of forest cover[5];

Box 1. Rough Estimates of Forest-Dependent Poor

	Est. 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).

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 NTFP's 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. This is so even though the rich were the main users of NTFPs in quantity terms. Yet this heavy reliance of the poor on NTFP's is a function of the poverty and economic constraints of rural households. It is the economic characteristics of NTFP's that makes them attractive to poor households. They are usually derived from commons areas and collected and consumed rather than purchased with cash; they are low value goods; are collected using unskilled labor, help offset production risks, and can fit easily into the diversified activity portfolio of the poor.

Source: Cavendish (1999).

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 developed alternative strategies to obtain fuel, construction materials, etc., that depended less on forests (Engelman, et al. 2000).

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). But 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.

NTFP's. Rural people may earn cash income from forest resources in a variety of ways. The most widespread is through 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 1990's. Only a minority reported that it was a major source, but more than 70 percent stated that it was important in helping them meet particular needs or 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 1990's found that forest assets helped to cushion poor communities by providing supplemental income through sale 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 1990's reported that three times as many women as men were involved in gathering NTFPs, that processing was exclusive to women, that twice as many women as men were involved in marketing NTFPs, and that NTFP's accounted for 20 percent of household income (Ford Foundation 1998).

In situations where population is growing faster than per capita incomes, forest activities emerge largely to absorb people unable to obtain income, or sufficient income, from agriculture or wage employment. 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 many 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, by planting "live fences" farmers generated supplies of

[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).

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 as 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 rapidly in number once the rules for the first commitment period (2008-2012) of the Clean Development Mechanism of the Kyoto Protocols 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 changing 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 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 so 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 1990's, 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 $1.3 million invested, while in Nuevo San Juan (a community forest enterprise in Mexico), an additional job is created for only $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

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, timber; 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).

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, pers. comm. October 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 1997). 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

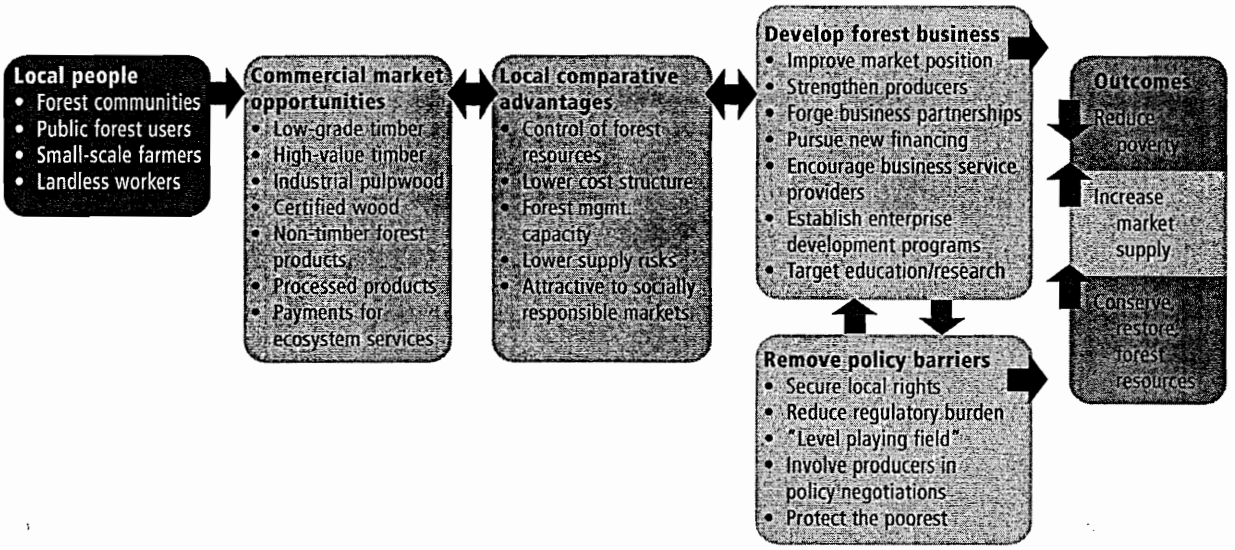
Figure 1. Potential Benefits of Forest Markets for Low-Income Producers, by Group

Benefits of forest markets	Small-scale Farmers	Community forest owners	Public forest users	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

[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).

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 2. Forest Market Development Strategy for Low-Income Producers



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. This percentage 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).

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, or less-intensively-managed smallholder plantations or home gardens where substantial spontaneous regeneration is tolerated, maintained or even encouraged;

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

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%)

[1] 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.

- 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, though not 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 (Chokkalingan, 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.

Agroforestry[11] 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 is often 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-value commercial tree products together with subsistence products. These "forest gardens" or "agriforests" 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, et al. 2000).

[10] This has historical precedent. Early land expansion and industrialization led to massive deforestation in Europe, Japan, Puerto Rico and South Korea; the later phase of industrialization led to a trebling of forest cover (Perlin 1989). The development of high-input, technical advanced production on the best farmlands drove down land prices in some parts of Europe (Mather 2000) and the southern U.S. (Rudel 2000). 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.

Table 2. 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 m3/yr timber	Beer, Ibrahim, and Schlonvoigt (2000)
	Silvopastoral systems	9.2 million	18.4 million m3/yr	Beer, Ibrahim, and Schlonvoigt (2000)
	Shaded coffee	857,000	Average 4 m3/ha/yr from shade trees, yielding 3.5 million m3/ha/yr supply	Beer, Ibrahim, and Schlonvoigt (2000)
S. Asia				
Bangladesh	All homestead forest resources		360,000 m3/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 m3/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 m3 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)
SE Asia				
Indonesia	Tree crop-coffee, tea, cacao	3.18 million	Harvest from over-mature trees, nurse trees – 1.76 million m3/yr	Vergara (1997)
	Various agroforestry		1.7 million m3/yr wood harvest, mainly fuelwood, poles	Vergara (1997)
Laos	Various agroforestry	562,000	Potential for 3.37 million m3/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 cocoa-producing regions	Mostly local wood demand	Leakey (1999)

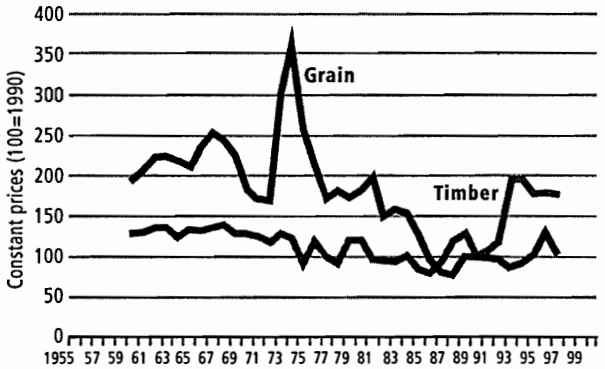


Figure 3. Relative prices of grain and timber, 1960-1997.
Source: FAOSTAT (1998).

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). 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, a majority of agricultural lands has over 10 percent tree cover, and over a quarter of such lands has 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 intercrops and shelterbelts may have raised agricultural productivity by 10 percent (Yin and Hyde 2000).

INCREASING DEMAND FOR FOREST PRODUCTS

Global wood demand grew by over 50 percent from the 1960s to the mid-1990s, though consumption per capita was roughly stable (Gardner-Outlaw and Engelman 1999).

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 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 1990's, 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 by increasing 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).

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 (Ryhotonen 200x). 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

[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 derived vegetation characteristics including woody vegetation, defined as mature vegetation whose approximate height is over five meters. These two data sources were overlain to obtain estimates of tree cover in agricultural extent.

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 hectares[13] 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 forests' role 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) and those 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 helping local farmers and forest communities to better manage their productive activities for ecosystem services, as well as to manage landscape mosaics mixing production and protective land uses, is 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, Bishop 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

[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 conflict, 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.

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, and 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 conducive to local input (Kaimowitz, et al. 2000). International norms have been developed that protect indigenous peoples' rights[15] to manage their own resources, particularly in the Convention for Biological Diversity, the International Labor Organization, and the Ramsar Convention (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 developing (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 or to supply domestic mills, especially for pulpwood, and planted areas are expanding quickly, and pushing product prices down. Such plantations often differ considerably in structure and species composition from natural forests, 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 with local producers for 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 artificially due to extensive subsidies for plantation establishment (White, Bull and Scherr forthcoming). 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 and as employees (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 contract concessions on about 300 million hectares (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 1970's 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, 20 percent of the total. Over 80 percent of international forest product trade is conducted by transnationals, which includes major logging companies

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).

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 or management. Local wood producers in some markets must compete with low-cost producers from around the world. While the real world price of saw logs 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), as plantation wood comes onto the market, prices of lower-grade wood, especially, are expected to decline or at best remain stable (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 seek 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 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 the 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, which could potentially 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).

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 their present level of activity. 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 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 COMMERCIAL FOREST PRODUCERS

Just because forests are important for local subsistence or for supplying small local markets does not necessarily mean that they are suitable for 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 NTFP's 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 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 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 to 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 than outside companies to sustainable forest management because of their longer planning horizons, eagerness to avoid boom and bust cycles, and 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 to advantage 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 where they do not compete directly with very low-cost producers; in market niches that prefer small-scale suppliers; where local people control valued species or environmental services; and where costs of market entry are low. Small-scale producers flourish most in regulatory environments with low cost of 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]

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).

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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.

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" location-specific
Production technologies locally known	Reduces adoption risks, maintenance costs	Training and extension programs can provide
Neutral or declining returns to scale for production	No economic advantage for large-scale producers	Especially where labor-intensive management
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
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, NGO's, 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

The disappointing experience of small-scale forest owners in argan oil markets in Morocco is instructive (Box 4). There, 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 1990's, 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 seemed hopeful that poorer local producers, who controlled most of the argan tree resources and were already experienced in argan oil production and marketing, should have benefited 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 relying 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 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, by harvesting 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).

[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.

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).

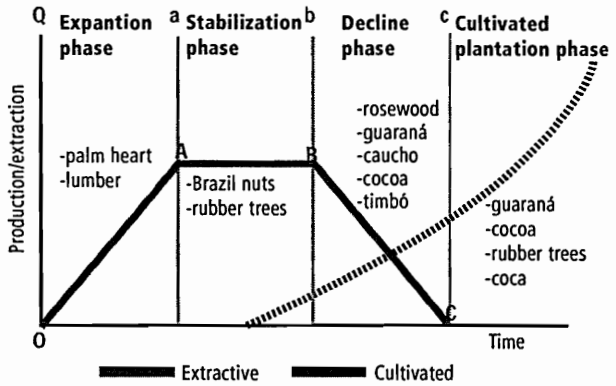

Figure 4. Historical cycle of forest production in the Amazon.

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.

Other studies suggest that sustainable forest management can indeed be economically more profitable if multiple income streams are produced from high-value timber, growth commodities (as a secondary product), NTFP's 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 an income flow 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 multipurpose 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 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 for export. A strategy to encourage wood supply only from fast-wood plantations, for 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 1 to 4, and 4 percent in categories 5 and 6 (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 growing in much of the low-income developing world. In such areas, environmental threats to forests must be addressed through legal and institutional frameworks that provide incentives to local people to manage natural forests in ways that enhance conservation (White, Scherr and Bull forthcoming). 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 be affected.

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, in 2020 40 to 50 percent of the volume of industrial round wood is still projected to come from management of natural forests, of which a third 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 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 (White, Scherr and Bull forthcoming). 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 harvest 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, of whom about two thirds 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 only for

[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 poaching (McLean 2001).

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 2001). 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, and 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, though they have lowered households' income, 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, Maseria 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 grow wild in their fields (Kumar and Saxena 2002). Farmers in Brazil regularly kill mahogany

[22] For example, in India plans are currently underway to relocate a million forest residents each in states of the 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).

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 (creating *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 $893/km2; in 32 countries finances allow only $100/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 organize themselves to be quite effective in managing biodiversity and other environmental values (Clay, Alcorn, Arnold and Butler 2000). Many examples have been documented of local willingness to protect specific forest resources, 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 (Wiley 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 1998). Indigenous forest managers commonly harvest much less than the legal allowable cut. In Oaxaca, Mexico, for example, communities commonly 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 indigenous 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 2001). 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 often 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).

[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.

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 that importance of cultural values 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 environmental 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, and 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 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 environmental services has been used to justify outsiders carving out huge areas of local people's forests to create parks

24 In Papua New Guinea, where indigenous ownership predominates, many tribes have agreed to highly exploitative timber harvesting systems (Filer 1998). The Dayak and Punan tribes of Kalimantan, Indonesia sold off large areas of their forest during the recent logging booms there (Brian Belcher 2001, pers.comm.) 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 overhead craft markets by a development NGO led to rapid depletion of raw materials used in baskets (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).

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 indigenous 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. As markets for environmental 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 also scope for low-impact types of commercial activity, even in protection 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 protection areas, extractive reserves, and ecotourism (Allegretti 1990; Bennett and Robinson 2000; Primack, et al. 1998; Snook 2000; Tattanbach, et al. 2000).

Regeneration and re-establishment of community forest resources. In forest-scarce areas, commercial incentives to increase forest cover can be highly compatible with 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 mono-crop 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 environmental 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).

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) and 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 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 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, pole, fuel by community to national or international traders or loggers	*	Ejidos in northern Mexico's Chihuahua and Durango
			Contracts or agreements for wood-using companies to harvest wood from community forests	**	Export of construction wood from Papua New Guinea
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	**	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	**	Eucalyptus farming in India (Dewees and Saxena 1995)
			Farm forestry or outgrower schemes that directly link producers with large-scale sawmills, commodity wholesalers or final users	***	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)	*	Community forests in Oaxaca, Mexico (PROCYMAF 2000)
			Communities actively market to international buyers	**	Ecoforestry operations in Papua New Guinea (Filer and Sekhram 1998, 297)
			Forest communities manage timber in partnership with private company	***	Iisaak Forest Resources, Ltd. (Baird and Coady 2000)
			Forest communities lease concessions to industry or government	**	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	**	Prima Woods project for teak production in Ghana (Mayers and Vermeulen 2002)
			Farmers grow timber at low densities in agroforestry systems and remnant forest to sell cooperatively	*(*)	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	**	Klabin pulp and paper company of Brazil assists outgrowers to obtain certification and to supply local furniture company demand (Mayers and Vermeulen 2002)

Table 4d. 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	***	Aracruz Cellulose "timber partner program" in Brazil (Desmond and Race 2000; Saigal, Arora and Rizvi. 2002)
			Farm forestry: farmers establish plantations with technical support from industry; sell output without purchase contracts	**	ITC Bhadrachalam Paperboards, Ltd., integrated pulp and paper mill in Andhra Pradesh State, India (Lal 2000; Saigal, et al. forthcoming)
			Land leasing by farmers to private companies for pulpwood production	**	Jant limited wood chipping operation in Madang, Papua New Guinea (Mayers and Vermeulen 2002)

Table 4e. 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 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 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 localprocessors or traders	*	Most NTFP producers
			Forest communities collect and sell NTFPs to processing and marketing collective or parastatal	*	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 hear of palm for local processing plant (Moles 2000)
	Community with biodiverse forests and capacity to negotiate deals with private firms	*	Bioprospecting agreement between forest community and private company	*	Bioprospecting agreements with communities in Latin America rainforests (Reid et al. 1993)
Public Forest Users	Producer groups can obtain exclusive or guaranteed access to raw materials; NTFPs have high value; mainly national demand	**	Groups collect/process and sell NTFPs to local processors or traders	*	Bamboo producers and artisan cooperatives in Andhra Pradesh, India (Kumar, et al. 2000)
			Groups collect NTFPs and sell to parastatal or collective	**	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 NTFP's to processing and marketing collective	**	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 environmental 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 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	**	Scolel-Te, 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, which 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 $13 to $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 in commodity-grade products for 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.

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

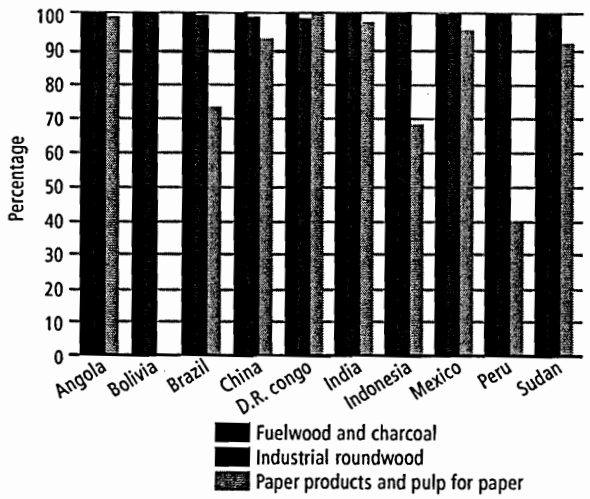

Figure 5 . National consumption as a percentage of national wood production in the 10 most forested developing countries.
Source: Area data from FAO (2001); production + export data from FAO (2003).
Note: "Most deforested" measured as the total area of forest lost from 1990 to 2000.

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 (Table 4a) near rapidly growing inland population centers. 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 through agroforestry, by-products from managing timber or tree crop stands, or

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 2001, pers. comm.).

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).

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 are often essential to negotiate reasonable prices from buyers, as are grading and sorting.[29]

Examples of successful commodity timber production are already widespread. Low-impact artesanal 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).

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).

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

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 $19 billion total present value of forest assets, the community share is worth more than $2 billion. In addition, local people now obtain 100 percent of the value of intermediate products and NTFPs, estimated to be worth $125 million per year. Reportedly, this amounts to about $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).

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 homegardens (Lutz, Current 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).

average harvest costs, though 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 that there may be significant potential for increasing productivity and marketability of products (Leslie 2002).

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 global decline of primary forest, together with an increasing share 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[30] (Table 4b). 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 (Nsenkyiere and Simula 2000). The leading international certification schemes are the Forest Stewardship Council (FSC) , the Pan-European Forest Council (PEFC). There are national schemes in Canada, Malaysia and the United States.

30 It seems likely that where high-value commercial timber is found in public forests, the bulk of revenues is likely to accrue to other actors.

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 homegardens. The highest value (previously over-exploited) timber species were maintained in house 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 almost 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 labelled (Atyi and Simula 2002).

Commercial forest producers are interested in these markets for a variety of reasons: to reflect their core business values and strategies; to take advantage of business opportunities (e.g., certification); 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 address social impacts, local rights and employment, and 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 is in North America; most 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 custody processes, dependence on external professional technicians, the need to identify special buyers,

[31] Many other forest communities have been brought into the decision-making process as stakeholders in the certification of public and private forests.

and the limited price premium for certified wood.[32] These 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; and 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 $1.8 to $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, though 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 of labor-intensive operations, such as upholstering, and production of low-value furniture and wood products, to low-wage countries 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, and high-value artesanal 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 sub-contract 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,

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, though, that the intangible benefits of certification could satisfy diverse community goals (Jansens and Harrington 1999).

33 The transition in Indonesia is an important case. During the 1980's Indonesia moved from exporting almost solely tropical timber to become 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.

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, industrial-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). They 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 (Flier 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 markets 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 chemically-treated wood products) 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 demand growth 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 US. International trade in tropical production of reconstituted panels, pulp and paper grew by more than 200 percent 1990-2002, from $1.5 to $5 billion. Most is based on wood produced in plantations, with only four countries—Indonesia, Brazil, Thailand and Malaysia—accounting for 94 percent of 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

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.

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 $7.5-9 billion per year, with another $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, hear 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 markets are arising for products

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).

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

Market characteristics

The most critical aspect of the market system 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, and the availability of labor and the alternatives to which available labor can be deployed (Arnold, et al. 1994). Most NTFP's 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 over-harvesting 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 NTFP's produced on farms, where there are few economies of scale in production[42], and for NTFPs that are difficult to domesticate[43] 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

40 For example, the mutsutake 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 (C. 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, et al. (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 papaya—are supplied by large-scale producers (Poulton and Poole 2001). Some NTFP's used as industrial raw materials (for example, the seed of the Jetropha 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.

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. NTFP's 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, 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 (2001) 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 agroforestry have demonstrated a wide range of productive land uses that are compatible with protecting environmental 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, Bishop and Porras 2002). Public agencies, private companies and conservation organizations are using direct financial payments to producers to protect watersheds and establish forest habitat (Johnson, White and Perrot-Maitre 2000; Tognetti 2001). 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). 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.

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 strengthen community position in bioprospecting deals (Villa et al. 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).

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, presence 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 sustainable forest management for other commercial uses.

Should international or even national agreements eventually be put in place for carbon 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, in press).

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 CAMPFIRE 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 markets 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.

[47] Much more basic market research is needed, such as that undertaken by in the humid zone of Cameroon (Ruiz Perez, et al. 2000b) 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).

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, though 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, medical 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.

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,

[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).

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

Michoacán state is one of the six forest-rich timber 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. CFE's 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 $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 artesanal 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).

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 (though 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. 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 to improve product quality.

Market opportunities by type of the 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 high-value 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 as outgrowers for high-value timber production, or by growing high-value trees in low densities in agroforestry systems. Farmers located in forest-scarce egions 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 transaction costs can be controlled for carbon sequestration, but 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 analysis. 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

50 Costa Rica's program of payments for forest environmental 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

and ecosystem services, and exploitation of wood and NTFP's 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 NTFP's.

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	*	o	*	o	o	o
High-value timber						
- domestic	**	*	**	*	*	o
- export	***	o	***	o	**	o
Industrial pulpwood						
- domestic	*	*	*	*	o	o
- export	o	o	o	o	o	o
Certified wood						
- domestic	*	*	*	*	o	o
- export	**	**	**	o	*	o
NTFPs						
- domestic	***	**	***	**	***	*
- export	**	**	***	**	*	o
Processed products						
- domestic	***	***	***	***	**	*
- export	**	**	**	**	*	*
Ecosystem services						
- domestic	**	***	*	*	*	**
- global	**	*	**	*	**	o

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

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

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 partnerships, 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 adapt certification to the 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**). 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**), development of quality standards, finding 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 business to enhance returns though 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.

Good market research[54] and cost, risk and feasibility analysis[55] are needed to identify a portfolio of products and strategies that make sense for a particular group of producers.[56] Low-

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 1997a).

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 1980's, 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 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 (Molnar 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).

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.

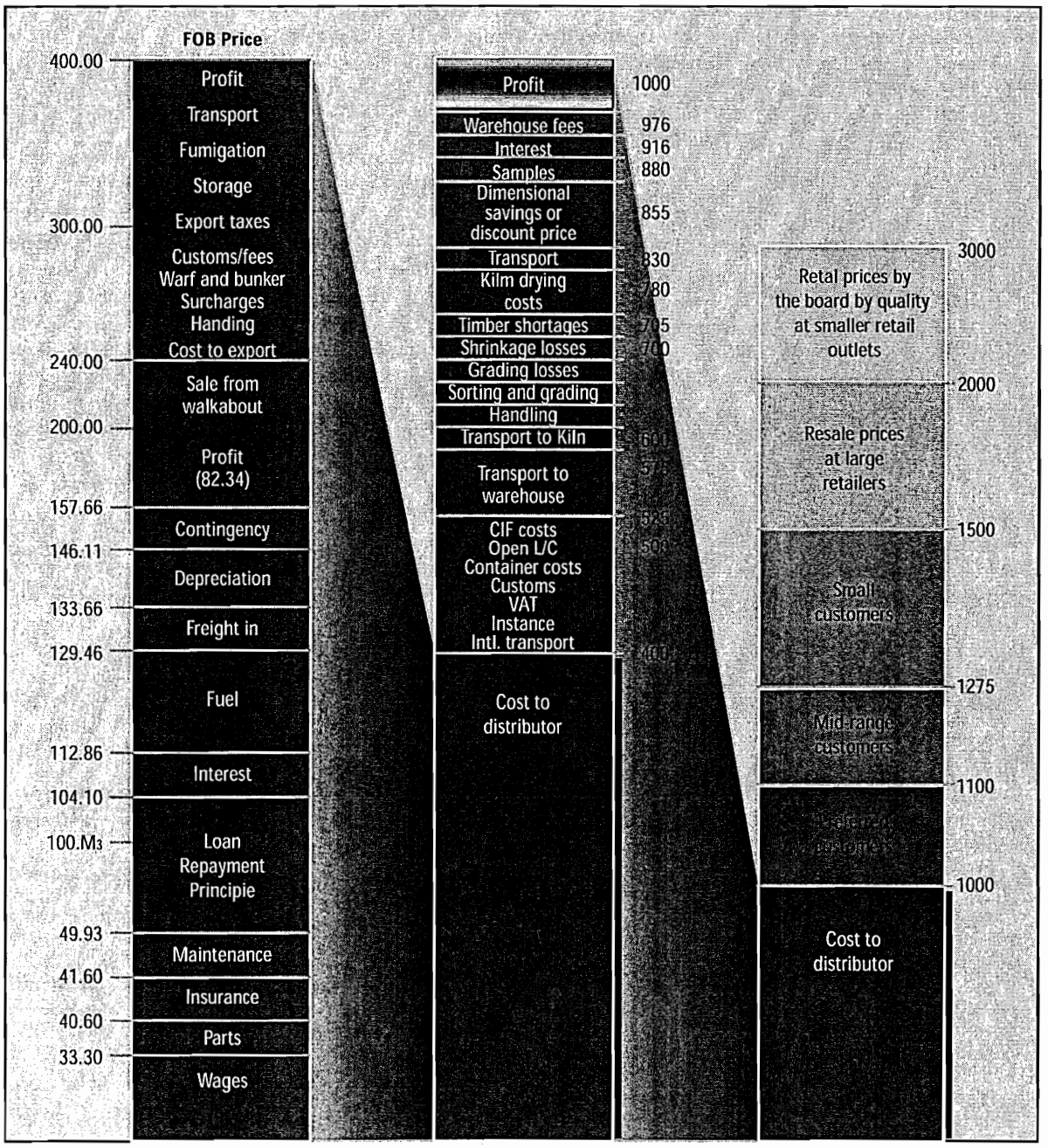

Figure 6. Market value chain for tropical timber from Papua New Guinea.
Source: Clay, Butler and Alcorn (2000).

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 km^2 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 1970's large-scale industrial logging had been banned in most forests, partly as a result of complaints from local communities. Local cooperatives developed in the 1970's and 1980's 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, of whom 11,500 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 $1.1 million in income. Of this, 75 percent 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 $50 in 1993 to $300 in 2001. Meanwhile, the price of sawn wood, sold to the capital city of Tegucigalpa, rose from $15 to $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).

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 perent 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.

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).

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-

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 with 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).

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 (Lutz, Current and Scherr 1995). The National Aboriginal Forestry Association of Canada (1997) promotes holistic multiple use forestry by grassroots member organizations.

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).

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, the 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" (Flier 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, problems 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 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 they 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

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, mainly in the United States, but also with some First Nations in Canada and with Maori groups in New Zealand, begun in 1986. 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, though 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 to investors and community members of responsible economic management.
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 at the pressures of the moment or to funding decisions made far away by governments serving diverse interests and handicapped by lack of local knowledge.

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

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

Is it 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 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 bank 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, mobilization of investment funding through grants or credit lines, assistance with forest planning and certification (Colchester, et al. 2003).[60] 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, p.c. 2003).

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 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 sell their timber to a local door manufacturer at a premium of 15 percent.

This additional wood production generates at least an additional $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 $1 million a year in tax revenue and communities' social expenditures, apart from salaries and wages, have increased at least $1 million a year.

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

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). The First Nations Development Institute manages a Sustainable Forestry Fund for Native American tribes (www.firstnations.org).

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, much less the potential demand from such enterprises if policies were to encourage local commercial production more actively. While the upfront costs of developing this local business capacity may be higher in the short-term than simply having forest industry work with suppliers who are already "ready", their long-term benefits could be far greater.

FORGE STRATEGIC BUSINESS PARTNERSHIPS

Strategic business partnerships 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 partnerships

Diverse models exist for business partnerships 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:

- partnerships in which growers are largely responsible for production, with company assurance/guarantee they will purchase the product;
- partnership 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 of 1 to 200 hectares, and the number of growers 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; volume-based timber quotas (Gray 2002). In Papua New Guinea, for example, local communities grant concessions to entrepreneurs, who establish portablesawmills within the concession and process logs for exports (Flier 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, attention 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).

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

Iisak 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 NGO's, 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 will develop and market conservation values such as carbon storage and biodiversity habitat.

Source: Baird and Coady (2000).

Making company-community partnerships work

The history of business-community partnerships 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.[61] 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 learned about the conditions under which such partnerships are successful (Table 8).

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, and 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, provide training programs, and undertake forest research to address key Aboriginal forest and partnership issues (NAFA/IOG 2000).

To establish effective partnerships 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 and means to manage forests cooperatively and equitably, and acceptability of the health of forest actors, cultures and the forest (Colfer and Byron 2001).[63] As partnerships 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,

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.

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

[61] Partnerships in Latin America have often been problematic, due either to unstable communities, persistent pressure by companies to reduce raw material prices over time, rent-seeking in production costs, or lack of technical services (Augusta Molnar, pers. comm. 2001).

[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 (Bertrand 2000).

[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).

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 partnerships, 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 community 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).

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,

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 furter to purchase wood dryers that could process 120,000 bf. In 2002 Mancomunados processed 25,000 m3 of wood from its own forests, and purchases 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.

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

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 environmental 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 for forest imports to developed countries 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).

[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).

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, Bishop and Porras 2002).

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 IMAFLORA 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, environmental services or ecoagriculture (Molnar, et al. 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; Markopoulos 1999; Meidinger, Elliot and Oesten 2002). 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 (Eba'a 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 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 (fair trade, ethical collection, standards, deregulation of market barriers, devolution of rights and responsibilities, and business support). Alternatives must address the multiple income

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 for A2R's Terra Capital. The venture capital fund was a partnership between Axial Renewable Resources of Brazil and Granthan, 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.

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 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 advisory services, market information, and market intermediaries.

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 NGO's, 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 (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 (www.info@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 intermediaries. 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

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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, NGO's 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 MBA's to review artesanal 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 partners.

69 For example, Iisaak 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, identify ecosystem sensitivity and desirable spots for logging (Coady 2000). Terra Capital (described in Box 14) has 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 (Shanley and Rodriguez G. 2000).

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 NTFP's, trade fairs can be organized to help local producers establish connections with potential buyers. Environmental groups have played an important role as intermediaries in environmental service markets (Landell-Mills, Bishop 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. These 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 for 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 services directly and thus 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.

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

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

The Scolel-Te ("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 intermediate 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 ($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.

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

[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).

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 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 sub-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

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 channelled much of their resources to the hardwood products industry. In 1979, MACED started to provide technical assistance to small operators of sawmills and wood-products 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 at $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 supply 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 $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).

[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 2000).

[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.

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:

- Analyse the viability, profitability and sustainability of different forest business models;
- Understand the structure, function 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;
- 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, though 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 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 training 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 the 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).

[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 Market Report July/August 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 PEOPLE[76]

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 and 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 have now been recognized to large areas of forest, 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).

75 Poffenberger and McGean (1996) 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 2001), and in some countries will only be controlled if forest ownership is devolved from governments.

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 environmental 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 (Agarwal and Ostrom 2001).

Return or transfer public forests to rural communities

Recognizing local ownership make sense, even in areas considered important for environmental protection. Governments, rather than utilize their own resources for forest protection and management, 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 group[82] 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 (White, Martin and Ellsworth 2002).

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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 $132 million in 1995 to $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 (Pinstrup-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.

Institutional development to support forest tenure reform. Laws governing local forest management need to strengthen and clarify local rights, with provisions that improve 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, to 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 citizen's 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 Vallee 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).

Addressing 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).

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 SFE's still have been allocated the most productive forest land, by 1999, of the 9 million hectares under natural forest cover, 1.43 million 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 cropping, fallow 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).

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 Plattau 1996; Meinzen-Dick and Knox (2002); Wollenberg and Edmunds (2001).

Concerns about poor conservation outcomes were addressed in Chapter 4 and 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 for 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 is that forest tenure reform could lead to irresistible pressure to extend this to areas with the richest or most endangered biodiversity. Contreras-Hermosilla (2002) note that such expectations did arise in the cases of forest tenure reform in Chile and Bolivia, but that they may be eased 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, though, 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, creates 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; 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 a different approach 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 whether the benefits of management will exceed the costs. 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). Commercial investment requires that such arrangements be made more reliable.

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 on-going 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

[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).

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.

Application 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 working 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).

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 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 (Kohler 2001). As eloquently noted by Christy, Mekouar and Lindsay (2000, p.4):

> *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 artesanal methods or simple gathering. The bureaucratic gauntlet facing those who wish to sell timber is illustrated by the case of West Bengal, which entails almost 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 accessibility of regulators, rather than the forest resource), to restrictions on the use of chainsaws for processing by small-scale loggers (only recently been in Honduras). In India, most aspects of NTFP collection and marketing are strictly regulated (Mallik 2000). Though 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).

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 particularly for small dispersed forest-based

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.

[87] Many of the main species for woodcarving are considered state property requiring permission to cut (eg., *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.

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, and elements that are completely irrelevant to the management of small forest areas[88] (Christy, Mekouar and Lindsay 2000; Kaimowitz 2003). 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, et al. 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 inadequate, regulations are ecologically unsuitable for local conditions, local people are unaware of the rules, and widespread corruption discriminates particularly against the poor (Molnar 2003).

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] But alternative approaches must be developed to replace the current oppressive, expensive and largely ineffective system of strict, complex, centralized regulation (Martin 2003). There are four broad recommendations for regulartory 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 actor is because they are by far the greatest direct beneficiaries of public forest concessions in developing countries, and have contractual obligations to protect public forest resources.

88 For example, Augusta 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 (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 becoming more dominant in many landscapes, and impacts on ecosystem services become more apparent (McNeely and Scherr 2003).

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, 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 2001, pers. comm; 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 become the baseline for decision-making except where a potential licensee could demonstrate while a lesser practice is necessary. 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 verify that standards are met. Meindinger 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 situation, and attain legitimacy.

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

91 Indonesia's forestry concessionaires commit to an administrative and technical regime that full compliance would require some 225 charts, books, forms and associated couments to complete, most of which requirement 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.

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, to address 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, they require every landowner who proposes to harvest to 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 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 stakeholders who undertake field visits jointly, with complete transparency of results.

If BMPs were not followed, forest owners can be sued for egregious violations, and required to participate in additional training for minor infractions. This system has demonstrated several important advantages: the costs are very low, approximately $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 1980's, 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); Schultz (1998); Andy White, pers. observation 2002.

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

[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 even salvage 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).

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, not 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 well as 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 manufacturers, 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 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' 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 small holders (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).

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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 (Dewees and Scherr 1994).

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 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).

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 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 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).

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.

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; and 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.

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; and 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 (ASL's) to utilize Municipal Forest Reserves, which can account 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 ASL's by assisting in forest management plan inventories, providing 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 ASL's, 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. ASL's 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).

2000). International norms have been developed that protect indigenous peoples' rights[101] 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.

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 (Rober Nasi, pers. comm. 2001) and Global Forest Watch, coordinated by the World Resources Institute (Ottke, et al. 2000).

Some countries have devised new arrangements to strengthen local voice 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 NGO's, 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 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' right 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/31/31fecofu.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 (ACICAFOC) 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 (CCAD). 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 in the future 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 also 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 (Dewees 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. Most important 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 damages 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 (Sigal, 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 gleaning 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.

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, of low-income producers, and rural development. More conventional models and some of the newer approaches now being explored 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 alternative 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 the livelihoods of 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 by 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 protected areas; approximately US$6 per hectare per year if extended to the 210 million hectares of biodiversity "hotspots," and about US$0.7 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 environmental 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.

Moveover, this strategy could potentially mobilize vast new financial resources for forest conservation. Primary forest product exports alone are worth close to $28 billion a year, and exports constitute less than 10% 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. The Clean Development Mechanism is estimated to be worth somewhere between $0.63 and $3.67 billion total over 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, is often overlooked.

But even if valued at only US$1 per day and 100 million forest owners, their active presence would be worth some $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, that:

1) Sustainable use will be an essential strategy for conserving biodiversity conservation 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 enhanced 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 to cope with and also 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 demands a move away from public administration and management of the forest resource.
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 1**, 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 environmental 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 environmental 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, 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 protect their interests against trade rules and initiatives that would unfairly compete 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 poverty reduction and natural forest regeneration, 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.

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 the 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), and consider strategically the 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 gain a long-term competitive advantage. 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 be willing to respect the perspectives and position of their local partners. There is promising potential in many countries for growth in private sector businesses that provide services to local forest producers, and 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, and 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 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 environmental services.

Secondary producer organizations can provide critical business support and advisory services, targeted explicitly for 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 full recognition of traditional rights and full rights to use their forest resources;
- Invest in local enterprises and organizational capacity that captures other investment and diversifies livelihood strategies;
- Invest in future leaders and local professionals to manage their 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 for 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 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 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; and
- 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 bank);
- 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 1970's, 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 community 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.

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ANNEXES

ANNEX 1.

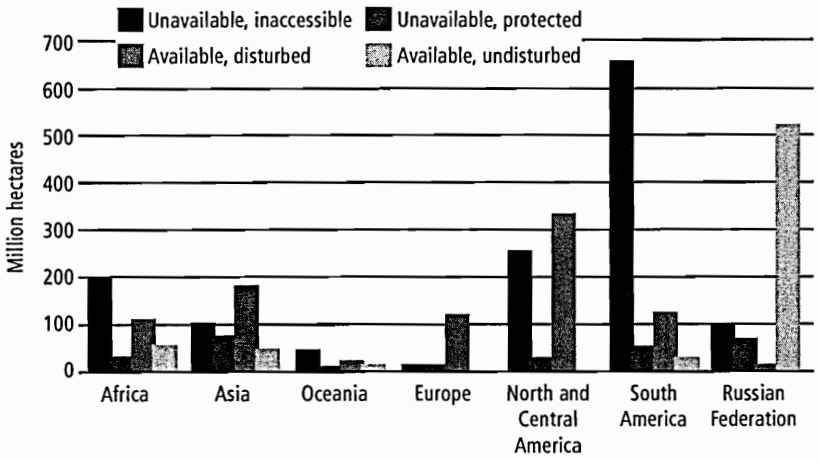
Official Forest Ownership in 24 of the 30 Most Forested Countries

Country (by descending area of forest cover as identified by FAO 2001)	Area in million hectares (percentage of country total)			
	Public		Private	
	Administered by government	Reserved for community and indigenous groups	Community/ indigenous	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.

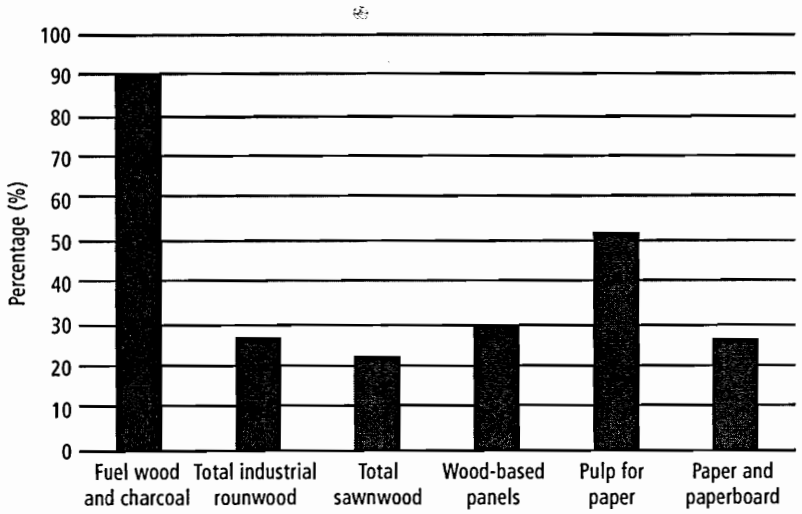
Global forest area available for production.



Source: Bull et al. (1998).

ANNEX 3.

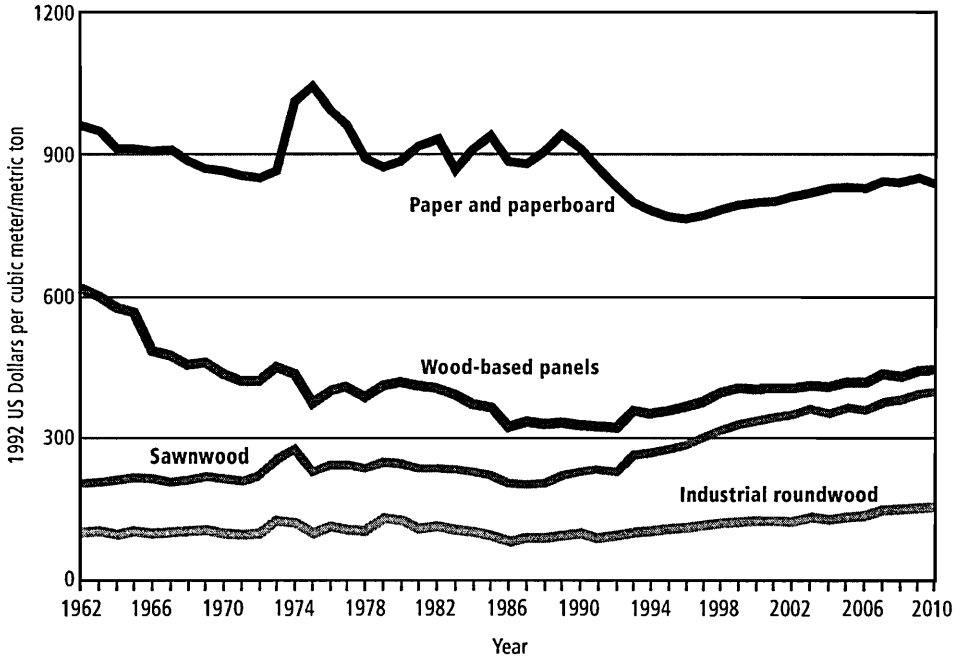
Role of developing countries in supply of forest products by portion of total world production.



Source: FAO (2003).

ANNEX 4.

Trends in real world prices of wood products, 1962-2010.



Source: Zhang, Buongiorno, and Zhu (1997).

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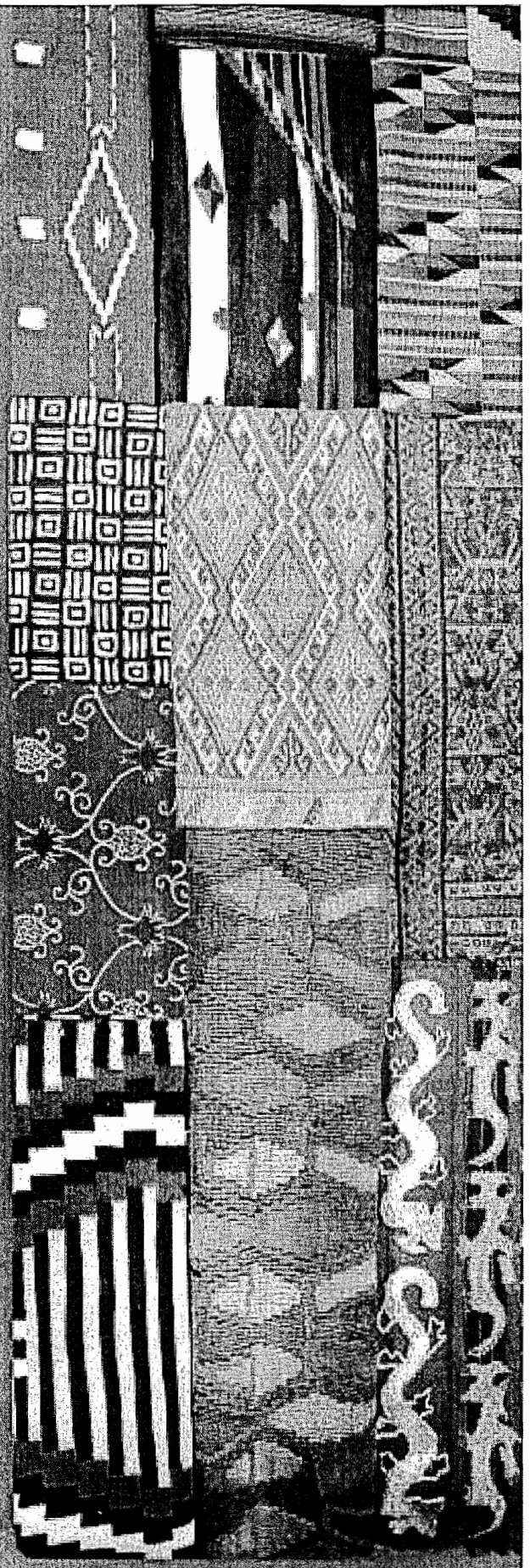
David Kaimowitz is the Director General of the Center for International Forestry Research (CIFOR), based in Bogor, Indonesia. Prior to becoming Director General, he was CIFOR's Principal Economist and worked on research related to the causes of deforestation, decentralization of natural resource management, and the links between natural resource issues, and violent conflict. David holds a Ph.D. in agricultural economics from the University of Wisconsin. Before joining CIFOR, he held research or managerial positions at the Inter-American Institute for Cooperation in Agriculture in Costa Rica; the International Service for National Agricultural Research in The Hague, which is also a CGIAR center; and Nicaragua's Ministry of Agricultural Development and Agrarian Reform. He has also written or co-written seven books and published more than 100 other scientific publications. D.Kaimowitz@cgiar.org.

FORD FOUNDATION

Building Assets

To Reduce Poverty and Injustice



NATURAL RESOURCES • ENVIRONMENTAL SERVICES • SAVINGS
INTERPERSONAL AND INTERGENERATIONAL RELATIONSHIPS • EQUITY IN BUSINESS
PHILANTHROPIC CAPITAL • MARKETABLE SKILLS • COMPREHENSIVE REPRODUCTIVE HEALTH
SOCIAL CAPITAL AND CIVIC CULTURE • HOMEOWNERSHIP

FORD FOUNDATION MISSION STATEMENT

The Ford Foundation is a resource for innovative people and institutions worldwide.
Our goals are to:

Strengthen democratic values,
Reduce poverty and injustice,
Promote international cooperation, and
Advance human achievement.

This has been our purpose for more than half a century.

A fundamental challenge facing every society is to create political, economic and social systems that promote peace, human welfare and the sustainability of the environment on which life depends. We believe that the best way to meet this challenge is to encourage initiatives by those living and working closest to where problems are located; to promote collaboration among the nonprofit, government and business sectors, and to ensure participation by men and women from diverse communities and at all levels of society. In our experience, such activities help build common understanding, enhance excellence, enable people to improve their lives and reinforce commitment to society.

Introduction

Several years ago, the Ford Foundation undertook a new direction in grantmaking aimed at reducing poverty and injustice around the world. The Foundation reviewed its previous efforts, along with the work of other foundations, government agencies, and nonprofit organizations. We consulted hundreds of individuals and organizations in the international community and also drew inspiration and ideas from the Foundation's other two programs: Peace and Social Justice; and Education, Media, Arts and Culture. Out of this process of inquiry and collaboration, the Asset Building and Community Development Program began to explore what we call an "asset building approach" to guide our Program's global grantmaking.

This publication has been developed to serve three purposes. First, we want to introduce the basic ideas that form the framework for our grantmaking. Second, we wish to demonstrate some ways in which asset building is making a difference in diverse contexts around the world. Finally, we'd like to share some of the lessons we have learned in using this approach.

This publication is a step toward increasing the visibility of international asset building endeavors supported by the Ford Foundation, and making information about them accessible to a wide range of interested people. We hope that the information contained here will contribute to an increased understanding of emerging strategies for tackling poverty and injustice around the world. At the same time, we want to help promote new alliances and opportunities that support the evolution and impact of asset building in Africa, Asia, Latin America, and the United States. At the end of this piece, you will find a list of reference materials that contribute to the ongoing dialogue about reducing poverty and injustice worldwide.

In the spirit of inquiry and collaboration we share this information and invite you to join us in this effort. Your ideas and experiences can only strengthen all our efforts to reduce the poverty and injustice that persist in the world today.

Melvin L. Oliver
Vice President, Asset Building and Community Development Program
Ford Foundation

An Asset Building Approach

To empower people and strengthen their political voice, we need to help them gain access to the sources of power in any society. Typically those include assets such as skills that are marketable, economic resources, and social supports. This is essential if we are to make a difference.

GEETA RAO GUPTA[1]

THE QUESTION OF HOW TO ESCAPE FROM POVERTY IS, IN ESSENCE, THE QUESTION OF HOW TO SAVE AND ACCUMULATE ASSETS.

MICHAEL SHERRADEN, ET AL.
SAVINGS AND ASSET ACCUMULATION IN INDIVIDUAL DEVELOPMENT ACCOUNTS

Most people are familiar with the concept of an asset and typically think first of financial assets such as savings, stocks, or property. This "balance sheet" application of the asset concept is important and relevant for poverty reduction. However, the Ford Foundation takes a more comprehensive view of assets, what they are, and how they can be mobilized to reduce poverty and injustice. We see assets as a broad array of resources that enable people and communities to exert control over their lives and to participate in their societies in meaningful and effective ways.

The Asset Building and Community Development Program supports grantees in building the enduring resources—assets—that individuals, organizations, or communities can acquire, develop, improve, or transfer across generations. These include:

- **Financial holdings** of low-income people, such as savings, homeownership, and equity in a business; and philanthropic capital, which is composed of financial resources that are assembled in permanent endowments from and for poor communities.

- **Natural resources,** such as forests, wildlife, land, and livestock that can provide communities with sustainable livelihoods and that are often of significant cultural value; and environmental services, such as a forest's role in the cleansing, recycling and renewal of the air and water that sustain human life.

- **Social bonds** and community relations that comprise the social capital and civic culture of a place that can break down the isolation of the poor, as well as the

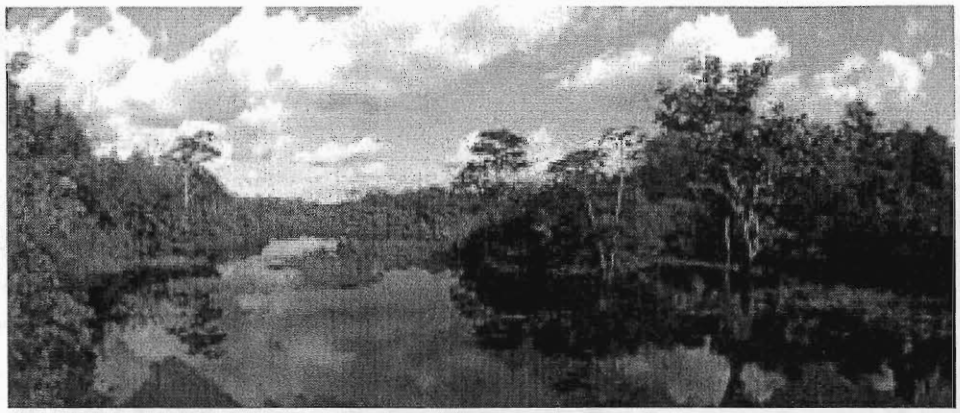
REMOVAL OR REDUCTION OF POVERTY MUST BE A CONTINUOUS PROCESS OF ASSET CREATION, SO THAT THE ASSET BASE OF A POOR FAMILY BECOMES STRONGER AT EACH ECONOMIC CYCLE, ENABLING THEM TO EARN, INVEST, AND SAVE MORE AND MORE. A POOR PERSON CANNOT ENSURE A LARGER SHARE OF RETURN FOR THEIR WORK BECAUSE THEIR INITIAL ECONOMIC BASE IS PAPER-THIN. ONLY WHEN ONE CAN GRADUALLY BUILD UP AN ASSET BASE CAN ONE COMMAND A BETTER SHARE FOR ONE'S WORK.

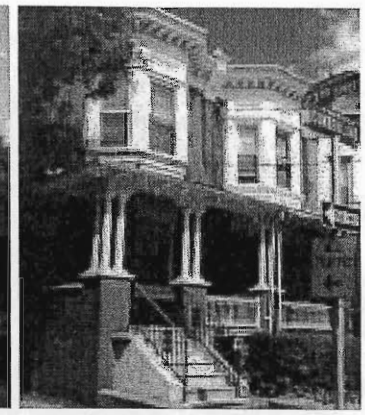
MUHAMMAD YUNUS
"TOWARDS CREATING A POVERTY-FREE WORLD"

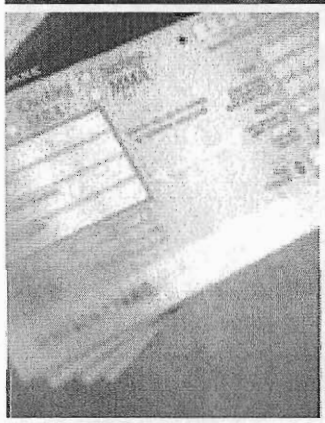
webs of interpersonal and intergenerational relationships that individuals need as a base of security and support.

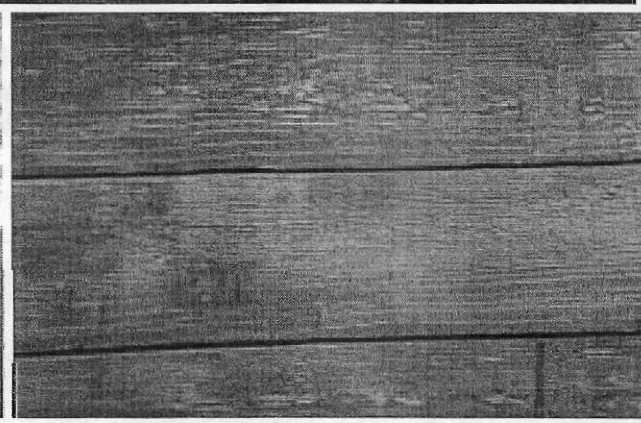
- **Human assets** such as the marketable skills that allow low-income people to obtain and retain employment that pays living wages; and comprehensive reproductive health, which affects people's capacity to work, overcome poverty, and lead satisfying lives.

During the last few years, the Foundation has made grants to help build assets in Africa, Asia, Latin America, and the United States. Our approach is very much a work-in-progress, and the assets discussed here do not represent categories that are exhaustive. Rather, our current emphasis reflects a review of the Foundation's previous work to reduce poverty and injustice and new thinking about which assets the Foundation is best positioned to help build.





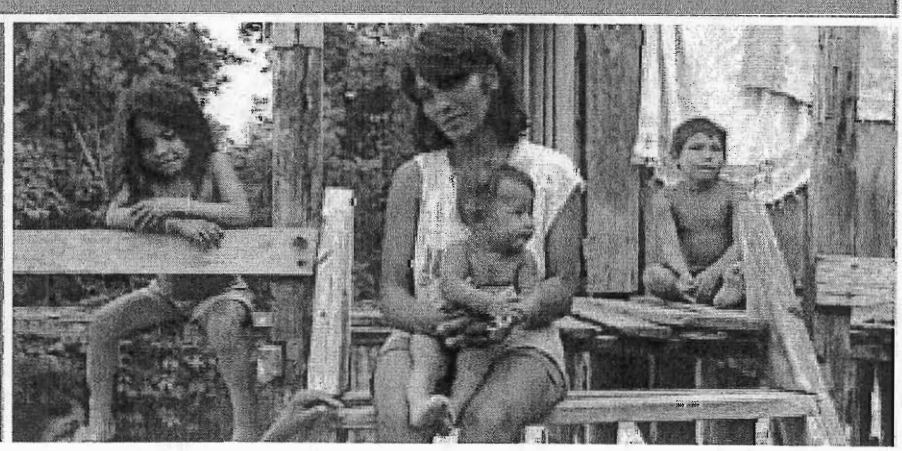




ASSET BUILDING AT WORK:

THE STORIES

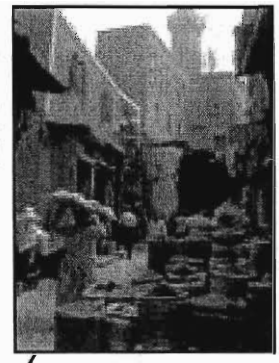
Come with us into some of the settings where asset building is reducing poverty and injustice. The following pages will take you to Brazil's rainforest to witness the actions of a remarkable state government to protect and leverage natural resources for sustainable development. See how an alliance between leading industrial corporations in South Africa and a pioneering nonprofit training organization are benefiting both employees and firms. Low-income families in Tulsa, Oklahoma who are accumulating savings and financial stability will also be introduced, along with women's organizations across India that are working to secure comprehensive reproductive health. Residents of the Blackfeet reservation in Montana will illustrate how community capital is being assembled while strengthening relations between Natives and non-Natives through an annual cultural festival. And you will see how residents of urban neighborhoods in Egypt have turned trash collection and recycling into successful enterprises that provide sustainable livelihoods and improve the environment. These are just a few examples that illustrate the power of the asset building approach.

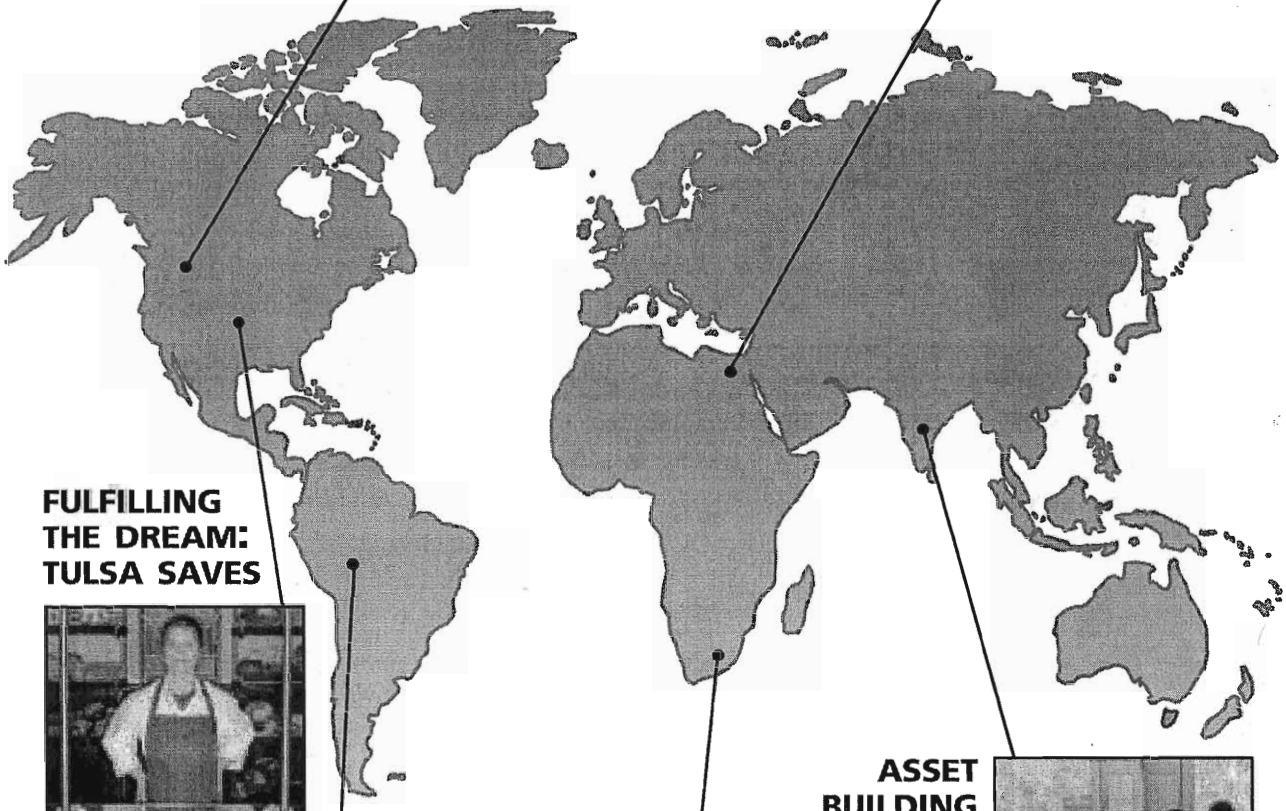


ASSET BUILDING AROUND THE WORLD

A NEST EGG FOR NATIONS AND CULTURES

USING A HIDDEN ASSET: FROM REFUSE TO REUSE





FULFILLING THE DREAM: TULSA SAVES

ASSET BUILDING IN INDIA: PROTECTING REPRODUCTIVE HEALTH

FROM APARTHEID TO ASSET BUILDING

THE PEOPLE AND THE RAINFOREST

ASSET BUILDING AT WORK:

The People And The Rainforest

In the State of Acre in Western Brazil, the deep and productive bond between residents and the Amazon rainforest is being restored. In January 1999 the citizens of Acre voted into power "The Government of the Forest." For the first time government is acting as a benevolent steward of the rainforest and its communities, where more than 40 indigenous groups make their home among the state's 600,000 residents, and where thousands of acres of forest land nurture the earth's environment. "The Government of the Forest," which emerged as a result of a powerful social justice movement, nurtures the region's resources as valuable assets to be tended for common benefit.

The changes followed tragedy. In the city of Xapuri, on an evening just before Christmas 1988, gunmen assassinated Chico Mendes, the renowned leader of the movement to reclaim the rainforest for its people. What began as protests by workers employed as rubber tappers spread throughout the region into a call to save the rainforest from degradation by cattle ranching, agribusiness, and logging. Chico Mendes gained international recognition as the leader of mass resistance to government policies that laid waste to forest land and threatened indigenous cultures. The movement had its own proposals for saving the forest and rivers and for preserving the area's cultures. But Mendes was murdered before the vision could be put into effect.

Now, one of Mendes' former colleagues, Marina Silva, is a prominent federal senator, and locally "The Government of the Forest" has enacted comprehensive initiatives to improve the region's economic and environmental performance. "The program has a clear goal, to combat poverty and create jobs through sustainable development of forest resources," explains Gilberto Sigueira, the government's secretary of planning. "We must grow by using the natural endowments of the forest. Through these assets we wish to establish a new entrepreneurial and modern culture."

Already, the achievements have been remarkable. The region's first Ecological-Economic Zoning Plan was developed to manage and market natural resource products under local control. A group of 375 small farmers formed an agricultural cooperative to diversify crop production and improve market access. The Federal University of Acre's 100-hectare Zoobotanic Park now serves as a "living laboratory" for researchers and students in natural resource management and sustainable development. A worker-owned rubber processing plant has increased production by 500 percent and earned certification for producing the best quality natural rubber in the country, a success that has led to a contract with Pirelli Tire Company and the development of a facility to produce 200 million condoms. In addition, a Brazil nut processing plant and a new furniture-making joint venture among the local government, certified wood producers, and an Italian design company is providing jobs and income.

"We have a long way to go," observes Acre Governor Jorge Viana. But "what we have done in Acre, thank God, is something everyone wants to do, turn dreams into reality."

Since 1988 the Ford Foundation's grantmaking in Acre has helped to build the region's research, technical assistance, training, marketing, and publications capacities in agroforestry, farming systems, and sustainable development, as well as contributed to key advances in policy research and advocacy on sustainable land use, resource rights, and democratic governance.

The Power Of Assets

Assets...are not simply resources that people use in building livelihoods: they...give them the capability to be and act.

ANTHONY BEBBINGTON[ii]

IN OUR FAIRLY LONG EXPERIENCE WITH SOCIAL SECURITY ONE THING THAT HAS COME OUT CLEARLY IS THAT FOR POOR WOMEN THE FUTURE WAS INITIALLY A MEANINGLESS CONCEPT. THEIRS WAS A DAILY STRUGGLE FOR SURVIVAL. BUT WITH ORGANIZED, COLLECTIVE STRENGTH, THE WOMEN GRADUALLY BECAME AWARE OF THE NEED TO SECURE SOMETHING FOR THE FUTURE.

ELA BHATT

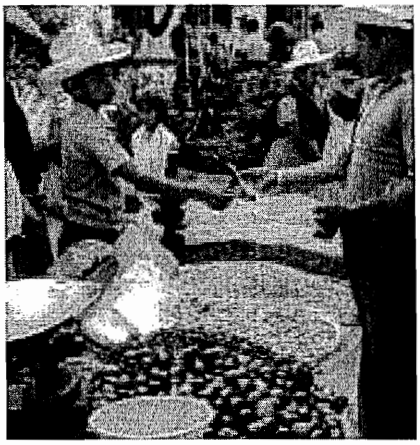
TOWARDS SECURER LIVES: SEWA'S SOCIAL SECURITY PROGRAMME

Control over assets gives low-income people the independence necessary to resist oppression, pursue productive livelihoods, and confront injustice. Even when they own few tangible goods or financial resources, individuals possess intrinsic resources such as intelligence, creativity, diligence, and inner strength. Groups of people also share common resources, such as community-based organizations, and cultural values and practices. These strengths and attributes have been called "assets" by proponents of people-centered and community-based development.

At the Ford Foundation, we extend the concept of building upon people's existing assets and see these capacities as a starting point in the development process. We believe it is important to help low-income people develop additional assets that will enable them to be productive participants in economic and social life. As Michael Sherraden writes in Assets and the Poor, "People think and behave differently when they are accumulating assets, and the world responds to them differently as well."[iii]

The power of assets is found in the familiar adage about the distinction between giving someone a fish and teaching him or her to fish. Our colleagues at the Kenya Community Development Foundation (KCDF) have used the asset building approach to push the proverb further. In "Beyond Fishing," a brochure that explains their foundation's philosophy, they wrote,

> *If we give a man a fish, it will satisfy his hunger today. But we will need to continue providing fish for him to survive. So we teach him to fish. This will solve the problem until someone pours toxic waste into the river. Then what?*



FOR COMMUNITY BUILDERS WHO ARE FOCUSED ON ASSETS, REBUILDING LOCAL RELATIONSHIPS OFFERS THE MOST PROMISING ROUTE TOWARD SUCCESSFUL COMMUNITY DEVELOPMENT AND UNDERLINES THE NECESSITY OF BASING THOSE RELATIONSHIPS ALWAYS UPON THE STRENGTHS OF THE PARTIES INVOLVED, NEVER ON THEIR WEAKNESSES AND NEEDS.

JOHN L. MCKNIGHT AND JOHN P. KRETZMANN
BUILDING COMMUNITIES FROM THE INSIDE OUT: A PATH TOWARD FINDING AND MOBILIZING A COMMUNITY'S ASSETS

He needs to be empowered to sustainably control all those factors, which affect his ability to fish.

At KCDF, we want to go beyond fishing—*building the capacity of the fisherman by helping him gain access and increased control over resources to which he has a right. For this, he will require vision, information/learning, appropriate technology, linkages, organization, resources, and an enabling environment.*[iv]

There are times when it may be critical to support consumption if, for instance, survival is at stake. But increased consumption cannot assure a reliable and sustainable path out of poverty. Nor can increasing income alone establish economic and social security unless it is also used to build a firm asset base. An asset offers a way out of poverty because it is not simply consumed, it is a "stock" that endures and can be used in many ways to generate economic, psychological, and social benefits that foster resilience and social mobility.[v]

- Economic Benefits. Assets can provide household stability, the capacity to weather changes such as the loss of a job or household income, triggered by business cycles, restructuring, or a family crisis. They also can help to develop other assets, for instance, building a business that generates revenues and employs others or equity in a home that can be invested in further education. Assets provide a head start for the next generation.

- Psychological Benefits. "Assets are hope in concrete form," writes Sherraden.[vi] They provide a sense of security, control, confidence, and a belief that one can take advantage of opportunities. They can provide an incentive to reduce risky behavior. Assets engender a desire and ability to look toward the future, make plans, and take an interest in additional steps toward independence. Assets support action on behalf of oneself and the next generation.

- Social Benefits. Assets can increase commitment to a shared vision and community action. The sharing of individual assets and building of community assets can contribute to broader social well-being. Assets create stronger families and communities for the next generation.

The Ford Foundation invests in building the assets of low-income people and communities that, through their economic, psychological, and social benefits, reduce poverty and injustice and increase meaningful, effective participation in social, economic, and political life.

ASSET BUILDING AT WORK:

From Apartheid To Asset Building

For millions of low-income South Africans, the promise of the nation's long-hoped for economic reforms and integration into the global economy comes with the peril of losing their livelihoods—as jobs and business opportunities increasingly go to the more highly skilled and educated. In the wake of apartheid's vicious inequities, economic transformation is leading policy makers, industry leaders, and organized labor to put a premium on skills for workers in the labor market.

"Marketable skills are important because of the continuous rapid change in the world of work," explains Vusi Silondi, manager of training and development, Continental Tyre. "The ability to reposition oneself [in the labor market] is becoming an increasingly important survival skill." Marketable skills are emerging as a vital asset for reducing poverty.

South Africa's political leadership has put into place a leading-edge policy framework that addresses employment equity, skills standards, the financing of worker education and training, and industry-focused economic and workforce development planning. But implementing these policies on the ground is an enormous challenge. The need is great, as a national illiteracy rate of 28 percent makes clear. One of the country's largest industrial concerns acknowledged that as many as 20,000 of its employees were functionally illiterate. Yet most education and training organizations do not have the capacity to respond to the massive problem, and many employers don't have confidence in these providers.

Fortunately, about 10 years ago, even before apartheid's end could be fully anticipated, 10 community-based organizations and 20 private businesses overcame their suspicions of each other and formed a partnership, the Joint Education Trust (JET), to serve disadvantaged groups in South Africa, improve the employment picture, and fundamentally change the nation's education and training system. Since then, JET has become a pioneer in delivering education and training services to individuals, in providing consultations and programs to businesses, and in facilitating the interaction of labor unions, educational institutions, and government to support displaced and at-risk workers.

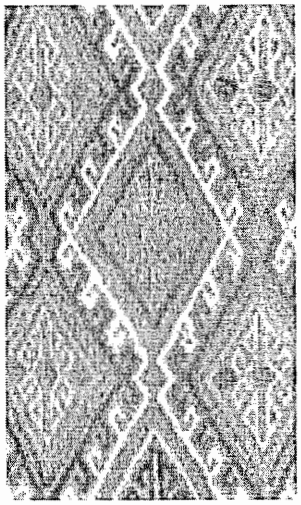
Now, with long-term support from the Foundation, JET is expanding its services to cover thousands of additional workers in the mining and automotive sectors, as well as serving workers in other sectors, and building the capacity of selected educational service providers for adult learners. Although strikes and widespread industry layoffs have slowed implementation, progress is being made.

In Kwa Zulu-Natal, a mining center, a package of skill-building services is being prepared for a pilot group of 500 ex-miners. In Pretoria, scores of manufacturing workers are being trained in new skills—carpentry, electrical wiring, welding, and computer technology. Large companies in the rubber and steel sectors, along with unions in the manufacturing and mining sectors, are collaborating with JET to develop their members' skills. By creating programs and strategies that address the intersecting interests of employers, workers, and educational institutions, JET hopes to build models for the investment of both public and private sector resources.

JET's model for serving both low-income workers and employers is based on the successful programs of the Council for Adult and Experiential Learning in Chicago, which is a consultant to JET.

The Foundation has supported the Joint Education Trust since 1996.

An Asset By Any Other Name



The word asset has many synonyms. These include words such as belongings, bounty, capital, coffers, equity, estate, fortune, goods, holdings, inheritance, investment, means, ownership, principal, property, possessions, resources, riches, savings, security, stake, stock, substance, sum, surplus, treasure, valuables and wealth, as well as the word money and its many slang terms.

MICHAEL SHERRADEN[vii]

BY GIVING OUR CHILDREN AND YOUTH BETTER OPPORTUNITIES, WE WILL ENABLE THEM TO LIVE WITHIN A SOCIETY WHERE THEIR RIGHTS ARE FULLY RESPECTED AND [WHERE THEY] ENVISION THEIR FUTURE WITH OPTIMISM. ANY WORK AIMED AT PROMOTING THESE CONDITIONS IS THE MOST PROMISING SOCIAL INVESTMENT ANY SOCIETY CAN MAKE. WE SEE YOUTH AND THEIR EDUCATION AND PARTICIPATION AS OUR MOST SIGNIFICANT ASSET TOWARD DEVELOPMENT.

LORENA CLARE DE RODRIGUEZ
WORLDWIDE WORKSHOP ON YOUTH INVOLVEMENT AS A STRATEGY FOR SOCIAL, ECONOMIC AND DEMOCRATIC DEVELOPMENT

The list of English language synonyms for the word "asset" is vast. How well does the concept of building assets translate into other cultures and languages?

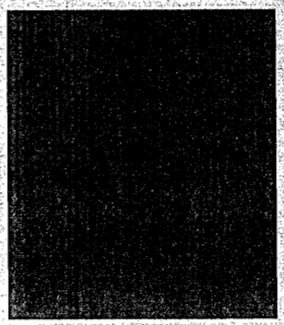
We are supporting asset building in many distinct cultural and national contexts, using a variety of methods that suit local circumstances. Although some languages do not have a word for "asset," we find it is possible to apply the broad concept in many contexts.

In places such as Kenya, Senegal, South Africa, Mozambique, Brazil, Mexico, Bangladesh, India, the Philippines, in Native American communities, and in rural areas and urban centers in the United States, new foundations are assembling permanent locally controlled philanthropic capital. This work builds on traditions of giving found across cultures worldwide. As noted by Sherry Salway Black, vice president of the First Nations Development Institute: "Sharing and reciprocity are universal."[viii]

Other examples of asset building strategies pursued in different cultural contexts worldwide include microenterprise and small business development, which can help low-income people to build equity in businesses. In several African and Latin American countries, the knowledge of traditional healers is drawn upon as a way to protect and secure individual and community reproductive health. In the Fatick region of Senegal, for example, grantees are participating in research on traditional herbal treatment of infections related to HIV/AIDS and other diseases. Elsewhere, exchanges among Nigerian, Kenyan, Palestinian, and U.S. youth groups have fostered young people's commitment to assuming individual and collective responsibility, which are needed for social capital and civic culture to take root. In another example, cultural values and practices guide some of the most effective efforts to support sustainable management of forest assets in Africa, Asia, Latin America, and the United States.

The asset building perspective has proven flexible and broad enough to capture imaginations, encourage collaborations, and mobilize resources in a wide range of cultural settings.

ASSET BUILDING AT WORK:



Fulfilling The Dream: Tulsa Saves

An experiment to encourage low-income Americans to save money and then use their growing financial assets to invest in their lives has reaped success in rural and urban communities across the United States, including Tulsa, Oklahoma.

In 1998 the American Dream Demonstration began to provide thousands of participants in 14 areas with an incentive by matching every saved dollar with as much as $2 that was deposited into an Individual Development Account (IDA) for each person. The money was intended, not as cash to use for consumption, but as an asset to use to obtain a home mortgage, start or expand a small business, or pay for post-secondary education, job training, home repairs, or retirement. Throughout U.S. history, public policies have encouraged such investment by individuals and families who form the core of the "middle class." Some people, however, have been excluded from or denied these asset building opportunities.

Like many communities confronting poverty, Tulsa bears many scars from the past. The city has the historic burden of a race riot in 1921 in which white residents torched a thriving African American community, the Greenwood District. The fire destroyed 18,000 homes and business enterprises, left 4,000 blacks homeless, killed 300 blacks and whites, and wiped out the black community's financial assets. Today, African Americans are a disproportionate share of Tulsa's poor population.

In Tulsa, 640 people, many of them welfare recipients, have opened IDAs and by August 2001 had saved $453,000. This has earned them about $599,000 in matching funds. Many of these people have also withdrawn funds—a total of $213,000 to purchase 82 homes, repair or remodel homes, develop businesses, or pay for education courses or retirement. Steven Dow, executive director of the Community Action Project of Tulsa County, which runs the demonstration, says, "IDA participants tell us that the experience of saving and purchasing assets is having profound effects on their entire approach towards living—causing them to plan more for the future and to model important behavior for their children."

The American Dream Demonstration is showing that the poor can save money, make investments, participate in economic life, and contribute to the community. "Account holders are beginning to generate more income taxes, jobs, and businesses," concluded a report by the Corporation for Enterprise Development, "As they become stakeholders, they are taking a longer-term view of their prospects and plans. Children, saving too, show new aspirations, and communities are establishing new bonds."[ix]

Today federal welfare reform legislation allows states to use IDAs, and provides $125 million to stimulate IDA development. Twenty-nine state governments, including Oklahoma, have IDA laws. Efforts to promote a national movement for Children's Savings Accounts to support education and asset building training for low-income youth are growing. Private financial institutions have formed a working group to promote IDAs as a financially viable consumer product. Not far from Tulsa, the Cherokee Nation started an IDA program for members of the tribe. At the local, state, and federal levels, financial-asset building in the form of IDAs is taking hold and promises to benefit millions of low-income Americans.

Since 1996, the Ford Foundation has provided grants for planning and implementation of the six-year demonstration to the Corporation for Enterprise Development, as well as to the Center for Social Development at Washington University in St. Louis and Abt Associates for evaluation and research. The Foundation also is supporting the planning of a demonstration to help learn how to implement Children's Savings Accounts.

Overcoming Barriers To Asset Building

I HAVE ONLY ONE REQUEST.
I DO NOT ASK FOR MONEY
ALTHOUGH I HAVE NEED OF IT,
I DO NOT ASK FOR MEAT...
I HAVE ONLY ONE REQUEST,

AND ALL I ASK IS
THAT YOU REMOVE
THE ROAD BLOCK
FROM MY PATH.

Okot p'Bitek
"Song of an African Woman"

Inequalities in the distribution of all types of assets are found in societies worldwide. While governments and multilateral agencies have long tracked income inequality within and among nations, weak accounting systems and elusive data often confound measurement on a global scale of even conventional assets, such as savings and equity. Nonetheless, the fact that approximately 25 percent of the world's people receive 75 percent[x] of the world's income strongly suggests the precarious state of the assets base of the poor. In the United States, 10 percent of families control 90 percent of financial wealth.[xi] It is estimated that without public sector safety nets, the assets of low-income households would cushion only three months' hardship caused by sudden unemployment, a medical emergency, or other crisis.[xii] Of the world's 6 billion people, 2.8 billion, almost half, live on less than $2 a day.[xiii] For much of the world's population, short-term crises and social disruptions, in the absence of assets, imperil people's very survival.

When it comes to natural resources, the historic pattern worldwide is one of increasing corporate ownership and decreasing local community control. Residents of chronically poor areas are becoming more socially isolated; they have few connections to mainstream society and little power to engage in decision-making. Low-income people, especially women, are disproportionately burdened by reproductive health problems. The HIV epidemic increasingly reflects global inequities in wealth, knowledge, and access to health care. In sum, the 'haves' are increasing their control over assets while the 'have-nots' are falling further behind.

The pattern of asset distribution reflects historical and contemporary public policy decision-making and longstanding cultural traditions. Today's inequities are the result of restrictive laws and barriers to education and services that exclude women, racial and ethnic minorities, and low-income people from creating, inheriting, purchasing, and in other ways building assets. An asset building approach seeks to change the ways assets are developed, distributed, and passed from generation to generation. This means confronting historic and contemporary forces of social, class, and caste exclusion, including racism, sexism, homophobia, and other forms of discrimination.

ASSET BUILDING AT WORK:

A Nest Egg For Nations And Cultures

In northwest Montana, the Blackfeet community is assembling philanthropic capital, preserving tribal culture, and broadening civic participation among both Natives and non-Natives through the efforts of the Blackfeet Community Foundation (BCF). The development and growth of philanthropic capital as an asset has become a building block of community well-being.

The Native peoples of Montana make up nearly 7 percent of the population and live on seven reservations across the state. Over the last century and a half, they experienced the loss of their land and natural resources and were confined to reservations with meager resources and inadequate infrastructure. In addition, U.S. government education practices and policies eroded the Blackfeet language and customs. Relations between white and Native communities were often distant and distrustful.

For the last six years, as part of a strategy to build up its permanent philanthropic capital as well as strengthen relationships between Natives and non-Natives in the region, the BCF has sponsored an annual Harvest Moon Ball and Indian Art Auction to raise funds, provide a community gathering place, and highlight the work of renowned Indian artists. Proceeds from the event are invested in an endowment fund now totaling over $210,000, that generates income to support community-building activities on the Blackfeet Reservation. As the endowment fund grows, it bolsters the Blackfeet community's aspirations for greater independence and opportunity.

In the meantime, the Montana Community Foundation (MCF), of which the Blackfeet Foundation is an affiliate, has expanded its support for reservation-based nonprofits and tribal enterprises, including the Piegan Institute, a language preservation school, the Blackfeet pencil company, the Blackfeet Reservation Development Fund's financial education and mini-bank program, an Individual Development Account program, and a recycling business that employs 14 disabled youth and has inspired community beautification efforts. Developing philanthropic capital as a community asset is having a powerful impact, says former MCF board chair, Sue Talbot. "Things happen. There are natural disasters, and man-made ones. But if communities have organized themselves and built their capacity, they'll weather those changes better. And if they've saved by building an endowment, they're even more able to bounce back."

The Blackfeet Community Foundation emerged as part of an effort to strengthen the Montana Community Foundation and other statewide and regional community foundations. Since 1993, the initiative has helped MCF to increase its permanent assets from $4.5 to $35 million, boost grantmaking, diversify its donor base, and increase its capacity to attract new resources. MCF also helped establish the Blackfeet Community Foundation as an affiliate to provide a new vehicle for building the assets of the Native community. As MCF board member and Blackfeet leader Elouise Cobell notes, "The BCF built on 25 years of organizing and community development by tribal leaders who in many different ways have been working to reclaim Native assets—especially land and trust funds—and to build other assets in an effort to secure the sovereignty of the Blackfeet nation, the vitality of its culture, and economic opportunities available to its people."

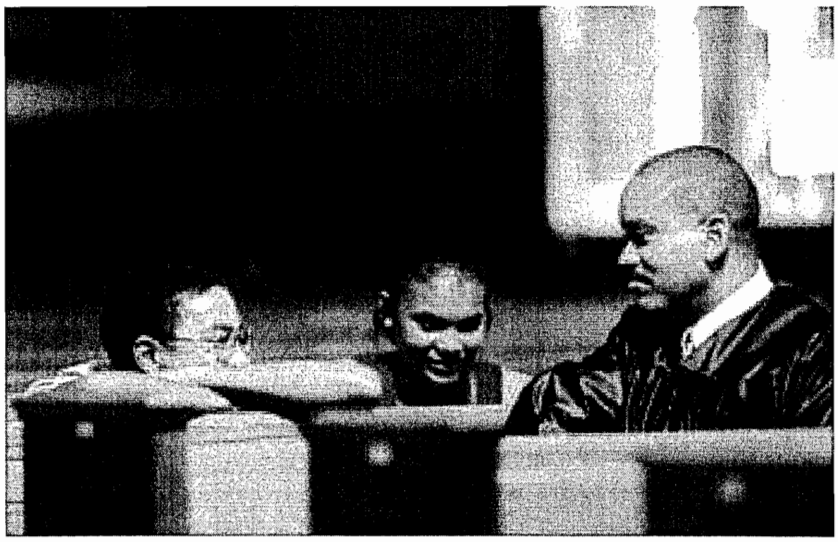
Since 1993 the Ford Foundation has supported MCF and seven other community foundations when it launched the Rural Development and Community Foundation Initiative (RDCFI). The RDCFI has helped MCF and others increase their ability to raise capital, include rural residents in decision-making, and engage in grantmaking that draws from national best practices while being locally responsive.

YOUNGSTERS WHO FIND THEY HAVE A BRIGHT FUTURE AHEAD OF THEM FIND IT EASIER TO MAKE POSITIVE DECISIONS, EASIER TO RESIST PEER PRESSURE, EASIER TO MAKE THE SACRIFICES NECESSARY FOR ACADEMIC EXCELLENCE AND EASIER TO SAY NO TO DRUGS, SEX AND OTHER FUTURE-THREATENING TEMPTATIONS.

WILLIAM RASPBERRY
"KEY TO TEEN BIRTHS IS SELF-PERCEPTION"

In many cases, the Ford Foundation's grants support organizations that are directly building assets:

- Locally governed *community development financial institutions* that provide loans, savings instruments, and other financial services to help low-income people accrue savings, invest in homeownership, and build up business equity;
- *Grassroots organizing groups* that advocate for the comprehensive reproductive health of low-income and/or marginalized women and men;
- *Natural resource management groups* that restore and protect forests, water systems, and other natural assets that provide livelihoods and help maintain cultural values in low-income communities;
- *Labor market intermediary organizations* that work to change the structure and practices employers use to recruit, hire, and promote workers so that they contribute to building marketable skills;
- *Community foundations* and funds that accumulate permanent philanthropic capital for investment in rural community development; and



- *Faith-based organizations* that strengthen a community's civic culture and build social capital.

We have also learned that a wide array of contextual factors such as laws, relationships, social networks, customs, and practices can have a significant impact on the development of individual and community assets. Governments, through policies and regulations, shape conditions that help or hinder asset building. Other more subtle factors also influence asset building opportunities, such as the mindset of a group of residents, habits that prevent change, long-held traditions, or cultural norms. To address these contextual obstacles, the Ford Foundation also supports efforts to develop a climate that is conducive to asset building.

ASSET BUILDING AT WORK:

Using A Hidden Asset: From Refuse To Reuse

In the crowded neighborhoods of Cairo, Egypt, low-income families and organizations are converting overlooked assets into economic opportunities while improving environmental conditions.

Every day in Africa's largest city, thousands of people living in Cairo's Mokattam settlement area fan out through the busy streets. Using trucks or donkey carts, they collect garbage from the homes of the affluent and middle class, containers on streets, dumpsites, empty lots, and businesses. These zebaleen (garbage collectors), who first came to Cairo in the mid-20th century, gather from this and other settlements about 3,000 tons of solid waste daily, a third of Cairo's garbage. Working with community groups and non-governmental organizations, the zebaleen are overcoming high levels of social stigmatization, poverty, illiteracy, and poor health conditions among the population.

The tons of waste gathered by the garbage collectors are "recovered" – hauled back to Mokattam, where other family members sort the plastic, paper, glass, metal, and fabric by color, size, shape, and potential reuse. "Each and every member of the family is involved in this business either as a truck driver, a collector or sorter," reports one description of this "informal solid waste sector." "Women and girls in the family are the sorters. They are the ones, who amidst their daily household chores of washing, cleaning, and cooking, manually sort the garbage that is deposited in their yards."

About 80 percent of what is collected is sent, through a network of semi-formalized operators, to recycling workshops to be turned into scores of products for sale. Organic waste is fed to animals or composted for use by farmers. Recyclers in Mokattam operate hundreds of crushing, sorting, grinding, compacting, cutting, washing, and other machines—and are the settlement's second largest source of jobs.

The recycled products are marketed and sold in Cairo, throughout Egypt, and even abroad. For instance, a small, glossy booklet for English-speaking customers contains page after page of attractive photos of colorful handcrafts—cloth carrying bags, wall hangers, Christmas stockings, quilts, bedspreads, paper calendars, gift bags, greeting cards, and notepads, rag rugs, pillows, backpacks, and doormats—all created by artisans out of recycled materials.

As many of Mokattam's 20,000 residents have generated jobs, businesses, and income from Cairo's garbage, they have also built homes in their settlement—one wall, one room at a time. They have invested in their fleet of trucks and developed and produced more machines for recycling. The Foundation has supported the zebaleen communities' efforts to improve living and working conditions, as well as to improve their waste collection and recycling businesses.

Meanwhile, the zebaleen's activities have prevented disease and environmental degradation in Cairo. Demand on landfills has been reduced, as has the amount of uncontrolled burning of waste. In 1998, the U.N. Center for Human Settlement selected the Association for the Protection of the Environment, a Foundation partner in these efforts, as one of the 10 best practices worldwide for improving the living environment. The zebaleen have changed the perception of garbage from a 'nuisance' to a 'resource.'

The Foundation has also supported efforts to improve the working and living conditions of zebaleen communities in Cairo since 1983—helping to strengthen nonprofit organizations, create a community-administered credit fund, establish a clinic and primary health program, develop a composting plant, and conduct research to ensure that zebaleen communities will benefit from efforts to privatize the solid waste sector in Cairo.

Worldwide, the Ford Foundation has helped to foster a climate more conducive to asset building that reduces poverty and injustice.

- A national network in the United States uses research, public policy, advocacy, media, and demonstration projects to increase the meaningful involvement of non-custodial fathers in the lives of their children. Partnerships between civic, governmental, and religious institutions have promoted policies and practices to provide employment services, fatherhood programs, and economic incentives for fathers to support their children financially and emotionally.

- In Indonesia, young women in Islamic boarding schools (pesantren) participate in seminars about women's rights and reproductive health conducted by the Muslim group, Indonesian Society for "Pesantren" and Community Development (Perhimpunan Pengembangan Pesantren dan Masyarakat). The group studies passages of the Qur'an that have traditionally been interpreted to subordinate women and considers theologically sound reinterpretations that will improve their status in Muslim society.

- In response to longstanding government policies in China to limit population growth through penalties, persuasion, and sometimes coercion, Chinese reformers began testing alternative policies based on protection of individual rights within the family planning program. Experiments were introduced in some counties, and, as interest in the 'quality of care' model grew, the state family planning system adopted the approach, promoting it in hundreds of counties in rural areas, issuing standard administrative guidelines, banning coercion, and proposing laws for "informed choice" by couples.

- The Central Bank of Nigeria is working to establish a more supportive national legal and regulatory framework for the private financial sector. Advocacy efforts are improving conditions for organizations lending to the poor and encouraging mainstream financial institutions to invest in rural and urban business development.

- A hardwood-based charcoal from Mexico's mountain forests, certified and labeled as meeting the Forest Stewardship Council's rigorous social and environmental standards, has become a popular product in international markets with a large demand for environmentally friendly "green" goods. Demand for certified charcoal is also growing in Mexico because of increased consciousness of the deforestation resulting from illegal timber harvesting or badly managed and overharvested forests. As a result of certification, the forests are generating more income for families, and the communities' natural assets are healthy and thriving.

ASSET BUILDING AT WORK:

Asset Building In India: Protecting Reproductive Health

Women in India's remote villages and busy cities are being empowercd to protect their reproductive health—one of their most important assets—from violence and neglect. Community-based organizations throughout the nation are using educational, medical, legal, police, policy advocacy, family counseling, and other social services to ensure that women have safe pregnancies and childbirth, and better control over their fertility and sexuality.

These efforts aim to increase low-income women's control over sexual and reproductive decisions, and to address neglected reproductive health issues, domestic violence prevention, and treatment of HIV/AIDS. In India, as in many other parts of the world, women have had insufficient access to adequate, comprehensive health services. Further, they face enormous barriers to using the criminal justice system and protective services to prevent violence in the home and on the streets.

The interconnectedness of disadvantages and the cycles of discrimination that women suffer is telling as a quarry worker on the outskirts of Delhi describes her own desperate plight: "I am ill because I do not get adequate food, adequate sleep and the dust from the stone quarry settles in my lungs. I do not have water to keep clean. My children are exposed to the cold, the heat and the rain. My husband gets drunk and beats me, and I am bruised all over. I work from dawn to dusk. I produced more children than what my emaciated body could handle—yet I fear how many will actually survive. When I seek the doctor, he does not listen to my story...when I complain of exhaustion, he says women complain too much."[xiv]

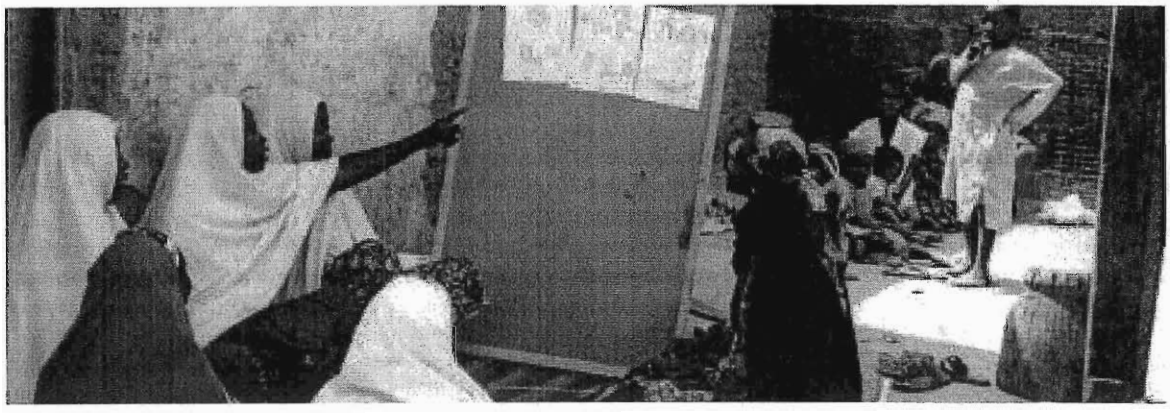
In the sprawling metropolis of Mumbai, a "one-stop" crisis center called Dilassa, which in Urdu and Hindi means reassurance and support, is helping abused women to end their silence and escape threats to their mental and physical health. "The reason why women don't break the silence," says Seema Malik, director of the Bombay Municipal Hospital, one of the organizations that formed Dilassa, "is because there is nothing they can get after they do." The medical and legal services that Dilassa provides are changing that. "For the first time in India," Malik explains, "there is an actual entity that can address women's needs, whether it's the police, the law, the shelter, or the health services—in one place." The center's successes have encouraged Bombay's Municipal Corporation to consider establishing similar centers in the 30 other public hospitals throughout the city.

In Purandar Taluka, the drought-prone region of Maharashtra, the Mahila Sarvangeen Utkarsh Mandal (MASUM) organization conducts workshops for survivors of violence in 25 villages to raise the communities' awareness about domestic violence and to provide a forum for public discussions. MASUM also provides family counseling to address domestic violence, while its Women's Resource Development Project provides women with access to financial credit to improve their economic status. "Initially, women borrow merely to survive, or in order to repay loans, for illnesses, for consumption expenses, and for their children's education," state MASUM leaders Manushi Gupte and Ramesh Awashti. "As they gain confidence, they begin to borrow for productive reasons—mainly as capital for...small vending ventures." Loans promote increased economic empowerment and independence among women, which in turn increases their self esteem and enables them to take a strong stand against domestic violence, whenever it occurs.

The goal of these and other reproductive health organizations is that their emerging model for comprehensive services, which promote health, prevent and respond to violence against women, will take root in India's national policies and become an integral aspect of the nation's health care system.

Since 1996, the Ford Foundation has been supporting partnerships among organizations in India that seek to prevent violence against women and promote sexual and reproductive health.

Reflecting On Our Experience



The stories and examples presented illustrate the ability of people and institutions to make a real difference in the creation, distribution, and use of key assets. They also reveal the importance of organizing civil society, securing human rights, making education available to all, good governance, and cultural stewardship—all areas in which the Ford Foundation is actively engaged.

From the Brazilian Amazon and Mexico, to Cairo and South Africa, India, Beijing, Oklahoma, and on Native American reservations, a broad range of strategies have helped improve the conditions for building assets and worked directly to build the assets of low-income people and communities.

We have invested in natural resource management efforts that vest control of key assets in local communities that depend upon them, supported research leading to the development of Individual Development Accounts, made loans to community development financial institutions that provide low-income people with access to the financial services they need to build assets, and assisted local workforce development organizations in their efforts to help low-income people to obtain livable wage employment. We have supported faith-based organizations that build social capital by providing mentors for troubled youth and by strengthening relationships among clergy, police, and other city agencies responsible for neighborhood safety and criminal justice. We have encouraged community foundation efforts to revive local giving. We have helped bring the wisdom of traditional healers into national health care systems to advance the prevention and treatment of HIV/AIDS. And we have supported participation of diverse voices in international conferences that forged a new consensus about comprehensive reproductive health as a building block for achieving development goals.

Of course, the extent and pace of change in today's world can challenge efforts to reduce poverty and injustice—but change is also providing new opportunities for asset building around the world.

- The trends toward decentralization of government responsibility, increasing economic globalization, access to communications technologies, and growing appreciation of environmental limits are creating a new equation for power sharing in communities around the world. We see an historic opportunity to

...ASSETS [ARE] NOT ONLY THINGS THAT ALLOW SURVIVAL, ADAPTATION AND POVERTY ALLEVIATION; THEY ALSO ARE THE BASIS OF AGENTS' POWER TO ACT AND TO REPRODUCE, CHALLENGE OR CHANGE THE RULES THAT GOVERN THE CONTROL, USE AND TRANSFORMATION OF RESOURCES.

ANTHONY GIDDENS

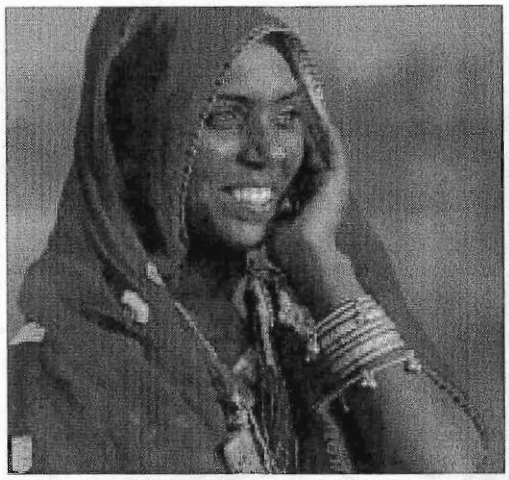
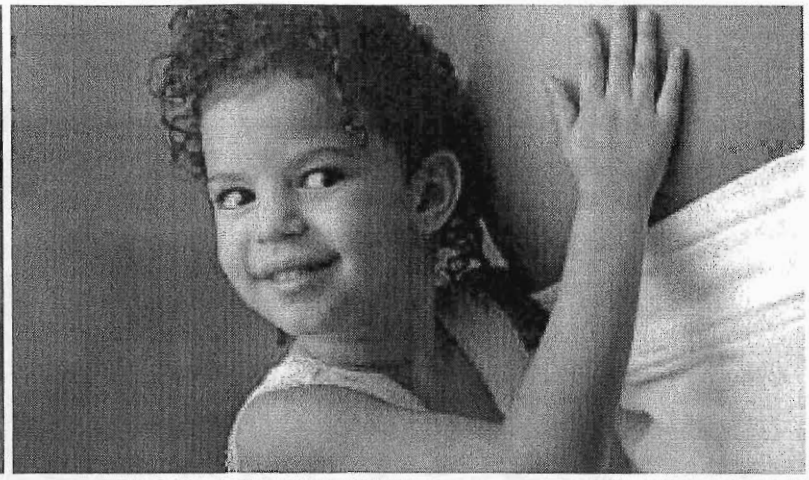
CONTEMPORARY PROBLEMS IN SOCIAL THEORY: ACTION, STRUCTURE AND CONTRADICTION IN SOCIAL ANALYSIS

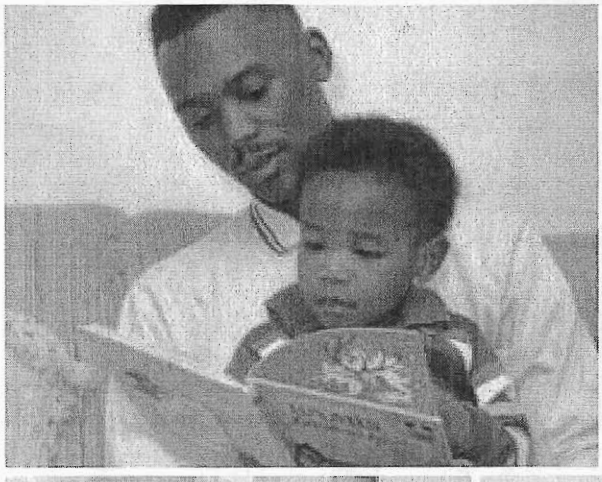
link local community organizations with other partners, both public and private, as meaningful allies in setting priorities and allocating resources that address poverty and injustice.

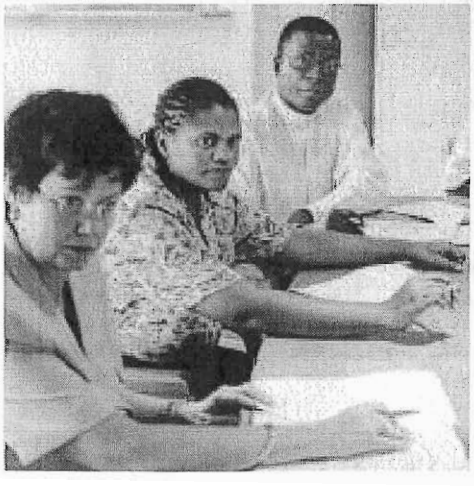
- There is an increasing willingness to include social and environmental values in the fundamental operations of business and markets. Making markets work for the poor and disadvantaged—by promoting shifts in corporate behavior, cultivating consumer preferences, and strengthening government regulation—helps ensure that our grantee partners have a real chance to create permanent and durable social change. This can link capital to community well-being in unprecedented ways.

- A new movement is emerging to mobilize governments, international agencies, and other public systems to be the base for equitable treatment of citizens. Government should be a key change agent—overseeing the private marketplace and developing public investments to address historic and contemporary injustices and to eliminate poverty.

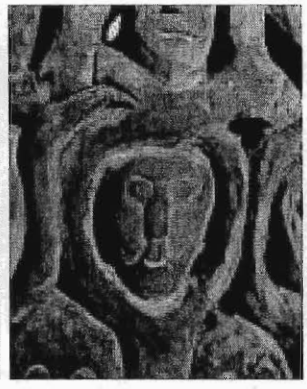
As we grapple with the implications of these changes for asset building, we are mobilizing our resources to build new knowledge, support practical experimentation, and encourage sound policy development and advocacy. Some preliminary results of these efforts—and the ingenuity and creativity of our grantee partners—are illustrated in the stories presented here. They give us reason to believe that building assets can make a difference in reducing poverty and injustice. As we learn from the asset building efforts of people and organizations worldwide, we want to continue sharing these lessons with others. We hope that these results will be helpful to all who care about creating a just society in which individuals and communities are active agents in their efforts to move out of poverty.





More Information About Building Assets



These publications reflect a selection of the current issues and debates about asset building worldwide:

Bebbington, Anthony. Capitals and Capabilities: A Framework for Analyzing Peasant Viability, Rural Livelihoods and Poverty in the Andes. London, UK: International Institute for Environment and Development, 1999.

Bebbington draws on ethnographic and sociological evidence that suggests that rural people make livelihood choices based on multiple criteria, of which income is only one. The author argues that livelihoods do more than just support life: they also make it meaningful, and so the maintenance of cultural and social practices that accompany rural residence is also important. Bebbington's analysis of rural livelihoods focuses on people's access to multiple assets.

Kretzmann, John P., and John L. McKnight. Building Communities from the Inside Out: A Path Toward Finding and Mobilizing a Community's Assets. Evanston, IL: Center for Urban Affairs and Policy Research, Northwestern University, 1993.

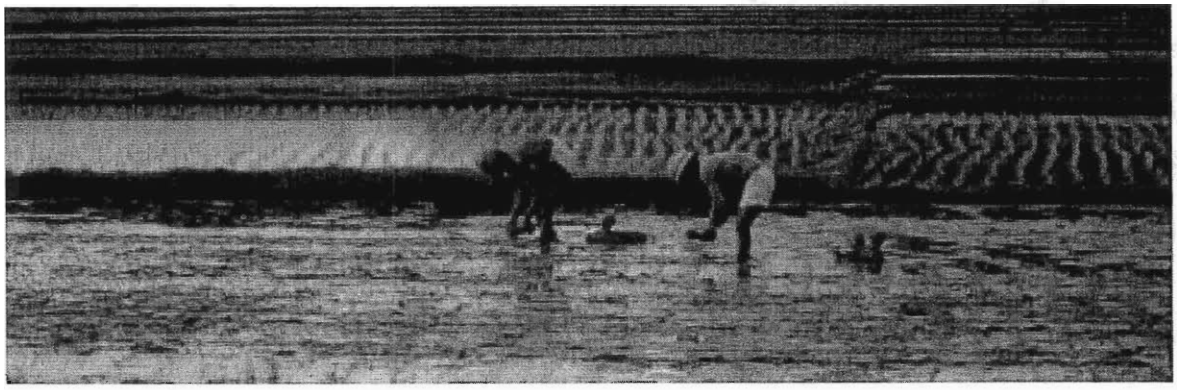
This guide summarizes lessons learned by studying successful community-building initiatives in hundreds of neighborhoods across the United States and outlines what local communities can do to start their own journeys down the path of asset-based development.

Oliver, Melvin L., and Thomas M. Shapiro. Black Wealth/White Wealth: A New Perspective on Racial Inequality. New York, NY: Routledge, 1995.

Oliver and Shapiro analyze patterns of private wealth-holding to uncover a deep and persistent racial inequality in U.S. society. Using an analysis of historical and contemporary social and political forces, they demonstrate how public policy and the actions of key institutions have created and maintained this vast racial and economic divide. They conclude with a call for new public policies that promote individual asset building and greater asset equality in U.S. society.

Sen, Amartya. Development as Freedom. New York, NY: Knopf, 1999.

Based on Presidential Fellow lectures at the World Bank, Sen's book outlines the need for an integrated analysis of economic, social, and political activities, and institutions. The interconnections among economic opportunities, political freedoms, social facilities, transparency guarantees, and protective security are examined. Societal arrangements are investigated according to their ability to enhance the freedom of individuals, seen as active agents of change, rather than as passive recipients of dispensed benefits.



Sherraden, Michael. Assets and the Poor: A New American Welfare Policy. Armonk, NY: M.E. Sharpe, 1991.

In the first half of this study, Sherraden provides a critical analysis of federal welfare policy, welfare theory, and welfare reform debates. In the second, he proposes an asset-based policy that would create a system of incentives through "Individual Development Accounts" based on the concepts of savings, investment, and asset accumulation rather than the income supports, spending, and consumption that guide current policy.

Yunus, Muhammad. Banker to the Poor. Dhaka, Bangladesh: The University Press Limited, 1998.

An autobiographical account of the founder of the Grameen Bank, this work fundamentally rethinks the economic relationship between the rich and the poor. Yunus believes that credit is a human right, the last hope for those faced with absolute poverty. Yunus integrates Eastern and Western cultural views, asserting that society must concentrate on promoting the will to survive and the courage to build the first and most essential element of the economic cycle—people.

The stories and examples in this publication reflect the Foundation's interests over time in innovative strategies to reduce poverty and injustice. Grants respond to local conditions and similar activities are not necessarily funded in all countries. To learn more about the current interests of the Ford Foundation:

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To comment and share your experiences with asset building

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Programs Of The Ford Foundation

The Asset Building and Community Development Program works in partnership with two other Ford Foundation programs: Peace and Social Justice; and Education, Media, Arts and Culture. Collectively, we support institutions, activists, scholars, practitioners, and leaders in 15 fields worldwide.

PEACE AND SOCIAL JUSTICE	ASSET BUILDING AND COMMUNITY DEVELOPMENT	EDUCATION, MEDIA, ARTS AND CULTURE
• Human Rights • International Cooperation • Governance • Civil Society	• Children, Youth and Families • Community Development • Development Finance and Economic Security • Environment and Development • Sexuality and Reproductive Health • Workforce Development	• Education Reform • Higher Education and Scholarship • Religion, Society and Culture • Media • Arts and Culture

Foundation program officers develop grant portfolios that respond to conditions and opportunities in selected regional and national contexts worldwide. Grantmaker portfolios typically include a combination of support for research and demonstration projects, organizational development, policy development, and constituency building efforts needed to address key problems and achieve large scale social change.

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Footnotes

i Geeta Rao Gupta, President, International Center for Research on Women, interview with the Ford Foundation, 12/13/01.

ii Bebbington, Anthony. Capitals and Capabilities: A Framework for Analysing Peasant Viability, Rural Livelihoods and Poverty in the Andes. London, UK: International Institute for Environment and Development, 1999. p. 5

iii Sherraden, Michael. Assets and the Poor. Armonk, NY: M.E. Sharpe, Inc., 1991. p. 148

iv Kenya Community Development Foundation. Beyond Fishing. Nairobi, Kenya: Kenya Community Development Foundation, 1998

v Sherraden, Michael. Assets and the Poor. Armonk, NY: M.E. Sharpe, Inc., 1991. p. 155-156

vi Sherraden, Michael. Assets and the Poor. Armonk, NY: M.E. Sharpe, Inc., 1991. p. 155-156

vii Sherraden, Michael. Assets and the Poor. Armonk, NY: M.E. Sharpe, Inc., 1991. p. 97

viii Ford Foundation. Lessons Learned From London: Report on the Ford Foundation's Worldwide Philanthropy Meeting. October 14-16, 1997. p. 6

ix Corporation for Enterprise Development. Ideas In Development. Washington, DC: Corporation for Enterprise Development, 1999. p. 9

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Natural Resource Management and Chronic Poverty in Sub-Saharan Africa: an overview paper

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Abstract

This paper briefly identifies some underlying premises of the 'small farmer' model that inform much rural development policy designed to address poverty. The paper then reviews recent work on processes governing the use of, and access to, natural resources. It argues that the small farmer model does not correspond to many of the processes of change that are observed in rural areas of sub-Saharan Africa. Differentiating between two scenarios, those of 'boom' and 'stagnant' rural economies, the paper explores the relationship these may have with concepts of 'remoteness' in rural areas and traces the different dynamics of agricultural production strategies and of evolving access to land in the two scenarios. It emphasises the operation of markets in influencing competition for land, and the importance of farmers' investment in productivity-enhancing technology in building their claims to land. The paper then considers the implications of these patterns of land use and access for policy seeking to improve conditions for the chronic poor.

1. Introduction

This paper aims to provide an overview of the ways natural resource management may be relevant to strategies to reduce "chronic poverty" (Hulme et al 2001). It therefore focuses upon issues of access to, and use of, natural resources that affect the livelihoods of the rural poor, in particular. In doing so, however, the paper makes no assumptions about the relationships between 'rural' and 'urban' livelihoods, leaving open the possibility that the distinction may be difficult to define in practice (Bemstein, 1992a; Ashley and Maxwell, 2001). Similarly, an assessment of the extent to which 'chronic poverty' is a 'rural' phenomenon is not a principal concern of this paper, having been considered in some detail by other papers in this series (Hulme at al, 2001; Bird et al, 2002). These have highlighted that chronic, or long-term, poverty is more likely among people who are particularly vulnerable due to their 'life stage' (eg children, older people), or who are discriminated against at national or local level because of caste, ethnicity, or refugee/ migrant status, or who are disadvantaged through illness or disability. To these general categories we may add that in the rural context chronic poverty is likely to involve those lacking access to land or livestock. The point of departure for this overview is an exploration of the extent to which policies on the management of natural resources, particularly land, water, forests and pastures, may reduce chronic poverty in poorer, less industrialised, countries.

The paper makes no claims to be comprehensive in its geographical coverage, drawing principally on the recent literature on natural resource management in Sub-Saharan Africa. Although a large part of the 'chronically poor' may be located in this region (Hulme et al (2001) estimate that 46% of people in SSA are living on less than $1 per day), this restricted scope does not, I believe, diminish its wider relevance to debates about how natural resource management can be harnessed to improve the well-being of the poor. The themes covered in the paper are directly relevant to drought-prone and forested areas of South Asia, and, to the extent that it addresses the consequences of declining access to natural resources – most notably landlessness – the paper is also relevant to those rural areas where the landless are a significant element of the population.

The paper uses as its starting point the 'small-farmer' model of economy and society which has for many years underpinned development agencies' vision for poorer countries (Ellis and Biggs, 2001). Section 2 summarises this model as set out by one of its recent proponents (IFAD, 2001). Section 3 considers alternative interpretations of rural poverty, and sections 4 and 5 respectively review how chronic poverty may be generated from changing use of, or access to, natural resources.

2. The 'small farmer' model.

IFAD (2001) claims that 75 percent of the poor live in rural areas, and that 60 percent are expected to do so even in twenty years time. The review of poverty studies undertaken by Bird et al (2001) also concludes that people living in rural areas are more likely to be poor than those living in urban areas. IFAD goes on to claim that "six in ten of the world's extremely poor earn their living mainly from farming or farm labour" (IFAD, 2001:4). From this follows advocacy of a 'small farmer' model of poverty reduction in which smallholder production of food staples is expected to "play a critical role in the livelihoods of the rural poor" (IFAD, 2001:4).

Within this model, the key to poverty reduction is perceived as increased productivity on 'small, private farms' through technological change: improved seeds, more reliable moisture availability. While the model argues that technological change should be 'labour-intensive', it also asserts that productivity should increase faster than output prices fall, so that food producers and food consumers both gain. This, it

is argued, will release labour for non-farm diversification to meet the growing consumption demands of the smallholder households. Factors supporting this poverty-reducing transformation are identified as market liberalisation, more control over assets (land, water, technology) and institutions by the poor (especially disadvantaged groups such as women), and decentralised and participatory methods (IFAD, 2001:4-6).

Three key elements of this model are the object of the subsequent sections of this paper:

- the problem of 'rural' poverty is primarily a problem of low farm productivity;
- increases in productivity of resource use by the poor are possible using 'scale-neutral' technology in the form of improved seeds and water control;
- access to natural resources for the poor will be improved by 'decentralised and participatory' methods and "land reform to create small, not-too-unequal family farms"(IFAD, 2001:9);

A fourth important premise of the IFAD report is that engagement of small farms in (global) markets will enable income growth as well as subsistence security for the smallholders. This will not be discussed in this paper, but needs to be mentioned because it profoundly affects the economics of farming in general and the significance, in particular, of economies of scale which disadvantage small-scale farms competing in global markets. In recent decades agricultural commodities have been characterised by falling prices on the world market, with severe consequences for small-scale farmers producing crops for export (Ashley and Maxwell, 2001:404). In this context, it is unsurprising that the most dynamic element in African farming is in the production of high-value fruit and vegetables for consumers in Africa's expanding urban areas, for which international competition from industrialised producers is likely to be less strong.

Improving incomes from other types of agriculture appear to depend on obtaining access to a higher-priced market segment. One such approach has been to switch to 'organic' production methods (eg for groundnuts) or a 'fairtrade' marketing channel (eg for cocoa or coffee) - or both. While 'fairtrade' may stabilise agricultural prices for export crops, it remains to be seen whether it can significantly alter the long-term decline in agricultural commodity prices. Moreover, producing for a relatively higher-priced market niche means farmers must meet additional quality standards. This is also the case for most of the recently established commodity chains for 'non-traditional' exports from low-income countries, such as cut flowers and fresh vegetables. The challenge of new technology adoption which quality standards impose may raise farmers' production costs at farm level, but, perhaps less equivocally, also requires conditions, such as timely transport and refrigerated storage, that may not easily be met within the resources of the small farm. This implies the need for linkage to larger scale entities. These may be commercial enterprises, such as contract farming or outgrower schemes (Coulter et al, 1999), or cooperatives, but, either way, suggests an important question mark over the terms on which small farmers engage with increasingly globalised agricultural commodity chains.

3. The character of 'rural' poverty

The small-farm model, or 'agricultural development' approach to rural poverty has been one of the strongest influences on policy since the 1960s (Ellis, 2000:21, Ellis and Biggs, 2001). As exemplified by IFAD (2001), this remains the case, despite the means originally identified for its delivery – the agencies of the state – having been to some extent substituted in more recent formulations by market-based processes.

One important aspect of this model from the point of view of an agenda to address 'chronic poverty' is a tendency for it to be associated with a view of 'rural' society as relatively homogeneous – defined above all by its character of being 'non-urban'- and relatively static: a rural society of 'small farmers'. This is not to say that social differentiation and change are not acknowledged, but that they are located within an overall view of 'small farmer' society as a stable social and economic formation whose main processes of changing material wealth are perceived in cyclical Chayanovian terms: younger households having fewer assets becoming wealthier as children increase their workforce, and less wealthy again as children leave home to set up new households. Small farmer models of rural society, such as that advocated by IFAD (2001), do acknowledge differentiation between small farmers and farm labourers. However, the potential conflict of interest within the relationship between employer and employee tends to be played down by emphasis on processes that will benefit or disadvantage both groups. Thus, it is argued that change (eg through new technology) needs to benefit both farmers and labourers by prioritising 'labour-intensive' initiatives. Conversely, impoverishment affects both when profitability of small-scale farming is undermined – a problem most frequently attributed to 'external' causes': formerly to 'urban bias' in government policy (Lipton, 1977), more recently to 'globalisation'.

Where attempts are made within this perspective to discriminate between degrees of rural poverty, the 'poorest' or 'resource-poor farmers' are characterised in terms of the (less favourable) agro-ecological conditions in which they must make a living, as in the case of the farmers in 'diverse, risk-prone environments' prioritised by 'Farmer First' approaches to technology development (Chambers et al 1989). This notion that poverty is concentrated in areas with lower agricultural potential has been commonplace in the 'targeting' of international agricultural research to combat poverty, although studies in India in the early 1990s suggested "the percentage of the total population which is poor is fairly uniform across agro-ecological zones, varying from approximately 25% in the 'wet zone' to 39% in the 'seasonally dry zone'.....(E)ven in the parts of India where the green revolution has taken place, the proportion of the population living in poverty is between 30 and 40%" (Ravnborg, 1992:55-6).

This observation underlines the importance of understanding heterogeneity and change in the analysis of poverty. An approach that gives greater prominence to these dimensions of agrarian systems is that of political economy (Byres, 1996; Bernstein, 1992b: 27-32), which argues that 'small farmer' or peasant forms of production are inherently unstable: the more 'successful' farmers tending to accumulate control over resources (notably land) at the expense of the less successful, creating a class of property-owning 'farmers' and a class of landless labourers. The pace and specific forms of such changes depend on the particularities of local markets (eg those for agricultural products, for technology and for labour), and do not preclude the possibility of new forms of small-scale production coming into being, as changing markets create new opportunities (for example in peri-urban horticulture as a result of urbanisation). However, one general implication of this view is that the very poor and less poor cohabit the same communities, and, as labourers on the one hand and employers of labour on the other, have livelihoods that are not only interconnected but in certain respects (wage rates) in conflict. Where labour wage rates are low (due to lack of alternative work opportunities) it is entirely possible that large numbers of the 'chronically poor' will be living in the more agriculturally productive areas – such as the 'green revolution' areas of South Asia referred to in the quote above. This is supported by the recent review by Mehta and Shah (2001) which suggests that in India mapping poverty simply according to agro-ecological potential is not useful, if only because of the extent of migration of poor

people to work as labourers in 'wet zones'. This suggests important parallels with Sub-Saharan Africa, as detailed below. Berry (1993) has argued that in Sub-Saharan Africa the negotiation between those controlling land and those supplying labour is influenced by a tendency for markets for labour to be less ambiguous than markets for land: "access to rural land remains contested and negotiable. Contests are fought with money and influence, in the name of customary rules and prerogatives" (Berry, 1993: 132). Whether this 'negotiability' of access to land offers sufficient 'social mobility' for the disadvantaged to avoid 'chronic poverty' is questionable (see section 4.3, below), although it is evident that the availability of farm labour in SSA reflects the particular dynamics of African economies, many which have for decades experienced political and economic instability, and an underlying 'failure of industrialisation' (Lawrence, 1986:7). Berry argues that this economic context has prompted many people to diversify their income sources, often investing in a multiplicity of social networks in order to do so, but with diminishing returns: "The result is a high degree of mobility of people and resources but little tendency for institutions to coalesce into stable frameworks for collective action, resource management, or the consolidation of capital and knowledge" (1993:196).

From a political economy perspective, then, both the perceived stability of 'smallholder farming' and the role of natural resources in the creation or reduction of poverty depends on underlying social and economic trends as much as, or more than, the agro-ecological potential of a particular area. Recent research has provided a wealth of case studies which have broadened understanding of such dynamics. As a consequence, neo-Malthusian explanations of poverty in terms of 'population growth' outstripping the available land resource, and causing 'land degradation', are now challenged by alternative analyses which offer a basis to understand the very diverse patterns encountered empirically. Most obvious of these is the observation that population growth is much more rapid in some areas than in others, and in some cases population is in decline (Raynaut, 1997a). A related important observation is that differences in population growth rates (and resulting differences in population density) are – in Africa at least – often the result of population migration.

Defining mobility as a key aspect of rural livelihoods has important implications for how we understand 'small farmers'. Identifying the factors responsible for migration patterns can also give insights into the relationship between natural resources and rural poverty. Perhaps the defining feature of much recent research on natural resource use and rural poverty is recognition of the importance of a historical perspective to an understanding of current patterns of resource use. Not only has this led to a re-evaluation of whether rural poverty is the result of 'environmental degradation' (Leach and Mearns, 1996; Fairhead and Leach, 1996), but it has shown that existing settlement patterns are the result of many interacting factors. Raynaut (1997a), for example traces existing population density and distribution in West Africa back not only to the zones of economic activity (mining, cash crop production, infrastructure development) established under colonial administration, but also to areas of stable administration (and population concentration) or insecurity (and consequent depopulation) under pre-colonial states. Such studies have also identified situations where the ecology of disease vectors creates a 'threshold' of minimum human population density below which the challenge of diseases such as onchocerciasis (Raynaut, 1997a) and trypanosomiasis (Richards, 1985; Kjekshus, 1977) makes continued settlement unsustainable. In this way, disruption or insecurity of economic activity can translate into permanent abandonment of otherwise productive agricultural lands.

From the perspective of mapping the role of natural resource endowments in rural poverty, the important conclusions are:

- social and economic dynamics providing security or market opportunities may be as, or more, important than ecological characteristics in determining the population density of an area.
- Conversely, 'stagnating' areas with low and/or declining populations will not necessarily be 'resource-poor' environments in an agricultural sense, even though they may be 'remote' from state or commercial investment.
- In 'boom' rural areas immigration will be an important element of population growth, increasing competition for resources such as land, water, pasture etc.
- Very poor people may be living in both 'boom' and 'stagnating' rural economies, although the mechanisms creating their poverty may be quite different: exclusion from access to land as a result of increasing competition in boom areas; lack of labour or capital with which to exploit land in 'stagnating' areas suffering emigration.

In relation to the geographical distribution of poverty, the analytical approach set out above supports the notion of 'remoteness' (Wiggins and Proctor, 2001; Bird et al. 2002) as an important factor in determining levels of chronic poverty. In particular, it supports the notion of 'remote' areas as characterised by low or declining levels of human capital: emigration of the most able, leaving a 'residual' population of the elderly, dependent children, and the disabled, poorly served by health and education services (cf Bird et al, 2002:17). Despite these disadvantages of remote rural areas, it should not be assumed that absolute levels of poverty will always be worse in 'remote' areas than in more economically dynamic, less remote areas. For example, Marzetti (2001), comparing more and less remote villages in Morrumbala District, Mozambique, found lower household incomes but also lower levels of child malnutrition in more remote villages than in villages with better market (road) access. This she attributed to greater social fragmentation under economic 'boom' conditions, which resulted not only in competing demands on parents' time, but also less willingness on the part of neighbours to provide snacks to young children.

The path-dependence of development patterns I have emphasised above cautions against trying to 'read off' the quality of natural resources (and hence their role in the determination of poverty) from 'remoteness', as in attribution of 'remote' rural areas as 'marginal' from the point of view of soil quality or rainfall (cf Bird et al, 2002:19). This may be the case, but should not be assumed to be always so. A number of observations reinforce this view. As Wiggins and Proctor (2001) point out, agricultural activities in peri-urban areas are not primarily influenced by the underlying quality of soil or climatic conditions, but by the strength of (urban) demand. One can add that, since urban areas originate from a variety of historical circumstances (trade, military, administrative) there is no more reason to associate urban centres with 'favourable' agro-ecology than there is to associate 'remote' areas with 'unfavourable' natural resource conditions. The extent of attenuation of demand (through 'geographical friction' effects of poor transport etc) in 'remote' areas can therefore be argued to be of more importance than the underlying natural resource base in 'remote areas'. This is certainly the conclusion to which Raynaut's (1997a,b) work in the Sahel would lead. It is further reinforced by the observation that today's 'remote' rural areas can become tomorrow's centres of highly productive agriculture. The development of irrigated horticulture in Maasiland (Southgate and Hulme, 2000) and in northern Thailand are cases of agriculturally 'marginal' areas being transformed in response to changing market opportunities.

With the caveats set out in the previous paragraph there is a degree of congruence between the concepts of 'stagnating' areas of rural economy and that of 'remote rural

areas'. However, a further issue may separate the way these concepts interact analytically. This concerns the terms of access to rural resources, such as forests, particularly in conservation areas. While it is true that conservation areas are often 'remote' in terms of distance, this does not necessarily mean that they are poorly served by roads or other services, particularly where they are the focus of international tourism or significant extractive activity (forestry, hydropower etc). Here, the key question for poverty analysis is the terms under which the poor gain access to natural resources, whether as direct users or indirectly as employees of the conservation agencies. As such, the primary consideration may not be 'remoteness' in terms of 'time to reach urban markets' ('geographical friction'), but the extent to which the rural economy can be considered to be 'growing' or 'stagnating' as a source of employment.

Thus, while geographical mapping of poverty clearly serves an important purpose in the analysis and design of policy, it may not be possible to do this using purely spatially-defined criteria of 'remoteness' or 'natural resource potential'. Understanding the distribution of poverty will need, in addition, some characterisation of the local socio-economic dynamics of the rural economy. The following sections review implications for poverty of two critical aspects of these dynamics, the (changing) technology of resource use and the governance of access to resources.

4. Using natural resources: productivity and diversification

4.1 Agriculture

Although many sources continue to assert that the impoverishment of rural areas in Africa is due to declining land productivity under an increasing population using low-input farming methods (IFAD,1994:10; World Bank, 1996: 22-5; WRI, 1998: 3-4), a growing number of authors point out that there is little direct evidence to support this (Young and Wright, 1980, Stocking, 1996; Scoones and Toulmin, 1999). Others have argued that increasing population is a pre-requisite for the intensification of farming methods and an increase of land productivity (Boserup, 1965; Tiffen and Mortimore, 1994).

However, it is not necessary to argue that agricultural productivity is declining, merely that it is not increasing, in order to identify a plausible cause for crisis. The long-term decline in the terms of trade between agricultural output and manufactured goods is sufficient to explain this. Raynaut (1997b) observes that in the Sahel an individual's annual tax obligation in the1940s could be paid with the sale of 20kg of millet, but in the 1970s required the sale of 90kg. Under such circumstances, migration of young men to seek wages in urban areas, in mining industries, or in rural areas with higher-value agricultural output (Cocoa, Coffee, sugar, tea plantations) was economically rational as early as the 1950s (Haswell, 1963).

The effects of this emigration are double-edged. On the one hand, it constitutes a loss of the most productive farm labour and thus reduces the potential investment of labour in improving productivity, and increases the workload of those who remain, notably women with children and the old. On the other hand, where absence is brief or seasonal, or where migrants generate significant remittances, migration as a means of diversification of income source can offset the loss of labour by providing cash to invest in agriculture. The aim of such investments may be simply to secure household subsistence, as in the case of irrigation pumps purchased by Senegalese migrants in France in the 1970s (Adams,1981; Diemer and van der Laan, 1987), or hybrid maize seed and fertilizer purchased by Swazi migrants in the 1980s (Low, 1986).

However, usually such investments also allow the prospect of increasing marketed output. In Sub-Saharan Africa, two key investments appear to have made economic sense to farmers in recent years: investments in soil and water conservation (SWC) and purchase of livestock. In fact, the term SWC is a misnomer – 'water augmentation' is probably more accurate - since investments in terraces, stone bunds, wetland cultivation, and so on are invariably made with a view to gaining higher returns in farming through production of higher-value crops, such as vegetables, rather than soil conservation *per se* (Boyd and Slaymaker, 2000), and hence the likelihood of such investments being worthwhile is critically dependent on access to the rapidly expanding urban markets for fresh vegetables. Where this is the case there is evidence of significant increases in farm productivity being achieved through farmers' investment in improving water control (Tiffen and Mortimore, 1994), but with increased socio-economic differentiation between wealthier and poorer members of farming communities (Murton, 1999; Southgate and Hulme, 2000), as opportunities for more intensive production are exploited by those with better access to assets such as water, land, and non-farm income as a source of investment in new technology.

In certain circumstances, small-scale water control technology for irrigation or rainfall storage may be considered an appropriate agricultural option for poorer social groups in the well-connected 'boom' areas, since quite high returns to labour can be achieved on very small plots of land. Such schemes have proved popular for women's groups in densely populated areas of South African ex- bantustans (Woodhouse, 1997). However, some access to land is needed, together with capital and labour to invest in the necessary infrastructure, and access to the market. Poorer people are unlikely as individuals to meet these requirements and it is likely that some form of 'social capital' – in the form of an organisational framework – is needed also.

Investment in SWC removes a major constraint to crop productivity – inadequate water availability – and conventional vegetable production may often be extended to include crops such as sweet potato, cassava, and green maize that can double as staple foods as well as high-value marketed output. In 'remote' areas, distant (in terms of difficulty of access because roads are poor) from urban markets, the options for intensification are much more restricted, not least because these are likely to be areas of labour shortage. Under semi-arid conditions there are few investments in increasing land productivity that are likely to be worthwhile as long as rainfall uncertainty remains a constraint. At the same time, investments in irrigation or in improving water retention by soil are unlikely to be remunerated by the production of cereals alone. Where such investments are made by the state, or otherwise appear free of cost to farmers, returns to cereal production, especially rice, can make it worthwhile for farmers to make other investments (e.g. fertiliser, hired labour) to increase productivity. The principle investment widely made in such contexts is in animal draught for ploughing, and possibly weeding, with the effect of improving labour productivity and expanding the area under cultivation. Successful farmers may diversify further with acquisition of more livestock (see below). The poorest members of communities in areas dependent on rainfed cereal production (eg in Zimbabwe and Botswana) are frequently defined by their lack of draught animals (Woodhouse et al, 2000; Clayton and Woodhouse, 2000).

Historically, customary institutions such as the *mafisa* in Botswana ensured that owners of large herds would loan draught animals to poorer households to enable them to re-enter the cattle economy. The breakdown of these customary practices (Clayton and Woodhouse, 2000) has accompanied the Botswana government's policy of providing ploughing subsidies. Owners of larger herds, now ploughing with

tractors, prefer to claim the subsidy for ploughing their poorer neighbours' fields instead of lending them draught animals. This has meant that for 'chronically poor' households who have lost cattle through disease or drought continuation in farming depends on assistance from the state or hiring cattle from neighbours.

Considering the risks of destitution of poorer arable farmers subject to the extreme rainfall uncertainty of semi-arid climates (which predominates in most of sub-Saharan Africa), it is worth asking whether such systems were less risky in the past. There are two principle answers to this. The first, derived from work in Zimbabwe (Scoones et al, 1996) is that present-day rainfed farming is concentrated far more on drought-prone interfluves (the higher parts of the landscape) than in pre-colonial times. This implies that, in addition to expropriation of much of the higher rainfall areas for European settlers, colonial policies prohibiting cultivation of valley lands (ostensibly to prevent erosion of drainage systems) made African farming systems more vulnerable to drought. A related development that increased vulnerability was the switch to more drought-susceptible crops. The most striking examples are the wholesale switch from sorghum to maize as the staple cereal in southern Africa in the first half of the 20th century and the substitution of millet and sorghum by rice as a staple in parts of the Sahel in the latter half.

A further, and possibly more widely relevant, answer is that farming of cereals in semi arid Africa is today undertaken by much smaller units than in the past. The system of cultivation by extended family or lineage groups has been described by many authors. The account by Toulmin (1992) makes particularly clear the tradeoffs for members of these large kinship cultivation groups: subordination to the labour demands of the group (though this does not preclude cultivation of fields of one's own, rather the priority they can be given) in exchange for the support of the group in times of hardship. Opportunities for higher cash income, from cash crops or from wage income are widely acknowledged to have led to an earlier departure of young men from the workforce of these family food cultivation systems to set up their own 'nuclear' households, and consequently to a decrease in the size of the farming unit. In this sense, increasing market orientation of agriculture during the past century may have contributed to increasing vulnerability among farming households.

These considerations suggest two scenarios for reducing vulnerability of poorer members of communities dependent primarily on rainfed farming under semi-arid conditions. First is that of diversification of management of natural resources such as water and trees to improve storage and provide reserves with which to confront the risk of drought periods. This option is potentially supported by a wealth of 'indigenous' experience (Reij et al 1996, Fairhead and Leach, 1996; Tiffen and Mortimore, 1994), but invariably involves substantial investment of capital or labour, and may hinge on whether crop values are high enough to make this worthwhile. In any event, these options may not be available to the 'chronically poor' – those least likely to command labour or capital.

The second scenario suggests that for the chronically poor the 'small private farm' may not be the basis for a reliable livelihood while at the same time not necessarily encouraging the social support needed to gain access to other assets. This is not to suggest that a return to large patriarchal kinship production units is either feasible or desirable, but to indicate that larger scale economic and/or social units may afford better protection to the more vulnerable in high risk environments. Typically, this may involve some form of cooperative effort. Examples exist of savings clubs linked to small-scale agricultural production, such as *stockfels* among women in South Africa (Woodhouse, 1997) or Maasai women saving to buy land (Southgate and Hulme, 2000), or *mwethia* terrace construction groups in Kenya (cf Berry, 1993:133).

However, these generally combine an investment in group activity to secure resources (land and water) with an essentially individualised small-scale farming activity. For some of the chronic poor, such as elderly or disabled people, individuals' work capacity is likely to be quite varied and a collective production unit will need to offer correspondingly varied types of work opportunity to its members. Processing of agricultural or other products derived from natural resources (trees, fish etc) offers such a range of different activity types, but the potential role of the chronic poor (disabled, elderly etc) in this area of activity is, as far as this author is aware, a relatively undeveloped area of rural development policy and practice. It may be one in which lessons from experience in the North need to be evaluated. The key questions would appear to be those of balancing the demands of the market with the range of different abilities and contributions available from different members of the 'chronically poor'.

4.2 Livestock and Pastoralism

Livestock production is possible where rainfall is insufficient to support reliable crop production, and in much of arid and semi-arid Africa transhumant livestock production or pastoralism has historically been the predominant form of natural resource use. In semi-arid West and East Africa pastoralist ethnic groups established considerable dominance over sedentary communities of cultivators. Since colonial administration at the start of the twentieth century pastoralists have lost ground politically, economically, and socially to cultivators. There are two principal reasons for this. Firstly, pastoralists' territorial scope for transhumance has been reduced by colonial and post-independence states' appropriation of land for other uses, such as game or wildlife reserves (e.g the Maasai in Kenya and Tanzania), or for agricultural development schemes (eg Toucouleur in the Senegal River Valley, Fulani in the Office du Niger, the Afars in the Awash Valley).

These reductions in the scope for transhumance were at least in part justified by a perception that pastoralist production methods were inefficient and environmentally destructive and a belief this could be improved by settling pastoralists on ranches managed under scientific principles. This perception is now seriously questioned (Sandford, 1983; Behnke et al,1993;Scoones, 1994) and there is a growing awareness that, under conditions of extreme rainfall fluctuation that prevail in semi-arid Africa, pastoralist impacts on vegetation are much less destructive than earlier thought and that transhumant grazing management in which grazing 'tracks' forage availability is more efficient than scientific attempts to identify a target 'carrying capacity' for rangelands.

The second reason pastoralists have suffered in relation to cultivators is that access to key resources, such as dry season grazing, have been curtailed by changes in crop production systems. The most marked of these is the development of wetlands, river valleys and other water resources by farmers in order to intensify agriculture (Southgate and Hulme, 2000; Woodhouse et al, 2000). A related development is the accumulation of livestock by farmers, which undermines the reciprocal logic of farmers allowing pastoralists' herds to graze crop stubble in order to benefit from the fertilizer effect of the manure (Ramisch, 1999). The mobility that is essential to pastoralists' production system means that their occupation of an area is transient, and as a consequence claims over resources are often seen as weaker than more sedentary communities (Hammel, 2001). Despite international advocacy of strengthening of pastoralists' rights over land, it seems clear that pastoralists' access to land is increasingly under challenge from expansion and intensification of crop production, and that particular effort will be needed if their position is not to be made worse by land tenure reform processes currently underway in many parts of Africa.

Although poverty is often significant among pastoralists, identifying a separate group of 'chronically poor' pastoralists is problematic. This is because poor pastoralists lose their stock and effectively cease being pastoralists: either they join the stream of poor seeking livelihoods in urban areas; or they become 'sedentarised' small-scale cultivators, or they become landless labourers- often employed as herders of other people's livestock. Zaal and Dietz (1997:7) suggest this latter may be a route to accumulate cash in order to purchase livestock in order to return to pastoralism, although Southgate and Hulme (2000: 110) regard this as 'somewhat optimistic'. As mentioned above in the context of Botswana, commoditisation of the pastoralist economy may lead to the breakdown of customary institutions that previously underpinned redistribution (loan) of livestock in order to keep poorer households within the pastoral economy.

4.3 Forestry and Forest-Related Resources

Forest resources provide the basis of a wide range of uses for both subsistence and commercial purposes, including medicines, mats, baskets, furniture, timber, fuel, fruit, mushrooms, 'bushmeat' and many others. For the poor, forest resources are "part of a larger body of rural non-farm activities that act as a sponge absorbing those unable to obtain employment on their own farms or as labourers" (Arnold and Townson,1998:3). With the exception of plantations (e.g. conifer and eucalyptus) dedicated to pulp or timber production, or forests subject to specific conservation regimes, the status of forests as public or common property under state or customary tenure means that in practice they can act as a 'commons' to which the poor have relatively unrestricted access. Use of forest resources may often be seasonal, determined by availability of household labour otherwise engaged in agriculture, by raw material availability, or by market access. Shackleton et al. (2000) argue that the importance of such resources as a 'safety-net' for the rural poor is often underestimated because their use and exchange is non-monetised and therefore unvalued. In this respect it is important to distinguish the significance of use of a resource between, on the one hand its contribution to users' livelihoods, and on the other hand the volume or value of the resource used. According to Arnold and Townson (1998), the contribution of forest use to livelihoods is highest for the poorest users, but the heaviest use of forest is by wealthier users. Shackleton et al's (2000) data from South Africa illustrates the huge disparity in benefits obtained from 'communal' grazing by richer and poorer households: net annual value of livestock products and services was US$765 for cattle-owning households and US$25 for households without cattle. This is consistent with Arnold and Townson's (1998) conclusion that market opportunities for forest products are most easily exploited by better-off users who can invest labour and capital to overcome entry costs. Consequently, the patterns of forest resource use of the very poor diverge from those of the less poor. Whereas the better-off resource users will exploit resources for which there are growing (ie urban) markets (eg bushmeat, furniture-making, charcoal) and therefore high returns to labour and capital invested, the very poor will concentrate on activities whose entry costs are lower but are more likely to suffer market saturation and low returns.

In terms of strategies to assist the 'chronically poor' this conclusion raises important questions about diversification as a livelihood strategy in rural areas. In particular, if the paths of off-farm diversification open to the very poor are limited to those producing low returns, this seems unlikely to offer a significant improvement in their well-being. If returns to the use of forest resource by the poor are to improve, it would appear that either they must be provided with capital to overcome the entry costs of more remunerative activities, as argued by Start (2001), or their access to the forest resources should be privileged over their wealthier neighbours. In regard to the latter, Inamdar et al (1999) have suggested protecting poorer people's access to income

from bushmeat by allocating individualised use rights, in the form of individual transferable quotas (ITQs), coupled with the promotion of local institutions (user groups) to police illegal hunting.

4.4 Poverty and livelihood diversification

Diversification of livelihoods of the rural population in Sub-Saharan Africa is both long-established and increasing (Bryceson, 1999). Berry (1993: 152) emphasises the importance of non-farm income in socio-economic differentiation in rural areas of Kenya and Zambia. Ellis (2000) suggests 'reliance' on non-farm income is 30-50 percent in Sub-Saharan Africa, rising to more than 80 percent in southern Africa. The review in the preceding sections of agricultural production and alternative natural resource-based livelihood options suggests that diversification as a strategy to improve the well-being of the 'chronically poor' depends critically upon the returns (particularly to labour) that diversified activity can generate. There appears a strong divergence between diversification into high-return activities achieved by those with higher levels of human (labour, education) or financial assets and the 'safety-net' diversification into low-entry cost but low return activities which is most commonly the pattern for the poor. In this respect, returns from diversification using forest resources are likely to reflect the patterns observed in farming: the lot of the very poor is unlikely to improve without more access to capital or labour. The answer to this problem, according to IFAD (2001), is for those who fail in agriculture to diversify their livelihoods into activities such as construction and transport to supply growing demand from those 'small private farms' which have succeeded in increasing agricultural productivity and income. Ellis (1999) suggests this assumption is 'no longer tenable' where a large proportion of farming families are no longer wholly reliant on agricultural income.

Aside from the likelihood that education will be a major determinant of the income achievable by those diversifying out of farming, the key observation in relation to the role of diversification in livelihood strategies for the poor is that diversification at the level of an *individual's* activity is likely to provide the advantages of flexibility in a context of risk. In contrast, at the level of *household* the advantages of flexibility (for the household as a whole) are increased by the possibility of specialisation, and hence higher returns to labour, for individual household members (Ellis, 1999). Specialisation in a non-farm activity by individual household members may take the form of small-scale enterprise, but this again presents entry barriers, not only of capital but also willingness to undertake investment risk. As suggested above, it is the chronically poor who are least likely to be able to overcome such barriers. Indeed, Start (2001) argues that many of the poorest will aspire to employment in formal labour markets rather than self-employment as micro-entrepreneurs. Equally, however, it is formal labour markets that discriminate against many of the chronic poor, such as the elderly and disabled. As with agriculture, therefore, while risk may be reduced by work within a larger entity, this may need to be cooperative in nature if it is to assist the chronic poor.

5. Access to natural resources: governance and property

5.1 Decentralisation and Natural Resource Management

"To manage and conserve natural-resource systems effectively and sustainably, it is essential that local stakeholders participate. Decentralization to local communities has shown that local users have a comparative advantage over government agents in managing resources; they can design more efficient rules and more easily monitor and enforce them" (IFAD, 2001:26)

"The problem of current modes of ...devolution, decentralization and participation is that rural 'big men' tend to run local institutions in their own interests." (IFAD; 2001:27)

These two quotes from the same source demonstrate the deeply contradictory character of current policy on the governance of natural resources, particularly in Africa. The emphasis on decentralisation of natural resource management was founded on the perception, rooted in the agenda of structural adjustment, that state agencies were both ineffective in managing resources such as forests, and also unaccountable to the local constituency of users of those resources. This perception was reinforced by arguments attributing degradation of natural resources in Africa to the disruption of local regulatory institutions by colonial government, markets, or 'centralising' African states (Moorhead, 1989; Scoones, 1994, 1996; IIED, 1999:29). Decentralisation would therefore allow management to be more responsive to local users' priorities, and make use of their local knowledge in designing and ensuring compliance with management regimes. In these terms "community-based" natural resource management held out the prospect of achieving both environmental conservation and greater security of access to natural resources for the poor (CCD, 1995; Toulmin, 1995).

In practice, decentralisation programmes tended to focus on establishing local assemblies with responsibility for service (education, health) delivery and with limited revenue-raising powers. The question of control of resources such as land, water, forests, and pasture was often dealt with under separate legislation to that on land tenure reform. One consequence was to leave unresolved the relationship between elected local assemblies and customary authorities whose control over land had been integral to colonial administration, and who, despite not being formally recognised by post-independence legislation remained the *de facto* arbiters of land rights in many parts of rural Africa. This remains unfinished business in many countries (Mamdani, 1996), and I explore the implications for the 'chronic poverty' agenda below. First it is worth briefly considering further the poverty implications of Community-Based Natural Resource Management (CBNRM).

5.2 Community –based Natural Resource Management

The logic of community-based natural resource management drew on evidence of long-term 'sustainable' management of resources held as 'common property' (eg fisheries, pastures) by 'self-governing' institutions (Ostrom, 1990). Key features of successful 'self-governing' institutions were held to be the use of indigenous technical knowledge (ie knowledge that did not depend on external expertise) in managing the resource, a level of social relationships ('social capital') among members of the community of resource users that enabled consensus on management rules and ensured compliance, and legal recognition (i.e. by the state) of the rights of the community to exclude non-members from the resource. The idea that self-governing institutions were appropriate to manage 'common property resources', such as forests and pastures, which were also identified as 'safety-net' resources for the poor reinforced the prospect of 'community-based' management as a basis for improving the security of the poor. The lack of formal recognition of customary land rights in many African countries was interpreted in terms of a dichotomy between customary rights on the on hand and formally registered 'statutory' rights on the other (IIED, 1999). Since most rural land is held under customary tenure, it was argued that strengthening recognition in law of local customary jurisdiction over resources would provide protection for community –based management from interference by the state or market.

Despite its attractions to development agencies, the CBNRM model has been undermined by a series of theoretical and empirical arguments:

- The implausibility of expecting that policies seeking poverty alleviation through community participation will be driven by communitarian values of social solidarity, that is, a different "set of rules" from those of the market which are expected to prevail elsewhere (Goetz and O'Brien,1995), including between kin (Amanor, 2001).
- Implementation of programmes designed to formalise village-jurisdictions to improve resource management, such as the *Gestion de Terroir* in the Sahel, quickly made evident that customary authority of the village resided in the heads of lineages of cultivators, who regarded rights of pastoralists or immigrant farmers as entirely subordinate to their own, so that community-based management excluded participation by such stakeholders in decision-making (Evers, 1994; Woodhouse et al, 2000; Gray and Kevane, 2001).
- Empirical evidence from case studies suggests that state agencies' intervention in many parts of rural Africa may be ineffective or absent, so that natural resource management is already *de facto* 'community-based' in the sense that land allocation decisions are largely governed by customary authority. What such cases demonstrate is that land users holding customary rights to land are capable of achieving rapid changes in land use and increased productivity in response to market opportunities. As with intensification of resource use elsewhere, however, these changes tend to be accompanied by a growing differentiation between winners and losers, and little evidence of security for the poor (Hulme and Woodhouse, 2000).
- The heterogeneity of most communities signifies divergent and possibly conflicting interests of different community members in the use of a resource, offering as much chance of conflict as consensus in resource management at the level of a 'community' (Leach et al,1997). This suggests that CBNRM must be underpinned by conflict resolution mechanisms that are both state-recognised *and* locally legitimate. In practice, this often leads back to the problem of reconciling the local legitimacy of 'customary' rights with 'constitutional' rights of individuals. This presents particularly acute difficulties where local customary rights discriminate against individuals on grounds of sex or ethnicity, but needs to be addressed explicitly by any state-sponsored campaign in favour of the poor.

The issues of how best the interests of the poor can be protected are highlighted by debates over present land tenure regimes and the options for their reform being considered in many African countries.

5.3 Land Tenure and its Reform

The issue of land tenure in Africa has been the subject of debate since colonial administration, and a proliferating literature accompanied initiatives to reform land tenure which many African governments began in the 1990s and which in many cases remain in progress. The review below draws on the important collection of papers based on Anglo-French studies of African land tenure reform, edited by Toulmin and Quan (2000) and on a recent review by Lund (2000). Much of this recent literature is concerned with identifying ways to enhance equity and security, that is, to ensure recognition in law of rights of access to land for the poor. For many (IIED, 1999; Toulmin and Quan 2000b; Platteau, 2000) these objectives are best served by recognising and reinforcing customary rights to land. The alternative, which is integral to many government plans for tenure reform, involves some form of written register of titles to land, along the lines adopted in Kenya at independence. Opponents of land title registration argue that

- it favours the wealthy, who are best placed to deal with the bureaucratic procedures involved;

- it generally involves registration of 'primary' (ie cultivation) rights and ignores secondary or seasonal rights (eg to grazing) which are likely to be important 'safety-net' rights under customary tenure (Platteau, 2000). As a consequence access to land is likely to become more exclusive.
- Registration has generally not allowed land title to be registered in a woman's name;
- One justification for registration, that it allows land to be sold and hence to be used as collateral for loans to finance improvements in productivity, is not supported by empirical evidence, which shows no difference in rates of farm productivity across different forms of land tenure (Migot-Adholla et al. 1993).
- Conversely, the development of a land market opens the possibility of distress-sales by the poor in times of hardship, thus accelerating social differentiation and landlessness among the poor.
- The flexibility (or 'negotiability') of access to land through kinship under customary law offers the possibility of re-allocation of land to poorer community members on the basis of need.

One of the basic assumptions of these arguments, that customary tenure is characterised by allocation on the basis of kinship or membership of a community (and thus, implicitly, a refuge from market forces) has come under increasing scrutiny and challenge (Woodhouse et al, 2000). The review by Lund (2000) concludes that customary tenure is neither egalitarian nor in any way inimical to privatisation and sale of land. The perception of customary rights being 'inalienable' is attributed to their (re)constitution under colonial administration, which resulted from a convergence of two sets of interests. Upon incorporation as the base of colonial administration, the customary authorities or 'chiefs' were able to overstate their land allocation authority, a tendency that suited the colonial authorities as it strengthened administrative control over the rural population. Indeed, evidence from accounts of African agricultural development in the late nineteenth and early twentieth centuries (cf Hill, 1963 ; Bundy, 1979, Berry, 1993) suggests emerging land markets were suppressed by colonial authorities (Chanock, 1991). In fact, Lund (2000) concludes, there is widespread evidence of land markets operating informally, and in some contexts illegally, under customary tenure regimes. Although land sales are often accompanied by procedures to ensure local recognition of the transaction, such as written and witnessed documents, Lund argues they form part of a continuum of weaker or stronger claims to land that may extend to alienation by sale, and over which the formal tenure regime has no controlling role.

From the point of view of agrarian change and the dynamics of the rural economy and society discussed in section 3, above, it is worth noting the importance of investment as a factor in strengthening claims over land. At its simplest, investment in clearing land by cutting and burning vegetation forms the basis of all customary authority – usually held by (or transferred from) the descendents of the first settlers who cleared the land. Conversely, pastoralists, who clear no land, have no such customary authority over grazing areas, no matter how ancient their management of them. However, investment in boreholes by Tswana cattleowners in Botswana in the 1930s provided the basis for more exclusive rights not only to the water, but also to the pastures around them (Peters, 1994). Similarly, investments in SWC, such as irrigation infrastructure, stone bunds and terracing – even manuring to maintain the period of continuous cultivation (Gray and Kevane, 2001) - are associated with an increasing degree of exclusive control – privatisation of land. In effect, privatisation of land is therefore a consequence (not a pre-requisite, as proponents of land titling programmes argue) of investment to improve its productivity. Since it is the wealthy that are able to invest, it is they who will strengthen their rights to land, while poorer farmers will be more vulnerable to losing land rights due to their inability either to

establish visible investments, or to maintain continuous production (and therefore occupation). The resulting differentiation between those consolidating their land holdings and those losing them appears similar whether land is held under customary tenure in Burkina Faso (Gray and Kevane, 2001) or under formal registered title in Kenya (Murton, 1999).

Under the hierarchical authority of customary tenure a number of responses to this mechanism of privatisation are evident. Holders of customary rights to land may prohibit investments (eg planting of trees) on land loaned to others (Lavigne-Delville, 2000), or may prevent formal registration of land on which investments have been made (Lahiff, 2000). They may make rudimentary and unproductive investments, such as land clearing (Lund, 2000) or even irrigation (Woodhouse and Ndiaye, 1991) as a means of pre-empting competing claims to the land. They may enter into formal rental or sharecropping agreements with 'strangers' as a means of formalising their individual rights over the land and deflecting claims based on kinship (Francis, 1984: Woodhouse et al. 2000, Southgate and Hulme, 2000). They may enter into formal sharecropping arrangements with other members of their own family (Amanor, 2001). Finally, where market conditions are sufficiently lucrative, as in the case of peri-urban areas in Tamale, Ghana (Abudulai, 1996) customary authorities may simply appropriate the rights of individual owner of 'freehold' and sell plots of land to the highest bidder.

Those losing land rights under this process may challenge the holders of customary authority over land. In peri-urban villages of Ashanti region, for example: "There was hardly any village not engaged in litigation either with a rival village or within the community, where local people are battling with the customary custodians of land for accountability in respect of land disposals." (Kasanga and Kotey, 2001:17). Community members with less purchasing power may seek to invoke 'customary rights' to expropriate or demand rent from wealthier immigrants (Berry, 1993: 157). For example, in Burkina Faso, "poorer and land-short farmers (particularly the young) use political discourses (infused with the language of ethnicity) to halt incipient processes of intensification and 'privatisation'" (Gray and Kevane, 2001:583).

These accounts are not encouraging for strategies of reducing poverty through recognition of customary rights at the level of the *community*. They imply that in a 'boom' area of competition for land and investment in increasing agricultural productivity, the incipient privatisation of land will tend to reduce access to land for the poor irrespective of the formal tenure regime in place. In these circumstances, any attempt at registration of 'customary' rights will only secure access for the poor if this allows the registration of *individuals'* existing use of land and other resources, as has been proposed in tenure reform legislation (as yet not implemented) in South Africa and Uganda.

In a 'stagnant' area, with low and/or declining population, competition for land between individuals is likely to be much lower, and registration of customary jurisdiction may be adequate to secure 'community rights' in the face of competition from commercial interests such as logging or mining companies. Hughes (2001) details such a case in a 'remote' area of Mozambique.

In both 'boom' and 'stagnant' areas issues of transparency and accountability remain, however, and many of the proposals for land tenure reform (in South Africa, Uganda, Niger, and Cote d'Ivoire, for example) include provision for local institutions to arbitrate and register land claims, modelled on the Land Boards in Botswana (Quan, 2000). From the point of view of poorer land users, there are two key issues in implementing these proposals. First is that of representation, which, in addition to

customary authority and locally elected officials, must be broadened to include representatives of resource users with only subordinate rights under customary tenure, such as women, immigrants, and pastoralists and other users of 'common property' . Second, is the question of the political context within which 'land boards' will operate: "(T)heir impact in practice also depends on the policies which they are required to implement" (Quan, 2000:205).

This raises questions about the effectiveness of decentralisation as a means to reduce poverty, and rural poverty in particular. The experience reviewed above shows that local institutions cannot, of themselves, be expected to act in the interests of the poor, as they will simply reflect the priorities of the more powerful local interests or 'big men' referred to by IFAD, above. As Johnson (2001: 525) remarks " in rural areas...large numbers of people are dependent upon small numbers of local, powerful elites." He goes on to quote Luckham et al (2000): "a certain degree of re-centralisation may be needed to ensure that the needs of the poor are not neglected." (quoted in Johnson, 2001:529). The important element of any 're-centralisation' is that the politics of the (central) government will have a key role in setting out policy – that is social goals - for land boards on equity issues, such as: the rights of women; the admissibility of ethnic discrimination in land rights; the relative weight to be given to 'indigenous' holders of customary land rights compared to immigrant land users, sharecroppers, or tenants. This latter may prove to be of particular importance to the poor in 'boom' areas, for, under conditions of increasing privatisation likely in such areas, sharecropping or tenancy will become their most likely means of access to agricultural income. This is evident in recent case studies in Benin (Edja, 2001) and Ghana (Amanor, 2001), which demonstrate the importance of renting and sharecropping: 75% of women in the villages studied in Benin were farming rented land, and for 40% of them rented land was their entire cultivated area. In the southern Ghana case two thirds of farmers obtained access to land through sharecropping and for nearly half of all farmers the 'share' to the landholder had increased (from a third to a half) under conditions of increasing land scarcity. It seems clear that local 'land boards' may have a role in monitoring and arbitrating such contracts.

The decentralisation agenda has correctly identified that it is at local level that natural resource management becomes effective, and, by extension, its impact on poverty is determined. The review above suggests, however, that this is to merely to state what happens at present, rather than an aspiration for the future. Recent work by James et al (2001) on the implementation of local revenue collection by district councils in Uganda underlines how central policy intended to increase local accountability can become translated locally into its opposite. From this perspective, the challenge of reducing poverty is not to liberate 'local communities' from 'central state interference' but, rather to ensure that the central state recognises the rights and priorities of the poor, and works to make those rights 'real' in the context of local society and economy.

6. Conclusions

This paper cautions against the 'homogenising' view of rural society to which 'small farmer' models of rural poverty reduction are prone, and which emphasise limitations of soils, climate or other natural resource endowments as the reason for rural poverty. Three key elements of the 'small farmer' model identified at the start of the paper were:

- the problem of 'rural' poverty is primarily a problem of low farm productivity;
- increases in productivity of resource use by the poor are possible using 'scale-neutral' technology in the form of improved seeds and water control;

- access to natural resources for the poor will be improved by 'decentralised and participatory' methods and "land reform to create small, not-too-unequal family farms"

In relation to these three premises we have argued that poverty is better understood through an analysis of the dynamics of agrarian change, in which a historical perspective and an appreciation of population mobility are key elements. This approach suggests two contrasting agrarian situations of 'boom' and 'stagnation' that are likely to be encountered simultaneously in different regions. The difference between these two types of area can be expected to be determined by social and economic factors and the nature of linkages with the regional economy as much as, or more than, agro-ecological resource endowments.

The 'boom' situation is characterised by agricultural output with expanding (typically urban) markets. Such areas will experience competition for land, fuelled by immigration, and investment in technology (notably that related to water management) to increase productivity. Under these conditions poverty is not primarily the result of low farm productivity, but, most immediately, the result of some sections of the rural population failing to secure access to land and/or water. While investment does bring productivity increases, as predicted by the small farmer model, the lack of 'scale-neutrality' of investment in technology – in the sense that the poor are least able to afford such investments – is a key factor driving the growing differential between landless and landholders. There is growing evidence that, in addition to wage employment on farms, landless farmers in 'boom areas' in Sub-Saharan Africa obtain land through rental and sharecropping arrangements, though possibly with an increasing share accruing to the 'landlord'. In many such areas the opportunity for "land reform to create small, not-too-unequal family farms" appears to have long gone. Key issues for an agenda to help the 'chronically poor' are to seek adequate representation for marginalised groups to ensure they can negotiate for protection of 'secondary rights'; to monitor the benefits to the poor of rental and sharecropping arrangements; and to seek improved access for poorer groups to high-return non-farm (though possibly natural resource-based) employment opportunities.

In 'stagnating' areas, demand is attenuated by distance from markets, population is likely to be static or declining due to emigration, and productivity is restricted by low rates of farm investment and by scarcity of farm labour. While it is possible that investment in technology might raise farm productivity in such areas, such technology should be labour-saving, not 'labour intensive' as the 'small farmer' model advocates. Fundamentally, however, the viability of any investment in farming will be conditioned by the lack of effective market demand. The high levels of vulnerability of the 'residual population' of such 'stagnant' areas may signify that the 'small family farm' is not the most appropriate scale on which production (and risk) should be managed. Larger units, with a range of possible labour inputs, might be expected to respond better to the needs of the chronic poor in such areas. Such approaches may be linked to agriculture or they could be focussed on non-farm diversification. Either way they need to seek ways of generating opportunities for the poorest groups to take part in higher-return natural resource use, rather than 'safety net' activities that provide only low returns to labour.

The paper concludes that 'community-based' models of natural resource management fail to take account of conflicting interests within communities and similarly mistakenly assume a welfare function can be ascribed to 'customary' rights to land. In abandoning these assumptions, proposals for land tenure reform currently underway in many countries in Sub-Saharan Africa need to ensure a broad and effective representation of different land users in the institutions through which land

rights are negotiated and formally recognised. This raises questions about what organisations would most effectively identify and represent the interests of the poor. The operation of representation through kinship (lineage/household), type of resource use ('user group'), age (youth groups, elderly), gender, ethnicity (eg immigrants), or property (customary landholders, sharecroppers) need to be monitored critically to explore how best to advance the wellbeing of 'chronically poor' people.

In attempting to understand the role that natural resource use might play in the reduction of chronic poverty, this paper has identified a number of dynamics of change which operate differently in areas termed 'boom' and 'stagnant'. The key discriminator between the two areas is the extent to which market demand for agricultural output (or output of other natural resource-based commodities such as timber, fish, charcoal) is driving an increase in output, with associated processes of immigration, competition for land and increasing productivity through technological change. In identifying markets as key drivers of change, this paper shares common ground with that of the 'small farmer' approach, but differs from it in the way markets are perceived to interact with other social and political relations. Above all, markets are perceived as factors in social change which is not substantively addressed (except in terms of aggregate improvement in farm income) by the small farmer model. The approach taken here assumes that whatever solutions are put forward to reduce chronic poverty must take account of market effects and in particular the way they may bear differentially upon the poor.

Remoteness conveys a substantial part of the idea of strength of market demand, and this can usefully convey spatial dimensions of economic and political (in the sense of distance from central government influence) influences on the condition of the chronic poor. However, spatially-defined categories do not operate satisfactorily as a proxy for describing social and economic dynamics or processes of change. I have argued earlier that the condition of 'remoteness' is both path-dependent and (by implication) may change. For these reasons, it appears that the most useful characteristic of 'remoteness' is the current dynamic of economics and politics which it identifies, rather than any intrinsic natural resource qualities. The 'boom'/'stagnant' typology employed here has been used to try to contrast situations of economic expansion and stagnation. However, it perhaps is invites at least a third type, that of economic decline and contraction. Whether there is much difference between 'stagnation' or 'contraction' in economic terms is perhaps difficult to ascertain at this stage, but it does identify a path towards a more finely graduated classification of zones of poverty in terms of the size (per capita) and rate of expansion of the local economy.

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2. Power & Social Dimensions

SEMINAR TWO: POWER & THE SOCIAL DIMENSIONS OF POVERTY & NRM
December 2, 2004

Presenters

- *Facilitator:* Ruth Meinzen-Dick, International Food Policy Research Institute (IFPRI)
- *USAID Resource Person:* Margaret Sarles , Democracy, Conflict & Humanitarian Assistance Bureau, Office of Democracy & Governance

Seminar Themes & Learning Objectives

This seminar focuses on improving participants' understanding of power and social capital, and their dynamic, mediating effect on natural resources management and poverty reduction at multiple levels — from the farm to the policy boardroom. In exploring levels of inequality and power related to the natural environment, we will encourage participants to think in more nuanced and complex fashions regarding labels used by USAID and many development practitioners such as "the poor", "traditionally marginalized people", "women", "local communities", and "indigenous groups". How does our use and internalization of terms such as "pro-poor" impact our programming in poverty reduction and natural resources management, especially given that rural people in many locations may be cash-poor but resource-rich in terms of their social capital and networks?

Building on the participants' own experiences and expectations, this seminar will use a workshop format to explore our understandings of power and social (in)equality and to discuss the implications for our day-to-day work. With valuable insights and reflections from two experienced practitioners, participants will use a case study and small group work to analyze possible programmatic responses to a natural resource management and poverty reduction challenge.

Sustainable Development in Ijebu-Ode, Nigeria: The Role of Social Capital, Participation, and Science and Technology

Akin L. Mabogunje and Robert W. Kates

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Working Papers

Center for International Development
at Harvard University

Sustainable Development in Ijebu-Ode, Nigeria: The Role of Social Capital, Participation, and Science and Technology

Akin L. Mabogunje and Robert W. Kates

Abstract

Sustainable development as an aspiration is global; as an ongoing process, it is local. A growing number of scientists and technologists share in the aspiration and experiment with the local. Here we report one such effort in Ijebu-Ode, a small city of 200,000 inhabitants in south-west Nigeria, which, by way of a participatory city consultation process chose to reduce poverty through a set of local and sustainable livelihood activities. Now five years into the effort, we describe the setting, the participatory process, the poverty reduction activities, and the impressive results to date. We attribute success to the large stock of social capital, the participatory process that drew upon this stock, and the scientific and technological community that both serve as boundary spanners to link Ijebu-Ode to the national and the global and as a resource for local technologies and advice.

Keywords: Africa, Nigeria, sustainable development, social capital, participation, science and technology.

JEL Codes: H1, I38, N57, Q01, Z13

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It is available at <http://www.cid.harvard.edu/cidwp/102.htm>. However, as a work in progress, this does not constitute formal publication, and your comments are especially welcome and may be directed to Robert Kates, email rkates@acadia.net.

This paper was written as part of the Initiative for Science and Technology for Sustainability (ISTS). The Initiative is an international, open-ended network with the goal of enhancing the contribution of knowledge to environmentally sustainable human development around the world. The Initiative was founded in late 2000 by an independent group of scholars and development practitioners gathered at the Friibergh Workshop on Sustainability Science. Since that time, it has worked to strengthen cooperation between two communities: practitioners involved in promoting human development and environmental conservation, and researchers involved in advancing science and technology relevant to sustainability. Membership is open to all interested individuals and institutions. Information on activities and opportunities are available at <http://sustainabilityscience.org/ists>. Funding for the Initiative has come from the David and Lucile Packard Foundation and the U.S. National Oceanic and Atmospheric Administration's Office of Global Programs, with additional support from numerous governments and institutions around the world.

Further information on the Initiative and the Sustainable Development Program at Harvard's Center for International Development can be found at <http://sustainabilityscience.org/ists> and <http://www.cid.harvard.edu/sd> respectively, or by contacting Nancy Dickson at nancy_dickson@harvard.edu.

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Introduction

Sustainable development as an aspiration is global; as an ongoing process, it is local. Deriving from the Brundtland (WCED, 1987) definition of 1987, sustainable development at the global level is now generally understood as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". As such it has broad appeal and little specificity, but some combination of development and environment is found in most attempts to describe it. Many in the scientific community have adopted the notion of a sustainability transition, one in which basic human needs are met, hunger and poverty are reduced, all while maintaining the life support systems of the planet. (NRC-BSD, 1999). More recently, these three generic goals have been given concrete global aspiration (Parris and Kates, 2003) in the forms of the targets of the millennium declaration (UN General Assembly, 2000) which includes the goals of reducing hunger and poverty by half in the world by 2015.

While such universal aspirations may be helpful, they are insufficient, at the local level, to identify local needs, choose meaningful targets, and most important, "harness the energies of local people and organisations and aid development of the local society and economy to change in ways which are conducive to sustainability" (Selman, 1996: 31). This paper focuses on one such local place, the city of Ijebu-Ode and its neighboring settlements, located some 60 miles north-west of Lagos, Nigeria. But the process it describes has wide application. Through the instrumentality of a private policy research institute, the Development Policy Centre, a strategy of mobilization and capacity building was initiated in Ijebu-Ode for purposes of poverty alleviation.

The paper is divided into five parts. The first describes the historical, economic, ecological and social context in which poverty has thriven in the city whilst the second outlines the strategy of developing a city consultation process exploiting the well-established social capital of the city. The third part then considers the participatory framework designed for program implementation whilst the fourth examines the knowledge-intensive basis of most activities in the program. The fifth and concluding section considers the lessons to be learned from the Ijebu-Ode experience.

Ijebu-Ode: History, Economy, Ecology, Society

Situated some 60 kilometers north-west of Lagos, the city of Ijebu-Ode had an estimated population in 1999 of 163,000. Its continued physical expansion has also meant that it has virtually merged with neighboring settlements such as Mobalufon, Erinlu, Molipa, Oke Owa, Iwesi, Igbeba and Latogun to give it a population in excess of 200,000.

Ijebu-Ode is a relatively old city dating, it is claimed, from A.D. 900. There was already reference to it in the 16th century by Pereira, who noted that "twelve or thirteen leagues up this river [the Lagos lagoon] is a very large city called Geebuu, surrounded by a great moat. The ruler of this country in our time is called Agusale [Awujale], and the trade is mainly in slaves ...but there is some ivory" (Pereira trans. Kimble, 1937: 123). By the 18th century, statements about the coastal trade of the Ijebu placed greater emphasis on the traffic in craft products. John Barbot (1732: 354), for instance, noted it as a place "where good fine cloths are made and sold by the natives to foreigners, who have a good vent for them at the Gold Coast..."

These historical antecedents suggest that Ijebu-Ode has not always been a city mired in poverty. Colonialism undermined its numerous craft industries and its strategic trade location between the interior and the coast. This provoked for most of the colonial period a massive out-migration of younger elements of the population to the new, colonially-created metropolitan centers such as Lagos, Ibadan, Kano and Port Harcourt to acquire western-type education and engage in new types of modern ventures and trading activities. Political independence enhanced the economic opportunities for citizens of Ijebu-Ode in the cities of their sojourn all over Nigeria, where many of them have become important members of the

emerging middle class. But in Ijebu-Ode itself, this simply created a situation where local poverty was relieved largely through substantial remittances from these sons and daughters abroad.

A study of the city in 1998 (Odugbemi & Oyesiku, 1998) found that less than 20 per cent of the population are wage-earners in the public or private sector; over 60 per cent are engaged in petty trading whilst some 8 per cent are subsistence farmers, whilst the remaining operate in the informal sector as self-employed artisans and providers of a wide variety of services. There are a few small- and medium scale industries in the city and its environs mainly concerned with sawn timber milling, furniture-making, brewing and fruit-juice production and a pharmaceutical industrial establishment. Informal sector activities are usually associated with low productivity and low incomes, and 70 per cent of the household heads earned less than N8,000 (US$80.00) per annum whilst only 10 per cent earned above N16,000 (US$160.00) per annum. Consequently, without the remittances from sons and daughters abroad, 90 per cent of the people of Ijebu-Ode lived below the international extreme poverty line of US$1.00 per day.

Located some 7°N latitude, Ijebu-Ode lies squarely within the tropical lowland rain forest region. The natural vegetation consists of a great variety of species arranged in a complex vertical structure with an emergent layer of large trees (up to 60 meters high) including mahogany (*Khaya entandrophragma*), obeche (*Triplochiton*), afara (*Terminalia*), iroko (*Chlorophora*), african walnut (*Lovoa trichilioides*), and ekki (*Lophira alata*) which form the basis of the major timber industry in the vicinity of the city. The forest structure protects the fragile soils from erosion in the high rainfall regime of the region. Traditional uses of the forest essentially maintain this protective function, by permitting long fallow periods and using mixed cultivation practices in which trees are allowed to remain. Increasing population densities, however, have caused the shortening of fallow periods and are leading to problems of soil erosion in parts of the region (NEST, 1991: 146).

The most significant ecological factor in the city region is, however, the deep, ferralitic soils characterized by friable consistency, low silt content, low base exchange capacity, low pH and generally low content of plant nutrient. Consequently, the region has not been very successful in cocoa production or in cultivation of yams (other than water yam). In traditional terms, therefore, Ijebu-Ode is not situated in a major agriculturally rich region. Kola nut (*Cola nitida*) is grown in parts of the region and the secondary regrowth of oil palms provide very valuable products (palm oil and palm kernels) for export and local commerce.

The introduction of cassava (*Manihot escutenca*) in the 16th century from South America provided the region with a crop whose productivity is remarkable on sandy, sandy loamy, and even exhausted soils unsuitable for other crops.

As a city, Ijebu-Ode, like most old Yoruba urban centers, has an administrative system that is in part traditional and in part modern. The head of the traditional administration of the city is the Alaiyeluwa, the Awujale, Ogbagba II Oba Sikiru Adetona with his different categories of Chiefs. The city is organized into three wards - Ijasi, Iwade and Porogun. Each ward in turn is organized in quarters or neighborhoods referred to as *Ituns* whose affairs are overseen by the *Olorituns*. Modern expansion of the city has necessitated the demarcation of new *Ituns* which continue to be referred to as suburbs. There are thus presently 36 Ituns and 15 suburbs in the city. Modern local government, however, has the city straddling three local government areas (Ijebu-Ode, Odogbolu and Atan). The city itself is a major transportation node in the state and a sizeable commercial centre, mostly informal.

Within this dual structure, traditional basic identities have been preserved to facilitate community-wide coordination and cooperation as well as some degree of group competition within the city. These identities revolve around age, sex, occupation, community organization and rituals of solidarity, which the current traditional ruler has done much to sustain. For instance, he has attempted to preserve the age-grade system in which all individuals born within a three-year interval are encouraged to organise

themselves into an age grade or *egbe*. Members of each age grade are meant to know one another fairly well, to choose a leadership group from among their members, to meet to discuss issues of mutual or communal interest, and be willing to help one another if the need arises. Thus they act in some ways as kin groups. More importantly, the traditional ruler has sought to involve the *regberegbes* (the institution of *egbes*) in the development of the city.

Sex is also a fundamental identity for the division of labor in the city. Women in Ijebu society have always had the prerogative especially of trading and marketing and have, therefore, established quite formidable organisations to this end. As a result, women in the society enjoy a substantial degree of economic independence and have a parallel but complementary institution of governance in the city. Thus, market women operate as occupational associations much like craft guilds. There are also many craft guilds in the city which, on their part, operate as closed professions often with centralized controls and hierarchies of rank and grade usually involving apprentices, journey-men and masters. Masters accept economic and quasi-parental responsibility in the training of apprentices and attempt to inculcate relevant moral codes in the discharge of the obligations of the guild to its clients and to the community.

Community rituals of solidarity have become a critical strategy for building up social capital in the city. Such rituals, tend to occur each year, usually at the beginning of the harvest season. In Ijebu-Ode, the *agemo* festival is perhaps the most notable although there are also the *obinrin ojowu* (the jealous woman) festival and the *Ojude Oba* (the palace square) parade of the age grades which takes place usually after the Islamic festival but which now involves even Christian members of the *egbe*. These various festivals bring the diaspora home for celebrations and thus serve to re-create and strengthen a sense of community solidarity and identity.

However, although the city is virtually almost evenly divided between Christians and Muslims, as among the Yoruba people in general, no serious identity conflict revolves around religion. Indeed, as Laitin (1986: 136, 183) aptly observed, "Yoruba in all walks of life stress the cultural importance of the family which is divided by religion but tied together by blood.....Thus, political calculations based on ancestral city attachments are 'commonsensical' in the Yoruba context whilst calculations based on religious adherence are considered fanatic, irrelevant, or out of the realms of calculations".

Social Capital and the City Consultation Process

Against the background that Ijebu-Ode was a city with a degree of internal cohesion built around its traditional institutions, it was chosen by the Development Policy Centre to try out the City Consultation process as a novel method for pursing a poverty alleviation strategy. The Development Policy Centre is an independent, non-governmental institution based in Ibadan whose primary goal is to help strengthen national capacity for policy formulation and implementation in Nigeria's development effort.[1] Working closely with the African Regional Office of the Urban Management Programme (UMP) the Centre set out to demonstrate the viability of the city consultation process as an effective strategy of poverty alleviation.[2]

The City Consultation Process is a paradigm developed in the course of working out a more effective methodology for initiating a series of social changes in the cities of third world countries. Essentially, it derives from the concept of urban governance as differing from urban government or management. Urban governance is the sum total of the many ways in which individuals and institutions, both public and private, participate in the planning and management of the common affairs of the city. It is a continuing process through which conflicting or diverse interests of citizens are accommodated and cooperative action is actively promoted. It embraces the activities of not only formal institutions but also informal organisations as well as the social capital of citizens. Consequently, for urban governance to be considered good, it must fulfill three basic conditions. First, it must exhibit well decentralised and devolved authority structures (decentralization); second, its decision-making process must be fully participatory and all-inclusive (inclusiveness); and third, its implementation strategies and activities must

be transparent and accountable to the generality of the citizens of the city (accountability). The City Consultation Process has thus been initiated as an experiment in which a fully participatory and all-inclusive strategy of decision-making and implementation is undertaken irrespective of whether this is for improved environmental management, infrastructural development or poverty alleviation.

As a process of civic engagement, the City Consultation Process seeks to bring together all stakeholders in a city as well as the traditional authorities, the local, state and federal government to establish consensus, through sharing of knowledge and experiences on key policy and operational priorities that should influence the design and implementation of poverty reduction programs and projects. The process falls easily into three stages.

The pre-Consultation stage included the preparation of a report providing a poverty profile of the city, opportunities for job creation, and particularly an institutional audit of the main actors in the socio-economic life and governance of the city. Based on this report, especially its institutional audit, a series of mini-consultative meetings with the major stakeholders is undertaken. In the Ijebu-Ode case, the stakeholders included, apart from the local authorities both traditional and modern, local branches of state and federal ministries and prostates, the local Chamber of Commerce, other private sector organizations, various informal trade and artisan occupational groups, cooperatives, non-governmental and community-based organizations, religious bodies, bilateral, multilateral and donor agencies, and university and research institutions (Odugbemi and Oyesiku, 1998). The objectives of the mini-consultations are to foster an appreciation of interdependence in the process of poverty reduction, enhance the feeling of ownership of the initiative and, thereby, guarantee effective development and implementation of the Plan of Action.

The second stage, the City Consultation Proper, brought together representatives of the various stakeholders to a three-day meeting from March 22-24, 1999. Although the initial expectation was for some 100-150 participants, the novelty of the strategy attracted over 350 participants. The Awujale of Ijebuland took a strong leadership role in the consultative process supported by the other local authorities, both traditional and modern. This gave maximum political, professional and community support to the process. Although the long-term objective of the City Consultation process was to strengthen the capacity of the local government for poverty reduction, it soon became clear that the formal local government did not have the influence or the credibility of the traditional local authorities. Consequently, it was the Awujale who provided the venue for the consultation in his palace Heritage Hall.

The first day of the consultation, which was chaired by the Awujale, was comprised of plenary sessions in which papers were presented on the poverty situation in the town, the local resources and various constraints of development. Participants were then divided into four working groups to discuss and make recommendations on each of the following topics: the socio-economic situation in the city, the natural resources that could be developed, the human and cultural resources, and governance and infrastructural situation. Each working group had a Chairman, a Deputy Chairman, a knowledgeable resource person and a rapporteur. The third day meeting was again plenary. The reports and recommendations of the various working groups were discussed, amended and later adopted. A Follow-Up Committee of sixteen individuals comprising the four officials of each of the working groups was then mandated to draw up an Action Plan based on the adopted set of recommendations.

The third stage comprising the post-consultation activities entailed the production of an Action Plan for Poverty Reduction in Ijebu-Ode. The 39-page Action Plan was divided into eight parts:

Provision of Basic Infrastructure and Social Overheads
Enterprise Development
Employment Generation and Skill Enhancement
Promoting Traditional Arts and Craft

Promoting Tourism
Attitudinal Change and Cultural Renaissance
Intensification of Cooperative Activities
Institutional Building

The Plan noted the poor state of infrastructure (potable water, roads, health-care centers, waste disposal, security) in the city generally but especially in those areas where the informal sector operators concentrate, such as markets and the mechanic village. But the real emphasis of the Action Plan was on enterprise development. For animal production the city could specialize easily in the production of delicacies such as snails, rabbitry, aquaculture and small-scale poultry; for crop production it could concentrate on pineapple to supply two fruit-processing factories in the vicinity as well as on cassava for industrial use; for industrial production the city could concentrate on cassava processing and industrial honey for regional pharmaceutical industries. These enterprises were to form the basis for not only increased income-generation but also new employment opportunities and skill enhancement. Traditional arts and crafts were also to be revived and the various rituals and celebrations better organized to promote tourism to the city. All this was meant to require significant changes in attitude especially with respect to deepening cooperative organization and culture among the people.

In short, the Action Plan provided a vision of how the City, through coordinated and complementary actions, intends to raise the living conditions of the poor and vulnerable groups in the population. It indicated a policy framework and strategy through which the city expected to effectively harness its resources towards improving the quality of life among the urban population.

Designing a Participatory Framework for Programme Implementation

The issue of an appropriate framework for the implementation of the various recommendations of the Action Plan was thoroughly discussed both at the City Consultation itself and in the Follow-Up Committee. It was recognized that the ideal institution to promote and coordinate the implementation of the recommendation is the Local Government. Indeed, Local Governments assume this responsibility in similar city consultations held in other cities in Africa. However, in the Ijebu-Ode case, the consensus was that the needed institution, while giving a prominent role to the Local Government, should be made to reflect the diversity of stakeholders. This was not only to ensure that the community had a strong sense of really owning the program but also to guarantee its long-term sustainability and protect it from the vagaries of electoral democracy and the three-year tenure of Local Government chairmen.

Consequently, an institution, the Ijebu-Ode Development Board for Poverty Reduction (IDBPR), was agreed upon which incorporated the two major players in the governance of the city, namely the Local Government Council and the Traditional Authority. The composition of this 30-person Board thus reflected the diversity among stakeholders in the city. Thus, apart from the 16 members of the Follow-Up committee, there were to be four nominees of the traditional ruler, two representatives of the Local Government, two representatives of Ijebu-Ode Development Association, two representatives of market women, one representative of cooperatives, one representative of the artisans, one representative of the local Chamber of Commerce and one representative of the National Association of Small-Scale Industrialists (NASSI). For chairman of the Board, the stakeholders chose a highly respected, retired civil servant who was well known in the community for his integrity, fair-mindedness and diligence, and the Local Government Chairman was made the Vice Chairman of the Board. The Awujale surprised everyone by his nominees. The expectation was that he would choose from among his Chiefs. Instead, he chose young men who live in Lagos but who were successful bankers, insurance executives, and managers.

The Ijebu-Ode Development Board for Poverty Reduction was inaugurated on July 29, 1999 by the Awujale. With the inauguration, the Development Policy Centre gradually withdrew its active participation and became more of an advising and monitoring institution for the process. Not

unexpectedly, the first challenge of the Board was finding the resources to prosecute its task of poverty reduction. A small, seed capital for summoning meetings and supporting a staff member was provided from the project fund of the Development Policy Centre. Although it was understood that an outside donors' conference would be convened by the Urban Management Programme, the City also appreciated that this would depend on what it can be seen to have done for itself.

Consequently, one of the first activities of the Board was to launch its Action Plan and to use the occasion to raise funds from sons and daughters of the City from far and wide. The Awujale led the way here by making available to the Board a furnished 4-room office suite within the Palace Complex. It was in the context of raising funds that the social capital of the City was made to yield the necessary dividend. The *regberegbes* taxed themselves for each *egbe* to contribute a given sum. Neighborhood associations (*ituns*), through their heads (*Olorituns*) made donations. Wealthy individual sons and daughters both at home and abroad also made substantial donations. In all, some N10 million (US$100,000) was raised with the Ijebu-Ode Local Government alone having contributed some N4 million. The Development Policy Centre contributed the computer and printer in which much of the data and information collected during the pre-Consultation activities had been entered. Other individuals made donations in kind, providing photocopier, fax and office furniture, office equipment and stationery.

With some initial financial resources guaranteed, the Board constituted itself into a number of Committees that have operated with considerable sense of commitment. Their titles are evidence of the breadth of activity:

Project Implementation Committee
Project Monitoring and Evaluation Committee
Fund Raising and Fund Management Committee
Mobilization and Enlightenment Committee
Formation of Cooperative Groups Committee
Training Committee
Loans Committee
Medical and Health Committee
Library and Archival-Related Committee

The Knowledge-intensive Basis of Activities

From the very beginning, the Board acknowledged that effective poverty reduction must be based on enhancing the knowledge and skills of the people. Consequently, most of its activities began with training the poor. And to ensure that the training was valued, some modest charges were made for securing application forms and for attendance at the workshops. Such attendance was a pre-requisite for securing individual credit to engage in particular activities. To ensure that securing and repaying credit was also part of a learning process, the Board deposited its funds in the local Imowo Community Bank and offered itself as a guarantee for the Bank to lend to approved individuals. Each individual receiving credit was expected to open and maintain an account with the Bank.

The basic strategy for promoting activities among the poor and the stakeholders was encouraging them to form cooperatives. This strategy was particularly important to take account of gender issues in poverty alleviation. In Ijebu-Ode, women are pre-eminently the traders in the four principal markets in the city, albeit petty traders operating with rather limited capital. Their need for micro-credit was championed by the traditional ruler himself who also got the Board to waive the usual payment for application forms for training in how to participate successfully in microcredit schemes. The training for the women was remarkably successful and the women organized themselves both on the basis of the commodities that they sell, as well as their location in the four markets, each of which has representation on the board.

When faced with devising the details of the microcredit schemes, the Board deferred to the women's intimate knowledge of their own and different needs for credit.

Presently, there are over 90 cooperative societies registered with the Board. These comprise cooperative societies of not only market women but also pineapple growers, bee-keepers, aquaculturists, cassava cultivators, welders, carpenters, seamstresses, motor-cycle transporters and so on. Each society has a bank account, determines the loan requirements of its individual members, sees to their monthly repayment of the amount due and ensures total recovery of the loans taken before a subsequent application can be made. Apart from an administrative charge of up to 5 per cent on major projects (excluding the micro-credit scheme of the market women), an interest rate of 24 per cent per annum or 2 per cent per month is charged on loans. A moratorium period of between two weeks (for market women) and eighteen months (for agricultural projects) is generally allowed on the loans. As of the middle of 2002, some N4,167 million (US$41,670) has been disbursed as loans to beneficiaries but this is far from adequate to meet the demand. Among the market-women for whom the microcredit was the primary means of poverty reduction, the repayment rate has been over 98 per cent.

Since its inauguration, the Board has also organized some seven training workshops (Table 1). These have been on pineapple production, bee-keeping, small-scale poultry farming, seri-culture, aquaculture, dry-season vegetable production and cassava production and processing. Each training workshop registers more than 100 participants and is usually conducted by well-trained scientists and technologists knowledgeable in the field. These have come from the Ogun State Agricultural Development Programme (OGADEP), the nearby Olabisi Onabanjo State University, and the University of Ibadan, but the Board has also used the internet to search for the most up-to-date information about each of these areas. For example, answers to questions about bee-keeping were received from New Zealand.

One of the major constraints facing the Board has been having enough funds to finance the activities of those who have successfully undertaken its courses. For those engaged in agricultural production, the expectation is that they will operate on their own or their family farm. The Board's strategy is to procure and develop multiplication centers for improved planting materials especially of pineapple suckers, cassava plants and vegetable seedlings for sale distribution to accredited participants in a particular program. For the aquaculture program, the Board also successfully negotiated and got the Ogun State Government's approval for the lease of 50 hectares of land from the Eriwe fish farm near Ijebu-Ode. The land was then demarcated and allotted to many of the prospective participants who are interested in crop farming, pineapple and cassava cultivation, and fish farming.

An exciting but secondary development of the program is the promotion of local technological initiatives among the artisans and technologically-oriented operators in the city. So far, seven major technological inputs have been successfully developed by local welders. These include honey pressers, bee smokers, bee-honey practitioners' outfits, beehive stands, bee honey settling tanks, locally-fabricated poultry cages and equipment, and a fish feed milling and pelleting machine. Much cooperation has developed between local agro-industrial enterprises and local technicians and engineers especially in the provision of such systems as the fish-feed milling and pelleting machine and the locally fabricated poultry cages. Application of such local knowledge is starting to have real impact on the poverty reduction processes through creating additional employment opportunities and developing new technical skills.

While focusing primarily on creating new enterprises for poverty reduction, the Board has not neglected infrastructure or other aspects of development. The Board has agreed to the development of at least six community-managed borehole and water point/toilets water projects in collaboration with relevant community partners. In prosecuting its health project, the Board relied on the proposals of a team of medical professionals from among the sons and daughters of the city living in other metropolitan centers who offered their services free of charge. One of their major decisions was to attempt the renovation of

the 230-bed State Hospital in the city to serve the city and six other local governments. An estimated total project cost of N100 million (US$10 million) is to be expended on this initiative which is expected to help provide the city with the much needed ultra-modern referral centre for the many Primary Health Care (PHC) facilities in the catchment area of the hospital. A total of N5 million was raised at the launching of the first phase of the renovation program on February 5, 2002 and construction work on the first phase of the renovation has been completed.

The same group of professionals put the Board in touch with the Association of Nigerian Physicians in America (ANPA). Some 27 members of the Association paid a one-week working visit to the City Hospital on August 18-25, 2002 during which they undertook some 95 general surgery operations for both children and adults, 45 gynecological operations, 49 cataract operations, 86 dental procedures and 3,500 medical outpatient consultations. This intervention by sons and daughters of the city in the diaspora together with the provision of free drugs and equipment has resulted in a major improvement in access to health-care for the many poor beneficiaries.

The Board is in the process of developing a special program for youths in the city. The Ijebu-Ode Local Government offered the Board its under-utilized Youth Centre. This has been renovated and part of it is now being used for skill acquisition programs, youth counseling, in-door games and recreational activities, as well as for information dissemination and other social engagements.

To date, the impact of the poverty reduction activities of the Board has not been easy to measure in quantitative terms. Since its inception, the Board has held two annual general meetings involving most of its beneficiaries with 140 registered representatives of stakeholders attending in 2001 and 240 representatives in 2002. The Annual General Meeting provides an opportunity for presenting the Annual Report of the activities of the Board, as well as its audited financial statements. The Annual Report, however, provides useful data only about the primary activities of the Board such as how many people attended the various training sessions, how many have been able to be funded directly by the Board, what is the rate of repayment of loans and so on. Data on the number of people engaged in secondary activities deriving from the activities of direct beneficiaries are not available in the report. Thus, there would be little data on the number of welders engaged in supplying needed inputs for direct beneficiaries engaged in poultry-keeping, bee-keeping, and so on, although one can see enhanced activities among these groups in the city. The Board, however, has indicated that it intends to begin collecting some of these data and to subject its programs to external and independent evaluation in the very near future.

Lessons Learned

Has poverty been reduced in Ijebu-Ode? Almost surely for the market women and the artisans providing services. But for most, it is still too early to tell. We plan to revisit the city as the pineapples, eggs, and honey products reach market, the new cassava, vegetable and aquaculture initiatives get underway, the boreholes get built, the hospital gets refurbished, and the youth programs get started. Has a realistic and inclusive poverty reduction strategy been developed? Surely so! We attribute the success to date to the large stock of social capital, the participatory process that drew upon this stock, and the scientific and technological community that serve both as boundary spanners to link Ijebu-Ode to the national and the global and as a resource for local technologies and advice.

Social capital is "generally defined as the information, trust, and norms of reciprocity inhering in one's social networks" and as Woolcock notes (Woolcock, 1998:153) more social capital is not always better. At one stage of a community's economic development it may be very beneficial, providing access to information, other forms of capital, and trusted leadership, but it may become limiting at another stage, when there is need for access to information, trust and reciprocity from beyond the social network of the community.

Ijebu-Ode's stock of social capital seems particularly rich, including traditional ethnic authority, government, neighborhood and occupational organization, and an engaged Diaspora, while at the same time bridging such potentially divisive identity gaps as gender, class, and religion or the inherent tension between traditional leadership and elected political officials. Much of the credit for bridging these identity gaps can be found in the transparent, participatory process that the community engaged in which enabled it to share information, create trust, and utilize its internal norms of reciprocity.

The scientific and technological community in support of the poverty reduction goals and part of the participatory process was also particularly rich and included three elements: the local experts in agriculture and other productive skills, the national institution of the Development Policy Center, and the global diaspora, especially in health. Thus this community was part of the Ijebu-Ode's social capital but also partly exogenous, serving as both trusted sources and as boundary spanners linking Ijebu-Ode beyond its normal reach and avoiding the restraints of an exclusionary, inwardly focused social capital.

Since its inception three years ago, the project of poverty reduction in Ijebu-Ode based on the strategy of city consultation has attracted attention locally, nationally and internationally. Locally, the attention has been due to its impact as well as its positive contrasts with earlier, less successful attempts to tackle the problem of poverty. That impact has been due largely to the knowledge-intensive orientation of the strategy and its openness to scientific and technological enhancement for its results.

On the national scene, the Nigerian government has adopted the World Bank/IMF-initiated PRSP (Poverty Reduction Strategy Paper) with its emphasis on a bottom-up approach to poverty reduction (NDI, 2002). The new initiative is designed to address poverty issues through four approaches. These are: youth empowerment, rural infrastructural development, social welfare services and national resources development. The modalities for implementing these various approaches are far from being well articulated and the impressive track record of the Ijebu-Ode Development Board for Poverty Reduction even within its short term of life was such that it had recently received significant funding of some N15 million (US$150,000) from the National Secretariat, more than matching the locally-raised funds that launched the Program.

At the international level, the participatory emphasis of the City Consultation, the operations of the Ijebu-Ode Development Board for Poverty Reduction, and the role played by science and technology are very much in consonance with the requirements of NEPAD (the New Partnership for African Development, 2003) for poverty eradication on the continent. Consequently, over the last two years the initiative has been receiving a number of international visitors to investigate the manner and progress of the project. Recently, it was judged an outstanding initiative and presented a Best Practice Certificate from the Dubai International Award for Best Practices and the United Nations Human Settlements Programme.

The Ijebu-Ode experience also has significance for the emerging efforts to create a sustainability science and technology (Kates et al. 2001 ICSU, 2002). The authors serve as co-conveners of the international Initiative for Science and Technology for Sustainability, which seeks to marshal science and technology to address real problems of environment and development—suggesting solutions and needed actions. Central to such efforts is the notion that the problems need to be identified by stakeholders in particular places and the needed knowledge should be "co-produced" through close collaboration between scientists, technologists, and practitioners. The Ijebu-Ode experience provides one model of how such problem identification and co-production should take place. Central to this model are trusted scientists and technologist with local linkages who—regardless of location—are part of the place-based social capital. (Mabogunje's family has strong ties to Ijebu-Ode.) But though unusually rich in social capital, Africa is not unique. In a recent extensive study of greenhouse gas emissions in four localities in the United States, local action to reduce such emissions was clearly facilitated by local scientists and university faculty providing trusted sources of information (Kates and Wilbanks, 2003). Thus what is

needed most is that we scientists and technologists use our universal skills and knowledge to act locally in the service of our global aspirations to meet human needs, reduce hunger and poverty, while preserving the life support systems of the planet.

Table 1

IJEBU-ODE DEVELOPMENT BOARD ON POVERTY REDUCTION
Number of Activities, Trainees, and Beneficiaries since Inception of IDBPR

S/N	Activity	Number of Trainees		Loan Beneficiaries
		1st session	2nd session	
1.	Pineapple production and Bee-keeping - 30th to 31st August, 2000	30	99	Bee-keepers:26 Pineapple growers: 19
2.	Poultry production and Cassava utilization - 25th to 26th October, 2000	130	-	Poultry farmers: 15
3.	One day Workshop in Micro-credit for women in the markets and business	695		378
4.	Aquaculture and Snailery - 23rd August, 2001	160	99	-
5.	Sericulture, Aquaculture, Bee-keeping and Dry Season Vegetable Growing - 11th to 12th December, 2002	99	99	-

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Endnotes

[1] Akin L. Mabogunje was then the Chairman of the Centre. He has since February 2003 retired from the position. He also hails from Ijebu-Ode. The Development Policy Centre, in collaboration with two non-governmental organizations, has also been experimenting with the city consultation process in a number of urban centres in Nigeria as a mechanism for effectively dealing with poverty reduction (Ijebu-Ode and Minna), with environmental degradation (Ibadan) and urban service delivery (Kano and Lagos).

[2] The Urban Management Programme dates from 1978 and is jointly sponsored by the United Nations Development Programme (UNDP), the United Nations Centre for Human Settlement (UNCHS), the World Bank and a number of bilateral donor agencies.

3. Assets, Traps & Rights

SEMINAR THREE: ASSETS, POVERTY TRAPS & RIGHTS
December 9, 2004

Presenters

- Chris Barrett, Cornell University Department of Applied Economics and Management
- Marilee Kane, USAID Office of Women in Development

Seminar Themes & Learning Objectives

Part I of the seminar will focus on the importance of assets for poverty reduction and prevention. It will enumerate the breadth of assets that poor houses control and describe how these assets can and are interchanged based on price and availability, the importance of these assets (especially natural resources) in rural households' assets strategies, and the thresholds of asset possession and poverty traps. It will provide participants with an understanding of the thresholds of asset possession and poverty traps and how — below a certain level of asset possession — economic actors are unable to take advantage of certain economic opportunities. This part of the seminar will also clarify the relationship between the thresholds of asset possession and programmatic initiatives that both protect the poor and transitorily poor from falling into chronic poverty (Safety Nets programs) and help the chronically poor climb out of poverty (cargo nets).

Part II will explore the connection between the ability to protect and use assets and poverty. It will provide seminar participants with a nuanced understanding of what makes assets usable. Participants should come away from this part of the seminar understanding that simply gaining possession of assets is not enough to move out of poverty and that the ability to make use of assets is also essential. Participants should learn about the importance of the factors that limit or improve use of assets, such as access to financing, rights to use the assets, and developed markets in which to buy and sell the assets.

The goal of the seminar is to help USAID staff understand the following:

- The importance of assets (especially natural resources), the thresholds of asset possession and poverty traps.
- What is the role of gender in natural resource management and poverty reduction? More specifically, how do men and women fare differently in terms of asset-building and asset usage, especially depending on where they live (rural/urban).
- What makes (natural) assets usable? (Financing, rights to land, titling, whether assets bankable, whether markets are developed). How do women and men fare differently in terms of their ability to use their assets?

4. Markets, Trade & Poverty

SEMINAR FOUR: MARKETS AND TRADE
January 6, 2005

Presenters

- Aaron Cosbey, International Institute for Sustainable Development
- Augusta Molnar, Forest Trends
- John Lamb, Abt Associates

Seminar Themes & Learning Objectives

This seminar will address the broad themes of making markets/international trade work for the poor, and the risks and vulnerabilities facing poor rural communities in global markets. Key seminar objectives include sharing knowledge on new research and thinking regarding the linkages between markets, natural resource management and poverty reduction, and shaping USAID programming to better reflect the inter-relatedness of these three elements.

Presentations

- Making Natural Resource Markets Work for the Poor - *Augusta Molnar*
- Trade, Environment and Development - *Aaron Cosbey*
- Value-Added in Agriculture -*John Lamb*

Recognising and tackling risk and vulnerability constraints to pro-poor agricultural growth.

Paper for Chronic Poverty session, OECD Povnet Agriculture Subgroup meeting, Helsinki, 17-18 June 2004

John Farrington, DFID RNR and Agriculture Team, London

1. Executive summary

This paper argues that, far from 'draining' public funds and so reducing public investment in the productive sectors, initiatives to reduce risk and vulnerability, if managed well, can enhance the engagement of the poor in markets, and so stimulate productive activity. Also, certain types of public investment (e.g. in infrastructure) as well as reducing risk, can stimulate private investment.

Risk is the likelihood of occurrence of shocks and stresses, has diverse origins (in health, social, environmental, political, and economic/market-based conditions), and has both idiosyncratic and covariate dimensions. Vulnerability is the degree of exposure to risk, and the capacity of households or individuals to prevent, mitigate or cope with risk. Some breakdown of the "rural poor" is important to identify what individuals or households are affected by what kinds of risks, and how. Households have a wide range of traditional ways of reducing risk (e.g. by jointly managing soil, water and vegetation in watersheds to prevent flash floods and erosion, and reduce the risk of drought) and vulnerability (by choice of crop, crop combination, crop/livestock enterprises, by increasing assets that can readily be liquidated, diversifying employment etc). More modern ways include the purchase of insurance policies against crop failure, asset loss, or death and ill-health. A central question for this paper is how policies in agriculture and related sectors can mainstream risk- and vulnerability- (R & V)-reducing measures in ways compatible with the kinds of options already available to the rural poor. One thread common to all prospective policies is that affirmative action is likely to be needed to prevent disadvantage by gender, caste, class or creed.

Policy options within agriculture include support for the creation of communal and individual assets, for local value-addition, storage and marketing facilities, the operation of buffer stocks, the reduction of transaction costs, including improved (and better-enforced) regulation and legislation, and technology policy which seeks a balance between productivity-enhancement and variance-reduction. Broader measures in which agriculture departments are likely to play a role include crop and asset insurance schemes, area-based programmes, rural finance and business services, and transfers or subsidies related to food security.

Although the central focus of the paper is on public policy in agriculture, the analysis is extended *vertically*, to cover R & V-reducing measures that can be taken by higher-level policy. This includes *international trade* policy, where exposure to low-cost imports and adverse foreign direct investment are major risk factors, but also *national* policy concerning e.g. fiscal measures to ensure appropriate resource generation for

public investments and transfers, and Medium Term Expenditure Frameworks governing public resource allocations among sectors, and across provinces.

The analysis is also extended *horizontally*, to consider the types of R & V-reducing measure that can be taken in other sectors, which would complement agriculture-based measures. Initiatives under small enterprise and employment departments may do so by helping the rural poor to diversify their livelihoods, for instance. A major opportunity for complementarities is between policies in agriculture and domestic spheres, given the large volumes of household resources that flow from one to the other to meet shocks and stresses as and when they occur. Potential domestically-focused policies include microsavings, insurance and credit, and social pensions and allowances. These permit the rural poor to engage in the economy, if not as labourers or entrepreneurs, then as consumers. But it is worth recalling that such transfers can release existing informal transfers for productive investment, and there is some evidence that pensions are used for production-relevant investments, such as the education of grandchildren.

The analysis suggests a number of specific *knowledge gaps* in relation to R & V reduction in agriculture. For instance, we know little about:

- how the links between SP, agriculture and gender are played out in relation to women's practical and strategic interests
- how the private sector might best be stimulated to design and market appropriate new R & V-reducing products, including micro-savings, credit and insurances, and how it can link with community-based organisations.
- the nature of individuals' trajectories (if any) from being outside to being engaged within the productive economy, what the preconditions for such progression are, and whether/how they might best be put in place

However, our general conclusion is that reducing R & V is less about filling knowledge gaps and more about improving the implementation of existing ideas and practices. In this respect, the paper offers a number of policy suggestions which governments and international agencies are well-placed to act upon:

- The priority is to 'mainstream' R & V-reducing measures within policies focusing on agriculture and related spheres. Experiments in reducing R & V need to be shared within and across countries, and innovative practice be promoted
- A major priority is to strengthen the *implementation* of existing policy measures
- Both of the above measures can be promoted through 'new architecture of aid' vehicles such as PRSPs, MTEFs and direct budgetary support, where there is scarcely any discussion of R & V reduction within the mandates of the productive sectors.
- National capacity needs to be strengthened to assess more rigorously the trade-offs between growth-promoting and R & V-reducing measures, and between different instruments for achieving R & V reduction, both within and across sectoral mandates.

2. Background to the issues

The poor benefit from growth either through productive activity in which markets play a central role, or through subsidies and transfers (which are funded via the taxation of productive activity). There are longstanding debates over where the balance of public expenditure should lie - in allocating more to growth, or more to transfers or other measures targeted towards particular subcategories of the poor. Clearly, there are tradeoffs all along the spectrum from, at one extreme, policies that support growth with little risk and vulnerability (R & V) reduction built in, to, at the other, policies focusing heavily on R & V reduction, but which require levels of taxation so high as to be a disincentive to private investment and initiative. The criteria on which public investment decisions are made will vary according to locally specific characteristics of production opportunities, the numbers in poverty, the nature and location of poverty and so on. This paper aims to contribute to more refined policy decision-taking by examining how risk and vulnerability[1] can be addressed in relation to a specific productive sector, namely agriculture, given that productive sector policies currently consider, at best, only limited aspects of risk and vulnerability.

This paper aims to identify new roles for government in contexts of markets which are changing rapidly but (from the perspective of the poor) continue to function imperfectly. It focuses on risks affecting the entrepreneurial[2] as distinct from the domestic sphere, but recognises that there some kinds of risk are common to both. It also acknowledges that money is fungible, and so, at household level, funds flow both ways between entrepreneurial and domestic spheres in response to shocks and stresses. It asks whether and how poor people can be better protected against the prevalent kinds of entrepreneurial risk. Different levels of household vulnerability also influence the degree to which given levels of risk impact on households and individuals, but vulnerability is not the main focus of attention here.

Further premises underpinning the paper are that:

- risk (and/or perceptions of risk) reduce engagement by the rural poor in productive activity and so reduce both efficiency and equity;

[1] Risk is the likelihood of occurrence of shocks and stresses, which can be either internal or external to the household; risk can also be idiosyncratic or covariant (i.e. affecting many simultaneously). It can also occur on different scales, and requires scale-specific responses (Table 1). Vulnerability is the degree of exposure of communities, households or individuals to such adverse events, and their capacity to prevent, mitigate or cope with them. Risks are of many kinds: health, social, environmental, political, and economic/market-based. Whilst all of these are touched upon in this paper, the focus is on economic/market-based.

[2] For short, these are referred to throughout as "entrepreneurial risks", though are interpreted much more widely here than the fairly narrow types of business risk usually associated with running an enterprise.

- if preventative, coping or mitigating action is not taken, risk and vulnerability can cause loss of productive assets and so send rural households on a downward spiral into poverty[3]
- households typically respond to perceived risk in two broad ways. *Risk management* strategies involve entering into low risk activities or diversifying into portfolios of activities with differing profiles, for example, growing more drought resistant crops, entering into petty trading or firewood collection, seasonal migration etc. *Risk coping* strategies involve activities to cope with the consequences of risk. Two types are commonly observed: self-insurance using savings (for example, in the form of small livestock) to be sold off when the need arises, and informal mutual support mechanisms, where members of the group or community provide transfers to each other in times of need of one of its members, typically on a reciprocal basis.
- the poor and better off face different kinds of market, so requiring different kinds of R & V reduction. In particular, perceptions of high risk among the poor may encourage them to enter interlocked market arrangements (on unfavourable terms) with a local patron who offers them some degree of social protection. Discrimination based on gender, caste, class and creed may also exacerbate risk and vulnerability.

Questions addressed by the paper are whether and how:

- R & V reduction can be 'mainstreamed' into policy decisions concerned with growth promotion, and into vehicles related to development assistance dialogue such as PRSPs and Medium-Term Expenditure Frameworks
- appropriate choices made where trade-offs occur, as e.g. between growth and risk reduction, and among different risk-reduction measures;
- new approaches to reducing risk can be devised, and traditional approaches to risk reduction built upon more fully;
- market liberalisation is likely to increase certain kinds of risk;
- risk reduction can be taken forward simultaneously in domestic and entrepreneurial spheres;
- the sequencing of risk-reducing measures is important: thus, for households having at least one member capable of engaging with the productive economy, a prerequisite may be to stabilise their domestic situation by providing appropriate risk- and vulnerability-reducing support before encouraging engagement in productive activity

3. The current evidence – what do we know so far ?

Who faces what kinds of entrepreneurial risk?

Efforts to reduce risk affecting the rural poor have to be undertaken against a context in which, in many countries, some two thirds of the poor are found in rural areas, and

[3] Jalan and Ravallion (2003) find that households take several years to recover from a single income shock, and that recovery is slower for the poorer.

two thirds of these are in remote and difficult areas which are weakly integrated into market-oriented infrastructure and institutions. Compounding this is the fact that agricultural growth in these areas has been weak, and that, increasingly, people are moving out for part or all of the year to take up work elsewhere, which may help them to diversify against certain kinds of risk but expose them to new kinds. Those selling their labour – the major productive asset over which the poor have control – face two kinds of risk: those specific to the kinds of work they do, and to the conditions under

Table 1 Sources and forms of shocks and stresses, by scale

	Micro (idiosyncratic)	Meso	Macro (co-variant)
Natural		Rainfall Landslide Volcanic eruption	Earthquake Floods Drought Strong winds
Health	Illness Injury Disability	Epidemic	
Life-cycle	Birth Old-age Death		
Social	Crime Domestic violence	Terrorism Gangs	Civil strife War
Economic	Unemployment Harvest failure Ethnic discrimination		Output collapse
	Business failure	Riots	BoP, financial or currency collapse Technology or ToT shocks
		Resettlement	
Political			Potential default on social prog.
Environmental		Pollution Deforestation Nuclear disaster	

Source: adapted from Holzmann and Jorgensen (2000)

which it is undertaken (including seasonal migration, and urban worksites with poor health and safety provisions); and the wider economic/business risks that affect the prosperity of the (sub-)sectors in which they engage, and so the amount and quality of work available for them.

Segmentation of the poor is important in identifying the types of risk they face, and how they might be vulnerable to them. The poor can be microentrepreneurs (i.e., farmers in this case), and/or labourers and/or consumers[4]. In relation to agriculture, a

[4] All entrepreneurs and labourers are also consumers, but the reverse does not apply: those unable to engage in the productive economy are consumers without being labourers or entrepreneurs. Many have

slightly stylised but robust segmentation is given in Table 2. The 'proportions of rural population' are indicative, and will vary considerably from one context to another.

Changing perspectives on risk and vulnerability

Early post-Independence support to agriculture remained partly concentrated on

Table 2: Schematic segmentation of rural populations by engagement in agriculture and types of risk typically faced

Categories of rural population[5]	Proportions of rural population	Types of risk typically faced	Typical measures to prevent/mitigate/cope with risk
1. Commercial or semi-commercial farmers	Upper 20% - 30%	Generally *new* risks: Input/output price fluctuations, possibly associated with international market changes; stricter quality controls on products; saturation of national markets; transport/storage failures for perishables	Improved technology (irrigation, agrochemicals, new varieties) may reduce generic risks (weather; pests and diseases). Relevant education, information and extension advice may help in diversifying and achieving higher quality; storage infrastructure may reduce price fluctuations , but these remain problematic
2. Those mainly active as small farmers on own land, but may also lease in or sharecrop, and migrate seasonally	Middle 30% - 40%	Generic risks (pests and diseases; weather); possibly problems (as in (1)) of new market links, but most likely to be problems of local and/or seasonal market saturation, and imbalances of market power	Sound macroeconomic and sectoral policy will reduce risks of market saturation, as will advice/education/input supply in relation to diversification. Information, institutional and infrastructure development needed to make markets function better. Farmers' strategies include diversification within and out of agriculture
3. Those having a little land, but mainly dependent on sharecropping, seasonal migration etc	Next 10% - 20%	As for (2), but also risk of landlords withdrawing land, of dearth of off-farm jobs, non-enforceable contracts, dangerous working conditions on construction sites, etc	Policy requirements as in (2), but also support to personal insurance and strengthened institutions for contract enforcement, health and safety etc. Farmers' strategies include diversification and investment in "bite-size" assets (trees; small livestock) that can be sold in crisis
4. Those with few assets, mainly dependent on casual, unskilled labour	Next 10% - 20%	As for (3), but with a particular focus on effects on the jobs market	As above, but policies to support seasonal migration, commuting and personal insurance may be especially relevant
5. Those unable to engage in regular productive activity (very elderly, sick, disabled, very young,	Lowest 5% - 10%	Any risks impacting negatively on the agricultural and related economies are likely to have	Measures as above to strengthen and stabilise the household economy will help, but (where national budgets can afford them) measures to provide social protection (health,

diverse livelihoods, such that for part of the year they may be farmers (entrepreneurs) but, for the remainder, labourers. Studies of households that have escaped poverty find that in more than 80% of cases, the decisive factor was that the head of a household found a new job (WDR 2005).

[5] There are potentially several further categories in the rural space – of (relatively) high income traders, and middle income artisans, for instance – but these are omitted, given the present focus on agriculture.

female-headed households with many dependents…), all of whom rely on informal transfers of food, shelter, clothing		secondary effects on this group via reduced informal transfers to them	social pensions, child & widows' allowances) may be especially relevant

commercial export commodities, at a time when real international prices had begun to fall, but the wide short- and medium-term fluctuations characteristic of the last decade or so had not yet kicked in. Concepts of price-related risk were therefore in their infancy, and farmer behaviour in response to price-related and generic risks (see Table 1) which was later demonstrated as logically risk-reducing, was widely regarded as "***backward***" and "***excessively conservative***".

Improved understanding of farmer decision-taking generated by the work of Norman (1974) on intercropping and relay cropping, and of Mellor (1966) and Collinson (1972) on ***farming systems***, revealed the logic of many farmers' decisions[6] to reject production-*maximising* approaches in favour of those giving some balance between productivity gains and risk reduction. This was subsequently taken up as a central tenet of current "niche" work on ***low external input and sustainable agriculture*** – "niche" because it relies on inputs of family labour at returns lower than what it could potentially earn elsewhere, and is likely to be displaced as soon as competitively paid jobs become more widely available. The "***tragedy of the commons***" arguments illustrated how risks would escalate if the institutions (private ownership, or common property management regimes) were not in place to manage the resource adequately. ***Livelihoods perspectives*** on agriculture and rural development allowed a more nuanced assessment of the types of "vulnerability context" facing small producers, how these helped to condition the livelihood strategies pursued, and how they could draw on (and build up) capital assets to reduce risk and vulnerability.

Policy failure to deliver growth and poverty reduction owing to inadequate incorporation of risk management principles

It is difficult to attribute observed events to specific policy action (or inaction) in relation to R & V reduction. However, there are large amounts of circumstantial evidence. For instance, agriculture development plans typically focus on the promotion of growth (of yield, of annual cropped area, of irrigated area, and so on) with rarely any reference to the need to reduce the variance (spatial or temporal) around rising trends, and variance is a strong indicator of risk. The stronger the "push for growth" the higher are risks likely to be, attributable to higher susceptibility to pests, diseases and drought, or, for products geared to specific markets, attributable to market price fluctuations. Plans and programmes generated at higher levels of government, such as PRSPs, typically provide some assessment of poverty, risk and vulnerability, and are replete with the rhetoric of poverty reduction, but rarely make essential connections between the two in the form of improved mechanisms for service delivery and public investment prioritisation that will allow risk and vulnerability which is rooted in the productive sectors to be addressed in practice.

[6] Especially farmers in categories 2 and 3 of Table 1.

The potential contribution of agricultural (and higher level) policies as a means of insuring and protecting livelihoods

At the level of ***international policy towards trade and intellectual property rights (IPR)*** (and related policies on e.g. exchange rates) there is considerable potential for risk reduction. Tariff reductions in principle offer improved prospects to exporters, but expose domestic producers to the risks associated with much higher competition. Producers of silk in India have, for instance, recently suffered as a result of increased Chinese imports as tariffs are restructured, and edible oil producers have suffered similar threats. Countries facing high transport costs to international markets are to some degree protected from cheap imports, but by the same token, would-be exporters cannot easily take advantage of new markets which open up as tariffs fall. Many observers[7] perceive several kinds of risk-related problem with current international trade, foreign direct investment (FDI) and intellectual property rights (IPR) regimes:

i. changes in tariff regime may leave some countries (and products) excessively exposed, and more work needs to be done on "getting tariffs right";
ii. north-based concentrations of power at particular stages in processing/marketing of particular commodities works to the disadvantage of developing country producers. Coffee provides a striking example. There is a view that nothing short of vigorously implemented international anti-trust policy will be adequate to make markets such as these function in a more pro-poor fashion[8]
iii. it is inequitable for developing country producers to be required to remove tariffs and subsidies when subsidies in OECD countries are running at some US$1bn per day.
iv. rapidly growing penetration of developing country markets by multinational supermarkets are imposing new product standards and buying practices on commodity chains which increase levels of risk for some producers and exclude many altogether. Given that many of these standards are cosmetic and serve only to increase the profits of supermarkets, there are powerful reasons for seeking greater corporate social responsibility (CSR) on the part of supermarkets (towards producers, whereas it has traditionally been towards consumers) combined with greater regulation of supermarket practices and capacity building among farmers to meet new standards. Where appeals to CSR do not work, it may be necessary to address these issues through regulatory regimes or through conditions attached to FDI.
v. long-term international price decline in many agricultural commodities, together with short- and medium-term fluctuations, pose considerable risk, but views are sharply divided on appropriate responses: no matter how desirable they may be, attempts towards that buffer stock management and supply restriction by the major producing countries acting in consortium have yielded little of enduring value so far. There are also serious doubts over the feasibility of commodity hedging schemes of the kind being developed by the World Bank (Varanghis, 2003).
vi. the rapidly growing acquisition by multinational corporations of intellectual property rights to plant and animal genetic resources, combined with their

[7] These arguments are expanded in, for instance, the recent DFID Natural Resources and Agriculture Team's electronic discussion forum: http://dfid-agriculture-consultation.nri.org
[8] see, for instance, the international trade section in http://dfid-agriculture-consultation.nri.org

growing share of overall expenditure on agricultural research[9] poses particular problems (discussed below), one of which is the increased promotion of high-performance varieties, often requiring high levels of purchased inputs, and often having characteristics suited to particular, narrow markets, sometimes controlled by the same multinationals. Whilst an individual farmer growing several of such crops might spread his risk, the tendency overall is towards individual specialisation, which tends to be risk-increasing

vii. most fundamentally, there are questions over the efficacy of the "export-led growth" model being advocated by international agencies in the wake of economic reform programmes, especially when this relies heavily on agricultural commodities, given that they are subject to long term price decline as well as to oversupply-induced shorter term price fluctuations.

At the ***national level***, there are clear possibilities for mainstreaming risk reduction, within the framework of PRSPs and Medium Term Expenditure Frameworks, where these exist. The possibilities may include:

i. public investment allocations *across sectors*: shifts in the balance of public budgets may help to spread risk by enhancing the prospects of economic diversification generally (such as the creation of export promotion zones; the expansion of transport and communications infrastructure, and so on). This may also facilitate risk-spreading through livelihood diversification at the individual or household levels as new employment opportunities are created, though more specific policies to support seasonal migration by providing childcare and education, or facilitating remittances may also be necessary

ii. changes in the balance of public investment allocations *across provinces* may have similar effects. These might include, for instance, investment promotion measures as well as transport and communications infrastructure.

iii. *fiscal* policy is also likely to have important roles to play, insofar as some elements of risk and vulnerability reduction require transfer payments (such as social pensions, other allowances, and possibly subsidised personal insurance – see below), which, in turn, rely on taxations systems which are progressive, and simple and robust to administer.

iv. policies towards *health and education* reduce the susceptibility of communities, households and individuals to risk, and enhance their capacity to prevent, mitigate and cope with risk.

At the ***agriculture and natural resources sector*** level, a wide range of options exists, including:

i. investment in *communal assets*, including soil and water conservation structures, to reduce the risk both of catastrophic events (e.g. landslides and flooding) and of chronic processes (e.g. soil erosion, lowering of underground water tables). Other forms of communal investment, such as gravity irrigation schemes, can be powerfully risk-reducing.

ii. promotion of investment in *individual assets*, especially those such as small livestock and trees which can be sold in small, divisible amounts to meet

[9] Implying that the public sector share has fallen

shocks and stresses. Such support might, for instance, take the form of provision of appropriate genetic material and technical advice.

iii. Promotion of investment in *value-addition*. Suppliers of raw materials tend to face stronger price fluctuations than do those of finished or semi-finished products. Investment in appropriate processing, storage and marketing facilities will therefore be necessary both to retain income in or near areas of production, and to reduce fluctuations in that income.

iv. Agriculture-related *legislation and regulation*, such as reform of land tenancy and inheritance legislation, minimum wage legislation (and its better enforcement), and pressures to make markets work better for the poor, including pressure to reduce excessively high phytosanitary requirements imposed by OECD importers, and efforts to reduce the (often cosmetic) standards imposed by supermarkets, which are increasingly impacting negatively on small producers with increasing concentration in wholesale and retail markets, and growing penetration of developing countries' urban trade in fresh fruit, vegetables and dairy products by supermarkets

v. Public investment in *buffer stocks* is in principle an effective way of maintaining foodgrain prices when they are under downward pressure (i.e. immediately after harvest) and so reducing short-term price risk to farmers, but also of reducing the risk of high prices to consumers (including rural people who do not produce enough of their own grain) during times of scarcity. However, practical experience has been mixed. In India for instance, powerful farmer lobbies have kept floor prices excessively high, grain 'mountains' in excess of 60 million tonnes resulted, much of it in poor condition, and with chronic problems of pilferage and ineffective distribution to consumers (Deshingkar and Johnson, forthcoming).

vi. Agriculture-related *service delivery*, including: an appropriate balance in agricultural research priorities between enhancing the productivity of e.g. crops and enhancing their capacity to resist pests and diseases or tolerate drought; the promotion of farming systems which spread risk among varying combinations of crop, livestock and tree enterprises, and pressures to ensure that private providers of e.g. agrochemicals adhere to standards, provide adequate information to buyers, and, ultimately, set up self-regulating bodies. In other agriculture-related services such as credit, insurance and processing/marketing, there is scope e.g. for crop insurance schemes engaging the private sector to address longstanding problems of covariate risk, moral hazard and high administrative costs.

vii. Pursuit of crop and livestock policies which seek a balance between *growth and risk reduction*. The highest-yielding technologies are often also the highest-risk, requiring heavy farm investment in equipment and operating materials such as agrochemicals. Unexpected shortfalls in yield or reductions in price pose particular threats where expenditures have been high. Traditionally, farmers' choice of crop, crop mix and sequence, and crop/livestock mix was designed to provide moderate productivity with high protection against generic risks (such as pests, diseases and weather). National agriculture plans generally paid little attention to these strategies, preferring instead to allocate resources to a "go for growth" strategy. Some national research services spontaneously studied and built upon these strategies (rice research in Sri Lanka for instance had a long tradition of breeding to suit local soil and water conditions, and incorporated new internationally available

genetic material only on a very selective basis – Pain, 198???). In other cases, donor-supported agricultural research during the farming systems movement of 10 - 25 years ago exerted pressure on national researchers to understand and build on local systems. However, much of this impetus now appears to have been lost, as a consequence of reduced farming systems impetus on the international stage, reduced funding by donors for agriculture in general and for public agricultural research in particular, and a higher proportion of agricultural research funded by the private sector, with consequent focus on high productivity commercial varieties of crops and livestock. For all of these reasons, there is a need to redress current imbalances by sacrificing a little growth in certain fields in order to enhance risk-reduction.

viii. *Efforts to reduce transaction costs.* These are normally associated with public investments in transport, storage and communications, made with the intention of reducing the costs and risks in searching for market information, establishing contact with potential buyers/sellers, guaranteeing the rule of contract law, and conducting transactions. These are potentially important risk-reducing measures insofar as they permit more rapid and more accurate decision-making, and so may also facilitate diversification. However, important initiatives are being taken by some larger private sector trading companies in some contexts. Thus, in India, the India Tobacco Corporation's e-choupal places a computer in the hands of a (usually medium/large-scale) farmer in a village, who commits to sharing information with a peer group. Internet connections are also provided, and then farmers are able to obtain daily updates of information on what price will be guaranteed by the ITC for delivery of a given quality of a crop to a specific depot (ITC, 2003)

Practically all of the above measures can be targeted to particular categories of the poor, or areas in which they are predominantly found, though some (such as strengthening the legislative and regulatory framework for trade) are likely to generate more benefit to the better-off. In addition, there are ***specific agriculture-linked targeted measures*** that may involve an element of transfer or of subsidy – either temporarily, to stimulate eventual private sector engagement, or on a more enduring basis – that have important risk-reducing implications. For instance:

i. *Area-based* agricultural and NR policies offer particular risk-reducing opportunities, for many of the same reasons as wider public investment policies discussed above. Area-based policies became unpopular at the same time as many donors pulled out of Integrated Rural Development Programmes[10], but many OECD countries, and blocs such as the EU, have vigorous policies to redistribute resources from central and/or wealthier zones to more impoverished. The provision of basic infrastructure and capacity building for new industry, low-interest credits, and tax-breaks are among the many instruments used. Clearly, it is unreasonable for reform-minded international agencies to reject developing countries' regional policies as simply "more subsidy" when such policies are widespread in the North. For agricultural development and risk-reduction purposes, it is convenient to

[10] The pendulum swing out of IRDP was prompted by views that many were overambitious in seeking to advance on many fronts simultaneously, that they set up parallel investment prioritisation and service delivery mechanisms, and they offered emoluments that drew the better staff out of the public sector.

distinguish between areas well-integrated into market-oriented infrastructure and institutions, and those weakly-integrated. The latter face a very limited range of growth prospects, and generally a high incidence of generic-type risks[11]. There may be considerable merit in seeking out investment opportunities that generate improved combinations of productivity and risk-reduction, and in defending such spheres of comparative advantage as are already enjoyed by weakly-integrated areas. These might include forest, fish and open-range livestock production. There is no suggestion that such patterns should be maintained for all time – rather that policymakers should be sure that market-driven alternatives such as peri-urban livestock production fully reflect the social and environmental costs that they incur. They might also consider whether a dollar gained by relatively wealthy consumers of livestock products through their relocation to peri-urban areas is of the same, or lower, social value as a dollar lost by poorer, more remote producers as their markets are captured in these ways. If it is of lower value, then this opens the way for an element of protection to producers in the more remote areas – not necessarily on a permanent basis, but at least to cushion transitional shocks.

ii. *Efforts to promote appropriate insurances.* Crop insurance schemes potentially mitigate risk but have been largely abandoned owing to the high administration costs of collecting premia and verifying claims. Also, the covariant nature of the major risks (attributable to adverse weather) mean that only the largest insurers can withstand the large number of simultaneous claims likely to be made. New approaches (Hess, 2003) rely on weather reports for a particular area as a "trigger" for payments to affected farmers and so stand to reduce administration costs. However, much work remains to be done to pilot different modes of implementing these. Insurances of many other kinds would also assist in mitigating or coping with risk. These include insurances for assets such as livestock, equipment or structures. They also include (farm-) occupational schemes for injury and sickness. However, markets for insurances of these kinds remain underdeveloped. Suggestions on how they might strengthened are made below.

iii. *Efforts to strengthen rural finance and business services.* Services of these kinds are typically weak in rural areas – especially the more remote areas. Insofar as they facilitate diversification, support for these services is potentially risk-reducing and merits attention. NAADS in Uganda provides an illustration of efforts to place agricultural advice in the broader context of business development and rural finance (reference).

iv. More enduring forms of subsidy provide one of the few examples within agriculture of *transfer* payments, though they may not have been conceived in this way. Thus, the Malawi Starter Pack scheme (later renamed Targeted Inputs Programme) was introduced in 1999 as a means of permitting continued access by low income farmers to improved seed and fertiliser after prices (especially of fertiliser) had risen rapidly following economic reforms, and so stimulating supplies of basic grains to meet national food security requirements. This is now seen as an unrealistic prospect: livelihood futures

[11] See Table 2 for examples

are seen to lie much more in agricultural diversification or off-farm employment than in maize farming, and starter packs are unlikely to help towards such diversification. However, this is likely to be a long-term transition, and starter packs can remain a cost-effective subsidy to maintain rural livelihoods above destitution level in the meantime, in the context of a rapidly diminishing size of farm holding and declining soil fertility (Levy et al, forthcoming).

The interface between domestic and agricultural spheres, requiring the involvement of departments other than agriculture

Agriculture in relation to other sources of risk

In such a brief overview as this, it is impossible to examine entrepreneurial risks as they apply to other production sectors or sub-sectors, or to assess in any depth the range of health, social, environmental or political risks facing the rural poor. However, one category of risks – broadly those occurring in the domestic sphere – is considered, largely because of its size may imply substantive resource flows out of agriculture if left unattended. For instance, field survey evidence from 12 villages in two States of India in 2001/02 indicated that, for Madhya Pradesh, expenditures on marriages, health and funerals averaged some 24% of annual net income over the sample as a whole (20% in Andhra Pradesh), the largest of these being marriage costs, which were especially high for daughters, followed by health and funeral-related expenditures. Approximately half this amount on average was spent on agriculture-related investments in each of the states. These "social" costs were disproportionately high – approximately 30% – for the lower caste (i.e. poorer) households. In many ways more important than average figures is the size of shock or stress for those households experiencing it. Thus, households marrying a daughter spent over three times the average annual household income on the event and related expenses, so that the risk of being plunged into a downward spiral of borrowing and asset loss from which they cannot recover is high.

These data suggest that such high expenditures on marriage, health and funerals will inevitably draw funds away from entrepreneurial activity. This may happen directly, or indirectly – most of the social expenditure funds were borrowed from friends, relatives or moneylenders, and this inevitably causes diversion of revenues from productive activity to repay loans, and/or reduced ability to obtain further credit whilst the loan remains outstanding.

The policy imperative is therefore to design and implement measures to reduce risk and vulnerability *in a coherent fashion* as between entrepreneurial and domestic requirements.

As Table 3 suggests, there can be several ways of supporting R & V reduction for the domestic sphere. Table 4 suggests how these can be made coherent with measures in the productive sphere in relation to different categories among the rural poor, and to differing types of risk. In relation to a framework developed by DFID for promoting pro-poor growth and risk-reduction, Johnstone (2004) groups these into three categories:

- Insurance-based policies (for example, social insurance, crop insurance and health insurance)
- Social 'assistance', ie. non-contributory, tax-financed benefits, in cash or kind, provided to certain categories considered vulnerable (for example, the provision of free school meals etc)
- Other (for example, microfinance services, employment support such as public works programmes)

These may include support for micro-savings and credit schemes (possibly on the Grameen Bank model), the provision of micro-insurance against sickness, injury and death, and regular payments such as social pensions to the elderly and widows, allowances to orphans or the disabled, school fee allowances, school feeding schemes etc. To transfer funds to those unable to engage in the productive economy is regarded by some as little more than a 'handout'. However, transfers need not be 'a pure consumption cost'. They can be made to support production in at least two broad ways: one is to transfer resources towards targeted groups on the basis of need and deliver them only when recipients have taken a set of actions, which usually consist of investments in their own human capital. Examples include food (or cash) for work, and food for education. The other is to use them as an investment for maintaining human productivity in the longer run, among those who would otherwise suffer irreparable damage, physically or economically. Obvious examples include the long term damage done by severe malnutrition in early childhood, the failure of orphans or street children to attend school, or the sale of household assets such as land or livestock in times of crises, all of which safety nets can be used to protect against.

In all events, whilst such transfers may be too small to allow a build-up of assets, they do at least allow the recipients to engage in the economy as consumers, and may allow existing informal intra-household resource transfers to be switched into productive activities such as agriculture. Further, in some settings (e.g. S Africa – Devereux (2003)) there is evidence that part of social pensions paid to the elderly are invested in productive activity.

One of the benefits of a closer coherence between interventions in domestic and productive spheres is the prospect of avoiding negative interactions, such as are caused, for instance, when poorly-timed food aid disrupts local agricultural markets.

In ***summary***, the central argument in this section is that there is a major task facing governments and donors in mainstreaming the consideration of risk and vulnerability into policy decisions at several levels, progressing from the international, through national, to sector-specific. Conventionally, interventions to support growth (even pro-poor growth) have neglected the scope for risk reduction, and for building on traditional risk-preventing, avoiding, mitigating or coping mechanisms. Such considerations should play a much stronger role in PRSPs, the design of Direct Budgetary Support, and the construction of Medium-Term Expenditure Frameworks than they have done hitherto. In addition, there is an interesting discussion to be had on how far the conventional role of departments of agriculture can be extended into more mainstream social protection practices by embracing e.g. subsidy intended to stimulate the uptake of new practices, or even certain types of transfer.

However, what is clear is that the bulk of mandate for specific socially protecting measures will lie with other departments, but should be undertaken in coherence with more agriculture-specific measures. These include social insurance, social assistance (ie. non-contributory, tax-financed benefits, in cash or kind, provided to certain categories considered vulnerable (for example, the provision of free school meals etc), and assorted other measures, such as microfinance services, or employment support such as public works programmes. This hierarchy is reflected in Table 4.

Table 3 Matrix of social risk management (examples)

Arrangements/ strategies	Informal/personal	Formal/financial market-based	Formal/publicly-mandated/ provided
Risk reduction	Les risky production Migration		Labour standards VET Labour market policies Disability policies
Risk mitigation			
Portfolio	Multiple jobs Investment in human, physical and real assets	Investments in multiple financial assets	Multi-pillar pension systems Social funds
Insurance	Marriage/family Community arrangements Share tenancy Tied labour	Old-age annuities Disability/accident	Mandated/provided for employment, old-age, disability, survivorship, sickness, etc.
Hedging	Extended family Some labour contracts		
Risk coping	Selling of physical and real assets Borrowing from neighbours Intra-community transfers/charity Sending children to work	Selling of financial assets Borrowing from banks	Transfers/social assistance Subsidies Public works

Source: adapted from Holzmann and Jorgensen (2000)

Table 4 Managing shocks and stresses in relation to the agriculture sector

Types of rural household		Domestic	Production-related
Established farmers	Types of shock and stress	Illness Injury Disability Death Costs of weddings and other rituals	Collapse in prices resulting from globalisation Extreme weather events (drought, hail, flooding) Degradation of soil, water and other NR Inadequate access to input, finance and output markets owing in part to failed liberalisation
	Types of response	Promote private sector insurance schemes	Promote private sector input supply and marketing, and insurance schemes (which may require public start-up and regulatory controls); develop new types of crop insurance and price hedging (Hess, 2003). Public/private partnerships to control erosion and soil
Marginal farmers	Types of shock and stress	Illness Injury Disability Death Costs of weddings and other rituals	Extreme weather events (drought, hail, flooding) Degradation of soil, water and other NR Inadequate access to input, finance and output markets owing in part to failed liberalisation (Possibly) collapse in prices resulting from globalisation
	Types of response	Promote micro-savings, micro-credit, micro-insurance	Promotion of private sector inputs supply and marketing may have to be accompanied by measures to reduce market segmentation and interlocking; Insurance and savings schemes may require a strong public or community-based leadership
Labourers	Types of shock and stress	Illness Injury Disability Death Costs of weddings and other rituals	Loss of rural employment opportunities and/or reduction in real wages attributable to the above Loss of opportunities for seasonal/permanent migration attributable to same or other causes
	Types of response	Promote micro-savings, micro-credit, micro-insurance. Investigate possibilities of occupation-linked insurance and pensions	Public works programmes Support for seasonal migration through improved information, accommodation, education provision for children, easier means of making remittances etc
Those unable to engage fully in productive activity	Types of shock and stress	Illness Injury Disability Death Costs of weddings and other rituals	Reduction in informal intra-household transfers resulting from above shocks/stresses in agriculture Reduction in opportunities for gathering fodder/fuel from commons owning to NR degradation
	Types of response	Social pensions for the elderly, widows and disabled; school feeding programmes; promotion of infant health and nutrition; distribution of free or subsidised food	Social pensions for the elderly, widows and disabled; school feeding programmes; promotion of infant health and nutrition; distribution of free or subsidised food Schemes to rehabilitate the commons and ensure equitable access

4. Areas of remaining debate and disagreement

Are there trajectories from destitution to engagement with the productive sectors?

The World Bank's presents its SRM framework (World Bank, 2001) largely as a "win-win" scenario, in which SP protects people against sliding into poverty, and at the same time allows increased entrepreneurial risk-taking by providing social protection. In principle this can generate synergies in the narrowly defined sense of making the whole greater than the sum of its parts. Table 2 provides examples such as migration, holding multiple jobs, and insurances where this can occur.

But many of these interventions – even if they do work in the ways anticipated – are conceived as a "trampoline" which allow those producers who face temporary setbacks to "bounce back" into the productive economy. There are very few efforts to bring those largely outside the productive economy into it – along something of a trajectory from situations in which they mainly rely on social protection, to one in which they benefit more from livelihood promotion. This kind of trajectory represents synergy of a different kind. One such effort is the work done by the Bangladesh Rural Advancement Committee (BRAC) in its Income Generation for Vulnerable Group Development (IGVGD) programme (Matin and Hulme, 2003).

BRAC has faced a number of field-level implementation constraints in its IGVGD programme. To keep costs down, it is obviously desirable for community development workers (who would normally handle social protection) to cover interaction with the poor over both livelihood protecting and promoting issues. However, they may lack the skills or inclination to become advisers in micro-enterprise or agriculture. The same applies to agriculture advisers – they may be a poor second-best when it comes to providing assessments and advice in relation to SP. If this applies to the well-motivated staff of a dynamic NGO, it is likely to apply even more to public sector staff in social welfare or agriculture departments.

There are also more fundamental issues of social exclusion: certain types of productive activity are denied to women and to members of specific castes, clans, classes and creeds, or made available on adverse terms. This kind of rigidity cannot be overcome by the conventional 'facilitation and regulation' types of effort to make markets work for the poor, but require specific and long-term targeted measures.

Do trade-offs exist and how can they be addressed?

Not all possibilities will be "win-win". In a productive sector such as agriculture, policy decisions supporting high levels of growth may generate high levels of risk, and some growth may have to be sacrificed in order to reduce R & V. This applies, for instance, to the choice of priorities for agricultural technology: a policy which "goes for growth" may generate high-yielding, but also high-risk crop varieties. One which is more concerned with risk management may trade off some growth and so generate varieties which are resistant to pests and diseases, drought avoiding etc.

Johnstone (2004) has argued that: "...the cost-benefit analysis ...clearly depends on:

a) the level of taxation and the extent to which this undermines private sector investment

b) the weight given to the welfare of the poor – lower overall growth may be a price worth paying for higher pro-poor growth if there is a trade-off

c) how tax receipts are spent, for example, if on policies that sustainably increase the productive capacity of the economy/reduce risk and vulnerability, overall growth as well as pro-poor growth may be promoted".

Similarly, there are choices over the types of R & V-reducing measures to achieve similar goals within agriculture. For instance, where both are technically feasible, gravity irrigation may be a more equitable protection against drought than individually pumped irrigation, but may require more public investment. In the same way, R & V-reducing measures initiated outside the agriculture sector can have very different effects on agriculture. Thus, food transfers tend to be politically popular, and can provide particular nutrients to e.g. HIV/AIDS sufferers, or school meal schemes may encourage attendance, but they are costly to administer, and may suppress demand in local food markets. By contrast, cash transfers or vouchers allow even the near-destitute to engage in the economy as *consumers*, and may boost demand for agricultural products in local markets. But they require robust transfer mechanisms if they are not to be diverted, something in which computerization may help by facilitating automated payments.

There is substantial unexploited scope for introducing the perspectives of the one into the design and implementation of the other, i.e. for giving aspects of SP more of a growth-promoting dimension, and for designing agriculture initiatives in ways aiming to reduce risk and vulnerability.

Addressing location-specific conditions

Risk and vulnerability factors in both productive and domestic spheres will clearly vary according to a wide range of conditions. It is not possible to consider the full range of these here, but a number of illustrations can be given:

Agro-ecological conditions will influence the "riskiness" of production, as will the extent to which infrastructure (such as irrigation) has been constructed to counteract these. Market-related risks will impact differentially according to the types of crop typically grown in different areas, the extent and quality of links with international markets, the international market conditions for such commodities and the extent to which these penetrate major consumer markets in a given country. Labour markets may be characterized by different levels of casualisation, different types and levels of migration, different pressures on wages coming from rural non-farm or urban labour markets, and different types and degrees of segmentation. Factors of this kind will determine the types of R & V-reducing measures needed (such as employment creation schemes) and by whom. Location will also determine the likelihood of events such as flooding, which will impact on both production and domestic spheres. Differences in social network will determine the extent to which informal protection mechanisms can be called upon during crisis.

Guidelines for operationalising the Social Risk Management framework within an agriculture context are proposed in Annex 1.

5. Conclusions

This paper argues that initiatives to reduce risk and vulnerability, if managed well, can enhance the engagement of the poor in markets, and so stimulate productive activity. Also, certain types of public investment (e.g. in infrastructure) as well as reducing risk, can stimulate private investment. A central question is how policies in agriculture and related sectors can mainstream risk- and vulnerability- (R & V)-reducing measures in ways compatible with the kinds of options already available to the rural poor. One finding common to all is that affirmative action is likely to be needed to prevent disadvantage by gender, caste, class or creed.

Although the central focus of the paper is on public policy in agriculture, the analysis is extended *vertically*, to cover R & V-reducing measures that can be taken by higher-level policy. The analysis is also extended *horizontally*, to consider the types of R & V-reducing measure that can be taken in other sectors, which would complement agriculture-based measures.

The analysis suggests a number of specific *knowledge gaps* in relation to R & V reduction in agriculture. For instance, we know little about:

- how the links between SP, agriculture and gender are played out in relation to women's practical and strategic interests
- how the private sector might best be supported in designing and marketing appropriate new R & V-reducing products, including micro-savings, credit and insurances.
- the nature of individuals' trajectories (if any) from being outside to being within the productive economy, what the preconditions for such progression are, and whether/how they might best be put in place

However, our general conclusion is that reducing R & V is less about filling knowledge gaps and more about improving the implementation of existing ideas and practices. In this respect, the paper offers a number of policy suggestions which governments and international agencies are well-placed to act upon:

- The priority is to 'mainstream' R & V-reducing measures within policies focusing on agriculture and related spheres. Experiments in reducing R & V need to be shared within and across countries, and innovative practice be promoted
- A major priority is to strengthen the implementation of existing policy measures
- Both of the above measures can be promoted through 'new architecture of aid' vehicles such as PRSPs, MTEFs and direct budgetary support, where there is scarcely any discussion of R & V reduction within the mandates of productive sectors.
- National capacity needs to be strengthened to assess more rigorously the trade-offs between growth-promoting and R & V-reducing measures, and between

different instruments for achieving R & V reduction, both within and across sectoral mandates.

Findings of this kind underpin the World Bank's Social Risk Management Framework, but efforts in this paper to locate the findings within the organisational structures of government and of the new architecture of aid help in identifying how the SRM framework can be operationalised. Guidelines to this effect are presented in Annex 1.

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Annex 1 Guidelines for operationalising and mainstreaming social protection and the Social Risk Management Framework[12]

Guidelines #1 – #4 are concerned with mainstreaming, and #5 onwards with coherence of approach between domestic and production spheres, and with the need to recognize contextual differences.

Guideline #1. Identify how far policy at the highest levels (in relation to macro-economic and fiscal management; trade and investment, the legal framework...) is cognizant of the SP and SRM requirements, and what scope there is for modifying it in order to mainstream these considerations.

Guideline #2. Repeat this process within the productive sectors, to identify within these the types of policy arena likely to impact on the poor, and how far the tradeoffs within these (typically between growth and social protection) have been examined to date, and how they can be adjusted to obtain better balances between growth and social protection favourable to the poor. Within these sectors, identify how far public expenditure has been substituted by private commercial engagement, what the implications have been for the balance between SP and growth, and how imbalances might be redressed

Guideline #3. Identify what measures such as insurance need to be undertaken to gain win-win outcomes by complementing production focused measures

Guideline #4. Identify who from among the poor remain marginal to these processes, and identify what can be done for them by way of direct SP measures

Guideline #5. Identify the major dimensions of risk and vulnerability within the country(ies) concerned, and how these vary according to such factors as: agro-ecology; infrastructure; links with market-oriented infrastructure and institutions; labour markets; the degree of market segmentation; location, particularly as it relates to market access and potential natural disasters, and social networks.

Guideline #6. Recognising that SP can be promoted at national, provincial, community, household and individual levels, identify the main groupings that require some difference of approach; identify in particular the differences in vulnerability among, and different types of risk faced by, for instance, men and women, male and female children, widows, and the elderly.

Guideline #7. On the basis of a sound understanding of the above, identify how coherence can best be achieved between domestic and productive spheres in terms of both SP and livelihood promoting measures.

There are then important questions of how all of the above can best be achieved. Agreement on the guidelines is first required among donors and other international agencies, and the OECD Povnet provides a starting point. At country level, there is

[12] Source: Farrington, 2004

already a mechanism seeking coherence in approaches to poverty reduction, in the form of Poverty Reduction Strategy Papers and the associated committees, and these provide an appropriate locus for discussing and implementing the principles on which these guidelines are based.

Guideline #8. Use existing fora of donors and international agencies to obtain agreement on the principles underpinning greater coherence between social protection and livelihood promotion.

Guideline #9. Use Poverty Reduction Strategy processes as a means of discussing and implementing the principles on which these guidelines are based.

What is clear from several assessments of PRSPs, however, is that, whilst they make strong statements of intent on poverty reduction, they are less clear on the ways in which public investment, service delivery and public-private partnerships will change in order to deliver these intentions. This calls for experimentation with new approaches in these areas, and a coordinated lesson-learning approach

Guideline #10. International agencies, governments and NGOs need to experiment with new ways of adapting policies in the productive sectors to be more socially protecting, and of adapting SP policies so that they support pro-poor growth objectives. They should also experiment with new forms of public investment, service delivery and multi-agency partnerships to deliver these new approaches more effectively.

Guideline #11. New knowledge is also needed on how new SP measures impact on traditional mechanisms, and how they might be modified to build on these where appropriate.

Guideline #12. Capacity needs to be built among senior officials concerned both with SP and livelihood promotion so that each appreciates more fully the perspectives of the other, and takes decisions in a coherent manner.

5. Macro / National Issues

SEMINAR FIVE: KEY MACRO AND NATIONAL ISSUES
January 20, 2005

Presenters

- Kadi Warner, Winrock International
- Asif Shaikh, International Resources Group, Ltd.
- David Reed, World Wildlife Fund
- Peter Veit, World Resources Institute

Seminar Themes & Learning Objectives

This seminar will address the macro-scale issues that affect the rural poor in developing and transitional countries. Key seminar objectives include sharing knowledge on new research and thinking regarding key broad-scale issues affecting poverty reduction and effective natural resource management, and shaping USAID programming to better account for these issues in Agency programs that address poverty reduction and natural resource management. Key issues:

- Valuation of environmental goods and services
- Natural resources' comparative contribution to GDP and poverty reduction
- Macro-economic policies affecting natural resources management and poverty
- Distribution and redistribution of natural resource wealth

Panelists

- Valuation and Payment for Environmental Goods and Services: Poverty implications – *Kadi Warner*
- Comparative Contributions of NRM to GDP and Poverty Reduction – *Asif Shaikh*
- National Income Accounting and Natural Resources – *David Reed*
- National Redistribution of Natural Resource Wealth – *Peter Veit*

6. Migration, Marginal Lands

SEMINAR SIX: MIGRATION, MARGINAL LANDS AND LEAST FAVORED AREAS
February 3, 2005

Presenters

- Kevin O'Neil, Migration Policy Institute
- John Pender, International Food Policy Research Institute
- Dennis Weller, USAID Bureau for Democracy, Conflict & Humanitarian Assistance

Seminar Themes & Learning Objectives

This seminar will address the links between environment and migration, and the role of remittances in natural resource management investment and poverty reduction. The links and disconnects between development assistance and humanitarian assistance in fighting poverty and sustaining the resource base will be considered, as will "creating natural capital" by transforming marginal lands into financially viable investments for the rural poor. The seminar will also look at the demographics of the rural poor who live on marginal lands and explore their differing livelihoods and coping strategies.

Panel Presentations

(each presentation will include an overview, conceptual Issues, case studies, policy Issues, and time for discussions)

- Migration, Remittances and Development – *Kevin O'Neil*
- Approaches to Natural Resource-Based Development in Least Favored Areas – *John Pender*
- Links and Disconnects Between Development Assistance & Humanitarian Assistance – *Dennis Weller*

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Feature Story

Using Remittances and Circular Migration to Drive Development

By Kevin O'Neil
Migration Policy Institute

June 1, 2003

This report summarizes the presentations and conversation that took place during the Migr Policy Institute-Migration Information Source meeting on "Using Remittances and Circular I as Drivers for Development" hosted by the Center for Comparative Immigration Studies at University of California San Diego on April 11 and 12, 2003. The meeting brought together international experts from academia, research institutions, government, and multilateral organizations. The fields of expertise represented included demography, geography, refuge protection, development economics, sociology and immigration law and policy, reflecting tl and diverse array of issues relevant to "migration and development." The goals of the mee to:

- highlight changes and new knowledge in migration and development.
- revisit old concepts of migration and development, extract those that continue to re: and build upon them with new ideas.
- open a frank discussion on the potential of circular migration and remittances as dri economic development.
- identify data and research needs in the area.
- provide the groundwork for a special issue of the Migration Information Source (www.migrationinformation.org) focusing on migration and development and featuri by many of the experts in attendance.

The synopses below closely track the agenda of the meeting, but also reflect the broad ran related issues that arose in the course of discussion.

I. Migration and Development: What's New, What's Old, What's Out

Introduction: Migration and development have been discussed together for well over 30 meeting began with a critical overview of thought on the topic, aimed at discarding flawed reviewing old debates and identifying new trends. Rather than attempting to settle questio have long resisted conclusive answers, the meeting focused on building the knowledge bas to develop coherent policies that maximize the development potential of migration. Discus: guided by realism about the limited ability of the state to influence positively migration out by recognition of the determination, hard work, and contributions of migrants themselves. growing awareness of the need to move discussion away from a single-minded focus on st to one that also looks at migrants themselves; several attendees spoke of a need for "imm policies" in addition to "immigration policies."

Advances in research and thinking on migration informed this discussion. Old themes have

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reemerged in new contexts, new trends have been studied, and difficult debates continue.

Old and discredited ideas:

- The concept that either poverty or overpopulation, in and of themselves, causes mig an oversimplification. People move for a variety of reasons, and their movements ar facilitated by complex and enduring transnational social networks.
- The wishful thinking that economic development can reduce migration pressures in t term has been dispelled.

Old, but reemerging ideas:

- Interest in remittances has grown while questions about how best to capture develo impact remain. Globally, remittances have grown both in nominal terms and relative countries' GDPs, far outpacing growth in official development assistance. Furthermo remittances are more stable than both foreign investment, both direct and portfolio. more countries are looking to remittances as a development tool.
- Debate over the "brain drain" continues. Many developing countries remain very cor their lack of control over high-skill labor exports. However, as high-skill and other e have increasingly lent their expertise and capital to business ventures in their home discussion has shifted to embrace the concepts of "brain gain" and "brain circulation

New developments:

- Complex "replacement" migration flows have gained in prominence. One example is replacement of Canadian doctors and nurses who have moved to the US by South A followed by the migration of Cuban medical professionals to South Africa.
- Women account for a growing and often unacknowledged proportion of migrants. In Arab countries and the "Asian tigers" have attracted large numbers of domestic worl These workers are among the most abused and least protected groups of migrants. to limit this type of migration have only driven flows underground, where more pote abuse exists. However, innovative programs, such as one that gives mobile phones Indonesian women working abroad, can prevent isolation and abuse in the destinati country. Implications of the continuing feminization of migration include the "care d women who leave their own families to work abroad as domestic workers.
- Financial flows from migrants other than remittances have grown, including tourism emigrants and individual and collective foreign direct investment and philanthropy ir source country.
- The concepts of "political and social remittances" has entered the conversation in re the recognition that migration promotes the exchange of ideas and practices as well and money.
- Successes in places such as Hinschu, Taiwan and Bangalore, India have drawn atten role of migrants in creating business linkages and outsourcing production back to th country.
- Technology has multiplied and intensified the networks that tie migrants and their s countries. The Internet helps migrants maintain social and business ties and gives p migrants ready information about jobs and life in the destination country, as well as information about how to get in. Cheap transportation has made return visits or circ migration much more feasible.
- The focus on international migration, and in particular on migration from developing developed countries, risks ignoring internal and intra-regional migration. Internal an regional migration are more likely to involve the extremely poor and thus are very i both in terms of their direct development impacts and their role in step-wise interna migration.
- There is a growing appreciation of the extreme measures—fueled by what some will "desperation" and others "determination"—that people will take to migrate. A migra development agenda must consider the adverse effects of border control policies an both illegal crossings and the risks they involve. "Concentrated border enforcement"

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on the US-Mexico border in the 1990s sought to discourage illegal entry by closing t routes and raising the costs of crossing. Crossings did not drop. Rather, illegal migra were diverted through more dangerous terrain. As a consequence, organized smugg increased and migrant deaths in remote border areas rose markedly. Undocumentec migrants now tend to stay in the US longer in response to the increased risk involve making another trip to the US.

- Labor migration continues to be part of the discussion on trade liberalization in the c the WTO's General Agreement on Trade in Services. Although political complications significant liberalization of labor migration under multilateral agreements difficult, tr migration experts need to work more closely. Likewise, although NAFTA and other fr arrangements have not reduced migration pressure, migration remains relevant to c countries when considering trade policy.

An Enduring Debate: Migration continues to raise difficult questions about the nature of de itself. On one level, development is the alleviation of poverty, and migration clearly contrib this. Migration that results in remittances raises the incomes of the families of migrants an many poor households. Much of that additional income is spent on debt repayment, housin and basic health care and education, roughly in that order. Thus, migration and remittance contribute to progress toward some of the UN's 8 Millennium Development Goals.

On another level, however, development entails long-term structural change: improvemen knowledge, human capital, and infrastructure and the creation of efficient and accessible m governments, public services, and other institutions. When viewed through this second len development, the effects of migration become more complicated. Some analysts worry tha migration, rather than promoting the structural changes needed for development, may act them while creating unsustainable local and family economies. This argument draws a para natural resource windfalls and posits that migration's potential is squandered if it raises inc without boosting human capital and institutional capacity. According to this line of thought, may rob developing countries of their most motivated and innovative people, delaying insti change. Further, the world's very poorest do not often migrate internationally, blunting mi impact on poverty.

This philosophical bend does not necessarily lead to different research and policy prescripti however. Whether or not labor export constitutes "real" economic development, widesprea agreement exists that stopping migration is neither possible nor desirable. Instead, public should focus on maximizing the development benefits of migration by increasing the positi of remittances and taking advantage of the learning and business opportunities offered by migration and the transnational connections that migrants create. No matter where they st debate, experts agree that remittances and the other benefits of migration are the private the exceptional hard work, risk and initiative of the migrant. Public policy made in the nam economic development must first and foremost reflect this reality: that the basic units of m and the most important actors for development, are migrants themselves, not the state. Ir particular, policies toward remittances must enhance the opportunities available to migrant their families through innovative financial instruments and incentive-based programs that further broader development goals.

II. New Issues Related to Circular Migration

Introduction: The popular legend of immigration is that migrants move to a receiving cou settle there permanently and are assimilated into a new culture. The reality is that this sto represents an increasingly smaller proportion of all migration: a growing proportion migrat circular (migrants return to their sending country, once or many times over a period of tim "transnational" (migrants move to migrant communities in one or more receiving countries maintaining strong social, business, and political ties to the sending country.) Although this not as obvious or pronounced for all immigrant groups, these new paradigms of migration a potential lever for development: financial, human and social capital gained abroad can ha powerful benefits for the source country if migrants return or maintain strong ties. Unfortu migration policy still has not addressed these predominant forms of migration and remains in the binary concepts of "permanent" and "temporary" migration. Innovation is needed to sending countries promote circular migration and use it for development and to assist labo countries in developing better temporary labor migration programs.

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New knowledge and developments in circular migration

- Modern forms of transport and communication have reduced the "friction of distance sending and receiving countries.
- International social networks, based on kinship and hometown ties, give migrants sc capital that is useful both in the source and receiving country, encouraging moveme between the two.
- Globalization and the growth of international companies have resulted in a dramatic in the number of international transfers within companies.
- The number and variety of occupations that have become part of the international la market exploded, and will continue to grow. Even in middle-income countries, migra provide most of the labor in the agricultural, construction, and domestic services sec
- A worldwide migration industry has developed, often with the participation or encou of national governments, to facilitate temporary labor movement. This industry has legal and a black market component. Despite the fact that the clandestine immigrati industry is largely controlled by well-organized criminal cartels, many enterprises th illegal immigration are small family businesses.
- Policies intended to stop undocumented immigration inflows may cause undocument migrants to spend longer amounts of time in the host country and encourage them t their families. For example, Indonesian workers cross the loosely controlled border v Thailand regularly, but few settle for long. In contrast, Indonesians who make the m closely guarded passage to Sabah in Malaysia tend to bring their families and stay lc
- Receiving countries increasingly prefer temporary migration programs to permanent although they are rightly concerned about how "temporary" they are. Australia, for e established its first temporary worker programs in the 1990s. One estimate predicts of new "temporary" migrants will end up living in Australia on a "permanent" basis— significant number, but not justification for the oft-repeated quote, "There is nothing permanent than temporary migration." The natural tendency toward voluntary circul migration, properly encouraged, can make temporary programs more successful for
- Labor segmentation is playing an ever-increasing role in driving migration, particula migration, but policy does not yet reflect this reality. In an increasing number of dev countries, natives are unwilling to perform work that is low-wage, low-prestige, seas physically demanding. As the populations of the developing countries age, the dema hard and relatively low-skill service work associated with the needs of the elderly wi to rise. However, migration programs in the developed countries, particularly tempo generally aim to attract high-skill labor and, aside from the agriculture sector, exclu labor.
- The role of migration and circular migration in spreading diseases such as AIDS and needs to be examined. Still, public health measures aimed at migrants need to avoi scapegoating them and acknowledge that labor migrants are not the only—or even p carriers of diseases from country to country. For example, evidence shows that AIDS introduced to Indonesia not by returning labor migrants, but Indonesian soldiers ret from peacekeeping duty.

Temporary labor migration: The good, the bad, and the difference.A first step towa integrating circularity into our policy frameworks will be to devise temporary labor migratic programs that work well. Experience with temporary labor migration has not been universa positive for migrants, sending countries or receiving countries, but good models and clear l exist.

The good: Mexico's temporary agricultural labor program with Canada has been generally s both in protecting worker rights and promoting circularity. The Mexican government recruit for jobs arranged through a Canadian employer's association. The agencies involved certify monitor both workers and employers. Last year, 12,500 workers participated. In 28 years operation, no Mexican migrants are thought to have overstayed their visa, only 5% have r before their visa expired and a number of workers return to the same employer year after Switzerland, too, has had a successful temporary visa program that allows migrants to wor hotel and service industry for nine months per year. Participation in the program has reflec ongoing development of the sending countries: Southwestern European migrants have bee gradually replaced by eastern European workers.

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The bad: Temporary labor programs have an enormous potential for abuse, particularly wh are unilaterally administered and their rules are not carefully enforced by the receiving aut H-2A and H-2B visas granted by the US, the overwhelming majority of which go to Mexicar to specific jobs. The system gives employers and recruiters an enormous amount of power migrants; with little regulation and enforcement on either side of the border, migrants may recruiter for a visa only to end up working for sub-standard wages or conditions. In practic system may also be encouraging illegal, long-term stays.

The difference: Future temporary labor migration programs should:

- create committed bilateral partnerships between sending and receiving countries.
- be market driven, flexible and self-adjusting.
- take advantage of technology in matching employers and workers and enforcing reg
- consider both the costs and benefits to the receiving country's workers.
- give migrants the same rights and obligations as native workers to every extent pra
- open a clear path to legal permanent residency for temporary workers who meet predetermined requirements.
- not tie workers to a specific employer beyond an initial period.
- be self-financed.
- have clear, independent dispute-resolving mechanisms.
- minimize bureaucracy without surrendering the government's ability to audit and en compliance.

III. New Issues Related to Remittances

Introduction: Remittances sent back by migrants continue to be a powerful financial forc developing countries. Many countries, such as Jordan, Nicaragua, or El Salvador receive re estimated to total 10% or more of GNP. After foreign direct investment and trade-related e remittances are the largest financial flow into developing countries, far larger than official development assistance. Unlike development aid, remittances are spent directly by the fan migrants, so in many respects remittances are a very efficient way to raise the incomes of poor countries. However, the costs of transmitting remittances remain high and the wider development effects of remittances are far from clear. There are ways that policy can mak remittances a more effective development tool, but interventions must be prudent, incenti and informed by further research. New Knowledge and Developments in Remittances

- Research continues to show that remittances are largely spent on debt maintenance retirement, housing, consumer durables, everyday expenses, education and health c are indications that in some parts of the world there has been a shift from spending housing toward spending on everyday needs.
- Remittances, at least as officially measured, have increased faster than developing c GDPs over the past decade. Remittances to Latin America have grown particularly qu probably reflects both a real increase in total remittances and an increase in the pro remittances that move through formal, observable channels.
- Legal status affects remittances. Legal immigration status increases remittances by earnings and making sending remittances easier, but may decrease remittances ove term by increasing integration in the migration-receiving country. One study showec migrants who enter illegally and later achieve legal status, remittances grow steadily the time of regularization, and decrease gradually thereafter.
- There are remittance "life cycles" and they vary across cultures, countries, and econ conditions. For example, Indian migrants in the US generally stop remitting within o generation, while many Koreans in Japan continue remitting two generations after m In many cases, if one migrant in a family returns home or stops sending money, a "replacement remitter" often migrates.
- Flows of "remittance migration" have grown in response to economic crises. Ecuador international migration grew significantly in the late nineties when the country was h major economic crisis. 75% of Ecuadorian households now receive remittances total

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billion a year. Most of this remittance growth has been in the past three years and 7 households with a member abroad say that the migrant left within the past five yea
- Countries may at times discourage mass return in order to maintain the flow of remi Salvador, for example, encouraged the extension of Temporary Protected Status to citizens to stay in the US.
- Anti-money laundering provisions put into place after September 11th have disrupte informal remittance channels, specifically those involving the Middle East, Indonesia Philippines. The full effect of new security measures remains to be seen.
- The matrícula consular identification card has made it easier for undocumented Mexi migrants to get bank accounts and remit via banks, which are often cheaper. Howev political backlash to the matrícula in the US has led El Salvador to put similar consul identification plans on hold.
- The cost of sending remittances to Latin America from the US has remained much h to the rest of the world. Poor banking infrastructure in some Latin American countrie long-term contracts with wire service companies have inhibited competition. US ban entered the market in order to use remittance services to attract US-based immigra long-term customers for other banking services.

Comments on Policy toward Remittances

- A light hand is needed. Concern was expressed that government intervention in rem risks destroying the enormous benefits of remittances. The government does have a play, in supporting migrants who would like to start businesses, invest in their comn origin or donate to public projects, for example, but caution is needed.
- Cut the cost of sending remittances. Competition, market exchange rates and easy formal banking institutions are keys to reducing the amount of money spent on rem transfers.
- Encourage the use of financial services. Remittances can be a way of introducing the banks and they will have stronger positive developmental effects if families keep the remittances in bank accounts. Innovative micro-credit programs, an expanded bank infrastructure and the use of new financial instruments like remittance-backed bond be supported.
- Nothing can replace a sound macroeconomy and good investment environment. Mig remit more and invest remittances in activities with substantial multiplier effects if exchange/inflation rates are stable and there are viable business opportunities avail a positive investment climate may be the most powerful tool for maximizing the ben remittances.

IV. Data and Research needs

Introduction: Better data and better-guided research is needed to inform policy on migra development. In particular, migration research needs to focus on and understand better ci temporary migration, look more at the community and long-term effects of migration and differences in research and data collection methods with economists and financial institutio Particular needs brought up by issues in migration and development include:

Circularity

- Current migration data is based on obsolete, binary models of migration and relies t on census and administrative sources. New studies must use longitudinal surveys ar flexible view of migration that takes circularity into account.
- When each is used alone, visa information, census data and the stated intentions of do not accurately reflect actual migration behavior over time. Data from multiple so time points and new types of analysis are needed to learn more about migration dec
- More information is needed about the effects of policies that disrupt circularity (such tightened border controls) or that encourage it (such as transferable pensions).

Remittances

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- Future studies of remittance use must focus on the effect remittances have on hous spending of total income. Too many surveys have asked only how the remittances tl were spent.
- Remittance studies need to look at the effects on entire communities, rather than ju households, and to look at changes over time. For example, it is possible that even i remittances decline as a migrant becomes integrated into the receiving country, the usefulness of those remittances increases because his or her family has met their ba and is now capable of investment.
- Current measures of remittances are incomplete, inconsistent, poorly understood an grounded in the reality of migration. One common measure of remittances is the IM measurement of "worker's remittances" in the current account, but that figure is sor flawed; the earnings of workers who have been living abroad for less than a year ar counted separately in "compensation of employees abroad" and the resources they l they move between countries as "migrant transfers," but these categories may be tc The IMF also determines residency using a "center of economic interest" criterion th not match the definition of residency most often used in discussing migration. Comp the problem, individual central banks use their own criteria to count remittances.
- The net gains of migration to a family need to be quantified. The conventional wisdo remittances boost family incomes has not been thoroughly evaluated. If, for exampl remittances are in fact repayment by migrants for a loan used to pay the often exto costs associated with illegal migration then migration may be a zero-sum outcome f family left behind, or even a loss, for some period of time. While this seems unlikely the net benefits to remittance-receivers is needed.
- Are remittances overcounted or undercounted? Official estimates of remittances do i include money sent by informal means or remittances held in foreign currency accou they are converted to local currency), leading many experts to believe that they are significantly undercounted. On the other hand, official estimates may include clande transfers from illicit activities or other non-remittance transfers. Finally, in calculatin remittances, some researchers and central banks include "compensation of employe but much of this money is spent in the migration-receiving country and never remitt

Other Needs

- Questions remain about many theories commonly used in thinking about migration. example, the "migration hump" will not be a useful policy insight until it is refined ar
- There is a need for "counterfactuals." Migration studies rarely aspire to the rigor of a controlled scientific experiment and all too often study only households that do migr ignoring those with no migrants.
- More econometric studies of migration-related topics are needed.
- The development of transnational political identities needs to be examined more clo more countries emphasize dual citizenship and allow migrants to vote from abroad, on both the migrants and the political systems in the sending country need to be ex more systematically.
- The role of funding from migrants in perpetuating civil conflicts deserves more exam Examples of violent groups financed by migrants include the IRA in Ireland and the Tigers in Sri Lanka.

Summary Remarks: As evidenced by the number and range of data and research needs i migration and development is a field where unanswered questions and unsettled debates s abound. A few clear points emerge, however:

- For both sending and receiving countries, efforts to limit or control overall levels of r have all too often resulted in limited success and unforeseen consequences. Howeve informed policies by governments and the private sector that seek to *manage* and *c* migration can enhance migration's benefits and minimize its costs. Research and po should focus on finding better management tools and identifying places where judici policy can help developing countries benefit more from migration.
- The community of researchers who study migration is continually redefining and imp understanding of the changing behavior of migrants. Concepts like "circularity" and

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"transnationalism" have drawn attention to more ways that developing countries be migration. However, both data collection and public policy remain largely grounded i less relevant concepts of migration.

- The intersection between migration and development is large and complex. Migratio linked to a variety of development policy issues: international trade and investment, development aid, finance and macroeconomic growth, among others. Likewise, all t migration have development impacts, from refugee resettlement to high-skill labor r New research is needed on a myriad of topics and researchers must be prepared to policymakers on a variety of issues. Far greater coordination and collaboration betw two communities will be needed to make research in the area as effective as possibl

Policymakers and researchers alike must not forget that the fundamental units of migratio *migrants themselves*. Policies must be built around migrants to give them incentives and disincentives that further both the aims of receiving countries and the development aspirat sending countries.

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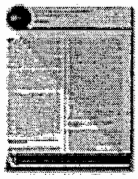

2020 Focus 4 (Promoting Sustainable Development in Less-Favored Areas), Brief 5 of 9, November 2000

RETURNS TO PUBLIC INVESTMENT: EVIDENCE FROM INDIA AND CHINA

Shenggen Fan and Peter Hazell

Conventional wisdorn suggests that the productivity returns to investment are highest in irrigated and high-potential rainfed lands and that growth in these areas has substantial trickle-down benefits for the poor, including those residing in less-favored areas. Even though investing in less-favored lands might have a greater direct impact on the poor living in those areas, it is argued that investments in high-potential areas give higher social returns for a nation than investments in low-potential areas. The logic behind this position is as follows. Investment in high-potential areas generates more agricultural output and higher economic growth at lower cost than in less-favored areas. Faster economic growth leads to more employment and higher wages nationally, and greater agricultural output leads to lower food prices, both of which are beneficial to the poor. Less-favored areas will benefit from cheaper food, from increased market opportunities for growth, and from new opportunities for workers to migrate to more productive jobs in the high-potential areas and in towns. Fewer people will try to live in less-favored lands, and this will help reduce environmental degradation and increase per capita earnings. Migrants may also send remittances back to less-favored areas, further increasing per capita incomes there, especially for the poor.

Many of the expected benefits arising from rapid agricultural growth in high-potential areas have been confirmed through empirical research. Nevertheless, the rationale for neglecting less-favored areas is being increasingly challenged by: (1) the failure of past patterns of agricultural growth to resolve growing poverty, food insecurity, and environmental problems in many less-favored areas; (2) increasing evidence of stagnating levels of productivity growth and worsening environmental problems in many high-potential areas; and (3) emerging evidence that the right kinds of investments can increase agricultural productivity to much higher levels than previously thought in many less-favored lands. It now seems plausible that increased public investment in many less-favored areas may have the potential to generate competitive if not greater agricultural growth on the margin than comparable investments in many high-potential areas and that these investments could have a greater impact on the poverty and environmental problems of the less-favored areas in which they are targeted. If so, then additional investments in less-favored areas may actually give higher aggregate social returns to a nation than additional investments in high-potential areas. In fact, they might offer win-win-win possibilities (that is, more growth, greater poverty reduction, and better environment).

To test this hypothesis, IFPRI recently analyzed the agricultural production and poverty alleviation impacts of different types of investments in high- and low-potential areas in India and China. Unfortunately, the available data did not permit a comparable analysis of the environmental impacts of public investments in these two countries. India and China are good examples to study because, like many other Asian countries, past public investments have been biased toward high-potential areas, and the remarkable productivity gains achieved in those areas (which led them from acute national food shortages to current surpluses) can now be juxtaposed against the lagging productivity and poverty, food insecurity, and environmental degradation that exist in many less-favored areas. The results provide strong support for the hypothesis that greater levels of investment in less-favored lands are now warranted, at least on growth and poverty alleviation grounds.

RETURNS TO PUBLIC INVESTMENTS IN INDIA

In India the analysis was based on district-level data, and districts were classified into three categories: irrigated, high-potential rainfed, and low-potential rainfed. Districts were defined as irrigated if more than 25 percent of the cropped area was irrigated. Rainfed districts were subdivided into high- and low-potential areas according to their agroecological characteristics. About 80 percent of the rural poor live in rainfed lands as defined here, and about half of those live in low-potential rainfed lands. Using district-level data for 1970B95, an econometric model was estimated to measure the impact of different types of public investments on

agricultural production and rural poverty. The model was then used to calculate the impact on growth and poverty of another unit of each type of investment by land type. The results are shown in Table 1.

For every investment, the highest marginal impact on agricultural production and poverty alleviation occurs in one of the two rainfed lands, while irrigated areas rank second or last. Moreover, many types of investments in low-potential rainfed lands give some of the highest production returns, and all except education have some of the most favorable impacts on poverty. These results provide strong support to the hypothesis that investments in less-favored areas are becoming win-win opportunities and that more investment should now be channeled to less-favored areas in India.

RETURNS TO PUBLIC INVESTMENTS IN CHINA

In a similar study of China, three regions were defined: the coastal, central, and western regions. The coastal region is the most fertile, with good rainfall, and can be classified as a high-potential region. The western region is the least developed and has poor natural resources and social infrastructure; it is a low-potential area. The central region falls between the other two and from an agricultural perspective can be considered a mid-potential area. More than 60 percent of the rural poor lived in the western region in 1996, and most of the rest lived in the central region. Using a similar method as for India and province-level data for 1970B97, the agricultural production and poverty impacts of additional investments were estimated for each region (Table 2).

All investments have their biggest impact on poverty in the low-potential western region and their second-biggest impact in the mid-potential central region. The high-potential coastal region ranks second or third for all investments. Most investments also have their highest production returns in either the central or western region, showing that investments in these regions are now win-win strategies. However, the production returns are mostly larger in the central rather than the western region, suggesting that some trade-off exists between growth and equity goals in allocating investments between mid-potential and low-potential areas.

These results from India and China should not be interpreted to mean that public investment should now be reduced in irrigated and high-potential lands. These areas are the major sources of food for rapidly growing urban populations, and they still offer favorable returns to many investments. But the results do suggest that attractive opportunities exist for reducing poverty through additional investment in less-favored areas and that rather than sacrificing growth, many of these investments actually offer win-win opportunities for achieving more production growth and greater poverty reduction. Similar studies have yet to be done for other regions, and it would be dangerous to extrapolate these results beyond Asia, since many poorer countries, especially in Africa, have not yet invested sufficiently in their high-potential areas to have reached the point of diminishing production returns.

For further information see Shenggen Fan and Peter Hazell, "Are Returns to Public Investment Lower in Less-Favored Rural Areas? An Empirical Analysis of India," Economic and Political Weekly (April 22, 2000): 1455B1463; and Shenggen Fan, Linxiu Zhang, and Xiaobo Zhang, "Growth and Poverty in Rural China: The Role of Public Investments," Environment and Production Technology Division Discussion Paper No. 66 (International Food Policy Research Institute, Washington, D.C., 2000).

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2020 Focus 4 (Promoting Sustainable Development in Less-Favored Areas), Brief 3 of 9, November 2000

TECHNOLOGIES FOR THE TROPICAL ANDES

Thomas Walker, Scott Swinton, Robert Hijmans, Roberto Quiroz, Roberto Valdivia, Miguel Holle, Carlos Leon-Velarde, and Joshua Posner

The heterogeneity of the tropical Andes has spawned many systems of agroecological classification, but the criterion that most effectively separates favored from less-favored areas is latitude. Proximity to the equator eliminates seasonal temperature change. In the northern Andes, rainfall is possible in any month of the year. In the southern Andes, both temperature and rainfall regimes are seasonal, and frost and drought determine the length of the growing season and periodically threaten crop production.

Seasonality defines the two great high-altitude grassland systems known as the Paramo and the Puna. The dividing line for these two systems crosses northern Peru at about the latitude of Cajamarca (see figure). We use this point of reference to group the tropical highlands above 1,500 meters into the northern and southern Andes. We briefly discuss technological change in the northern and southern Andes before focusing on the Altiplano, the least-favored production region of the southern Andes.

THE NORTHERN AND SOUTHERN ANDES

In the northern Andes, adequate natural resource endowments of temperature, rainfall, and soils have set the stage for some impressive examples of intensification in response to increasing population pressure and market access. The most outstanding examples are the thriving cut-flower industries in Colombia and Ecuador.

Pests and diseases potentially exact a toll on production in the northern Andes. These threats can be managed, however, by using disease-resistant varieties or more costly but still remunerative inputs. In spite of a moderately high incidence of these biotic stresses, specialized areas of potato production have emerged in the highlands of Colombia and Ecuador where yields of 20 (or more) tons per hectare are common and where it is possible to cultivate rain-fed potatoes throughout the year. In most cultivated regions of the northern Andes, applying inorganic fertilizer pays not only on high-value and fertilizer-responsive horticultural crops but also on cereals.

In contrast to the northern Andes, the rural residents of the southern Andes are significantly poorer than those in other regions of the same countries. In the southern Andes, drought is accentuated by the cyclical occurrence of El Niño.

THE ALTIPLANO

The least-favored production environment in the southern Andes is the Altiplano, a high plains region encompassing Lake Titicaca and extending nearly 800 kilometers from north to south with a width of about 200 kilometers (see figure). Three-quarters of the Altiplano lies between 3,600 and 4,300 meters above sea level. Most land is in unimproved pasture. Potato accounts for the lion's share of value of production among native Andean and introduced crops cultivated on the Altiplano.

Conditions for crop production are harsh. Drought, hail, and frost are frequent visitors. Floods can severely damage crops on the relatively fertile, flat perimeter of Lake Titicaca. Degraded soils are common; salinity is endemic in some areas.

The comparative advantage of the Altiplano is in the extensive grazing of livestock, mainly sheep, cattle, and alpacas. Compared with crops, livestock has greater commercial potential because of the availability of frost-tolerant forages, the abundance of rangeland in the drier, colder subregions, and the higher value of meat and fiber that respond to the economic reality of distant markets. But the Altiplano is not the ideal place to raise all species of livestock, especially small nonruminants. For example, guinea pigs, a prized source of meat in the

Andes, have better commercial prospects in lower-elevation highland areas where the reduced requirements for maintenance energy are conducive to weight gain.

The importance and relevance of agricultural research is derived from the large number of poor, mainly indigenous peoples, who make up the majority of the Altiplano's 2.2 million residents. About 65 percent of the economically active population is engaged in agriculture. Since the 1970s, seasonal migration of working-age adults has been evolving into permanent emigration to the land-abundant rainforest and the coastal cities. Remittances are low or have not been used to invest in agriculture; therefore, the migration of labor has eroded productive capacity.

The harshness of the environment for crop and livestock production is mirrored by the limited adoption of improved practices and varieties. It pays to apply inorganic fertilizer to potatoes in good years; however, good years are not the norm, and amounts applied are very small. High- and stable-yielding potato varieties widely cultivated in the rest of the southern Andes of Peru have not been able to penetrate into the Altiplano, where native varieties and low-yielding frost-resistant cultivated species prevail.

In the rest of the semiarid tropics, it is possible to transform production potential with irrigation. Not so in the Altiplano, because cold temperatures impede sequential cropping.

Scanty evidence for the uptake of improved technologies may suggest an absence of investment in agricultural research. Indeed, more stability in research could have helped improve impact, and public sector support for extension has been weak. However, since 1970 considerable funds have been allocated to research on Andean commodities. Several hundred theses have been written on Aforgotten@ Andean crops at agricultural universities, mainly in Peru. Since 1975 one donor has invested in more than 20 development-oriented research projects on or near the Altiplano. Regional scientists and farmers have been trained. Germplasm of Andean crops has been conserved. The research process has improved. Regional and local institutions have been strengthened. But the record on practical impact has been disappointing. Farmers have accepted few technologies. Productivity is flat or fluctuates in response to climatic events associated with El Niño. Moreover, rehabilitation of neglected labor-intensive terraces and raised beds designed to improve production potential in other times has required hefty subsidies to achieve targets.

A few production-oriented projects have also negatively affected production potential. Investment in poorly designed irrigation in the wake of the severe drought caused by the 1983 El Niño event resulted in salinity damage in some areas. Indiscriminate disc plowing to accommodate an increasing demand for quinoa, an Andean grain, has been indicted for accelerating wind erosion.

Nevertheless, there have been some successes in the past, and others are unfolding in the present. Improved temperate dairy breeds have been widely adopted. White clover, alfalfa, and other forage crops have been introduced in limited areas to improve forage quality. The production of alpaca fiber has increased from sire exchange among herds and from community investment in wetland areas for forage. The early acceptance of rustic greenhouses has been encouraging. Revolving funds for the purchase of higher-quality seed of selected native varieties of Andean crops have also met with some success. An export market for quinoa is emerging, and preferences are for white bold-seeded types that grow in the very dry conditions of the southern Altiplano.

Some promising technologies are in the pipeline. Several frost-resistant potato varieties are nearing the release stage in Bolivia. Halophytic plants could markedly improve feed supplies and rehabilitate saline areas. Low-cost shelters for livestock can substantially reduce energy loss during cold nights. Research on cold-tolerant forage crops and on range management of native grasslands also has bright prospects. Advances in information technology featuring computer simulation models built on digital databases and satellite imagery and incorporating GIS techniques are increasingly helping to define problems, evaluate risk, and design technologies.

The generation of new, low-cost, divisible components to improve the management of crops in cold temperatures is one of the foremost priorities in technology design. For instance, some impressive gains have

been recorded in marginal production areas of China with the use of clear plastic mulch that has extended the length of the growing season and fueled the so-called White Revolution in maize. Several such techniques that have worked well in the production of crops in cold-growing conditions could be adapted to the Altiplano.

Biotechnology has been widely touted as a means to enhance plant resistances to abiotic stresses such as drought and frost. However, these stresses are poligenic, and few transgenes have been identified. Also, opposition to the use of transgenic varieties of Andean crops in or near the Altiplano, where many of the Andean crops were first domesticated, is strong on the grounds that it may threaten biodiversity. At this time in potato breeding, a more feasible prospect appears to be to increase the market value of frost-resistant cultivated speciesCthat is, enhance the sweetness of bitter potato. Molecular-marker technology will eventually contribute to improving the efficiency of conventional breeding, but the question is when. Private sector investment in plant breeding could also contribute to productivity growth when cost-effective ways for hybridization of Andean crops are found.

Greater market access holds the key to unlocking production potential. Freer trade among Bolivia, Brazil, and Peru will enhance the competitiveness of trout farming and vegetable growing in and around Lake Titicaca. Continued progress in road construction will increase this remote region's comparative advantage vis-à-vis irrigated coastal and rainfed inter-andean valleys.

For further information see Luis Argüelles and Ruben Dario Estrada, *Perspectivas de la investigacion agropecuaria para el Altiplano* (Lima, Peru: Proyecto de Investigacion en Sistemas Agropecuarios Andinos, 1991).

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September 2001

STRATEGIES FOR THE SUSTAINABLE DEVELOPMENT OF DRYLAND AREAS

Written by Peter Hazell (IFPRI)

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The author is grateful to Camilla Toulmin for helpful comments on an earlier draft.

INTRODUCTION

The Earth's drylands as defined by the United Nations Convention to Combat Desertification (UNCCD) cover nearly 40% of the Earth's surface and are home to some 1.2 billion people, many of whom are poor [1]. Inappropriate land use practices are leading to widespread degradation of many dryland areas, where it is known as desertification. Possibly as much as 70% of all drylands are degraded to some extent, and severely so in many cases. The World Commission on Environment and Development [2] has estimated that desertification is affecting an additional 6 million hectares each year. In addition to agricultural productivity losses and increasing poverty, desertification results in significant reductions in carbon storage in soils, contributing to global warming, and loss of biodiversity. It also triggers soil erosion because of the loss of vegetative ground cover exacerbating water erosion and flash floods. These accelerate siltation of rivers and lakes and pollute water reserves.

In some areas, the key driving force behind this degradation is a nexus of poverty, rapid population growth, and inadequate progress in increasing agricultural productivity, In many parts of the East African highlands, for example, poor rural people in their quest for food and other livelihood needs are (i) expanding cultivation into remaining forest, hillsides and other fragile areas that are easily degraded; (ii) reducing fallow periods to the point where soils are inadequately rejuvenated; (iii) pursuing land management and cultivation practices that deplete soils of their nutrient and organic matter content and promote erosion; (iv) overgrazing pasture areas; and (v) cutting but not replanting sufficient trees and bushes for fuel wood and other purposes [3]. In other areas (e.g. parts of West Asia and North Africa), population pressure is less severe but degradation is induced by agricultural policies that subsidize cereal cultivation in fragile areas, the carrying of excessive livestock, and the abandonment of traditional grazing practices that protected rangelands [4]. This is not to say that all drylands are being degraded, and many examples of indigenous and public responses to deteriorating conditions can be found where investments are improving the condition and productivity of natural resources. These successes are currently of insufficient scale to make major inroads into the problems of dryland areas, but they are important embers of hope upon which future policy and investment strategies can be built.

Population growth rates remain high in many dryland areas. In much of West Asia, North Africa and Sub-Saharan Africa, for example, population growth rates still exceed 3% per annum. With slow agricultural and economic growth, the pressure on natural resources in dryland areas seems destined to worsen. Migration will provide some relief but, even so, population densities in many dryland areas will increase considerably during the next few decades. Given low and erratic rainfall, the scope for absorbing all these additional workers in agriculture whilst maintaining or increasing per capita incomes and food supplies will be difficult. Social and environmental crises are already common and are proving costly to governments and donors. These problems

are likely to become much worse unless major new efforts are made to address the livelihood needs of dryland peoples.

Policy makers have generally been reluctant to invest much in dryland and other lower-potential (LPAs) areas in the past because they perceive that the returns to investment are much higher in irrigated and "high-potential" rainfed areas. Thus, for example, "green revolution" areas have tended to gain the lion's share of agricultural research and extension, access to inputs, provision of credit, and major investments in roads, electrification and irrigation. This investment bias has contributed to the marginalization of many dryland areas. When poor agro-climatic conditions are reinforced by poor infrastructure and market access, malnourished and illiterate people, and inadequate technologies, it is hardly surprising that many dryland areas cannot compete in the market, and are being left behind.

This paper addresses two key policy questions for dryland areas. First, can greater levels of investment be justified in dryland and other LPAs? Second, how should the resources allocated to dryland areas be used to promote development that is beneficial to the poor and environmentally sustainable?

RETURNS TO PUBLIC INVESTMENT IN DRYLAND AREAS

Conventional wisdom suggests that investments in irrigated and high-potential rainfed lands give the highest returns and have substantial trickle-down benefits for the poor, including those residing in dryland areas. Drylands will benefit from cheaper food, increased market opportunities for growth, and new opportunities for workers to migrate to more productive jobs in high-potential areas and in towns. Fewer people will try to live in dryland areas, and this will help reduce environmental degradation and increase per capita earnings. Migrants may also send remittances back to dryland areas, increasing incomes there further.

Many of the expected benefits arising from rapid agricultural growth in high-potential areas have been confirmed. Nevertheless, the neglect of drylands and other LPAs is being increasingly challenged by: a) the failure of past patterns of agricultural growth to resolve growing poverty, food insecurity and environmental problems in many LPAs; b) increasing evidence of stagnating levels of productivity growth and worsening environmental problems in many green revolution areas; and c) emerging evidence that the right kinds of investment in many LPAs, including drylands, can increase agricultural productivity and incomes to much higher levels than previously thought. Within this context, greater public investment in many LPAs may now have the potential to generate agricultural growth at the margin comparable to that in many high-potential areas, and have a greater impact on poverty and environmental problems in the areas in which they are targeted. Recent research on India and China confirms this possibility.

Returns to Investment in India's Drylands

In India, researchers classified rural districts into predominantly irrigated or rainfed agriculture, and then subdivided the rainfed areas into 13 agroecological zones. Historical data were then used to estimate the impacts of different types of investments on agricultural growth and poverty reduction in each land type [5]. For every investment, the highest marginal impact on agricultural production and poverty alleviation occurs in one of the rainfed lands, while irrigated areas often rank quite low (Tables 1 and 2). Moreover, several types of investments also give favorable returns in the drier rainfed lands and have some of the most favorable impacts on poverty. Rural roads and education scored particularly well on both growth and poverty outcomes, as did irrigation in areas where untapped water resources are available. The returns to agricultural research in dryland areas were more mixed, possibly because the study was only able to capture the returns to crop improvement research and not the returns to natural resource management research.

Table 1: Marginal return to investment in infrastructure and technology variables by agroclimatic zone, rural India [a]

	Normal rainfall (mm/yr)	High yielding varieties	Roads	Canal irrigation	Electricity	Education
Irrigated areas:						
	858	4.64	26.80	2.76	0.86	0.22
Rainfed zones[b]:						
1	1690	0.00	38.38	4.90	1.18	0.10
2	1391	26.14	8.29	6.27	10.02	1.54
3	986	7.50	102.83	3.17	5.15	0.09
4	902	0.00	29.94	3.63	0.80	2.50
5	960	0.86	37.88	2.19	1.28	0.86
6	918	12.87	135.85	3.51	1.09	1.07
7	965	29.80	100.47	6.96	4.44	0.94
8	924	0.41	137.28	7.81	4.28	2.41
9	508	5.30	82.53	1.95	2.92	10.55
10	649	9.21	9.14	0.14	6.90	6.76
11	443	0.02	2.57	2.53	0.16	11.93
12	719	10.67	50.88	2.71	5.78	1.10
13	335	0.00	113.29	0.00	31.42	12.37

[a] Annual returns are in rupees for every rupee investment.
[b] Rainfed zones are ranked by land productivity (1 = highest, 13 = lowest).
Source: Shenggen Fan, Peter Hazell and T. Haque, "Targeting public investments by agro-ecological zone to achieve growth and poverty alleviation goals in rural India", *Food Policy* 25 (2000): 411-428.

Table 2: Reduction in number of poor for an additional one million rupees (1994 prices) invested in technology and infrastructure by agroclimatic zone, rural India[a]

	High yielding varieties	Roads	Canal irrigation	Electricity	Education
Irrigated areas	0.76	8.02	0.46	1.56	0.48
Rainfed zones[b]:					
1	0.00	25.69	1.00	12.47	1.09
2	32.56	55.07	0.55	26.37	3.83
3	0.97	35.84	0.05	11.20	2.16
4	0.00	35.98	0.00	7.15	7.01
5	0.72	39.75	1.85	4.10	1.24
6	13.43	165.35	0.44	5.65	3.01
7	5.44	18.34	8.82	8.97	3.36
8	0.17	0.00	0.98	3.33	3.02
9	1.21	25.29	1.85	2.37	3.73
10	3.39	1.02	0.00	11.82	5.66
11	0.00	2.60	0.48	0.03	2.54
12	0.00	1.75	1.88	26.21	8.93
13	0.00	6.06	12.43	1.68	0.66

[a] Persons per million rupees in 1994 prices.
[b] Rainfed zones are ranked by land productivity (1 = highest, 13 = lowest).
Source: Shenggen Fan, Peter Hazell and T. Haque, "Targeting public investments by agro-ecological zone to achieve growth and poverty alleviation goals in rural India", *Food Policy* 25 (2000): 411-428.

Returns to Public Investments in China

In a similar study of China, three regions were defined: the coastal, central, and western regions [6]. The coastal region is the most fertile with good rainfall and can be classified as a high-potential region. The western region is the least developed and has poor natural resources and social infrastructure; it is a low-potential area. The central region is intermediate between the other two, and from an agricultural perspective can be considered a mid-potential area. More than 60 percent of the rural poor live in the western region and most of the rest live in the central region. Using a similar method as for India and province-level data for 1970-97, the agricultural production and poverty impacts of additional investments were estimated for each region (Table 3).

Table 3 : Marginal returns to infrastructure and technology investments in rural China

	Coastal	Central	Western
Production returns (Yuan/ Yuan Investment)			
R&D	7.33	8.53	9.23
Irrigation	1.40	0.98	0.93
Roads	3.69	6.90	6.71
Education	6.06	8.45	6.20
Electricity	3.67	4.89	3.33
Rural Telephone	4.14	8.05	6.57
Poverty Reduction (Number of Poor per 10,000 Yuan Investment)			
R&D	0.97	2.42	14.03
Irrigation	0.15	0.23	1.14
Roads	0.70	2.80	14.60
Education	1.79	5.35	21.09
Electricity	0.92	2.64	9.62
Rural Telephone	0.98	4.11	17.99

Source: Shenggen Fan, Linxiu Zhang, and Xiaobo Zhang. Growth and Poverty in Rural China: The Role of Public Investments", Environment and Production Technology Division Discussion Paper No. 66. International Food Policy Research Institute (IFPRI), Washington, D.C. June 2000.

Apart from irrigation, all investments have their biggest impact on poverty in the low-potential western region and their second biggest impact in the mid-potential central region. The high-potential coastal region ranks second or third for all investments. Most investments also have their highest production returns in either the central or western region, showing that investments in these regions are now win-win strategies.

One reason for these favorable results is that India and China have already invested heavily in their irrigated and high-potential rainfed areas, and productivity growth has slowed in many of these regions. With diminishing returns in favored areas and relatively little public investment in many LPAs, including dryland areas, it is not too surprising that the latter should now give higher returns to some investments. Similar studies have yet to be undertaken in other countries, and care must be taken in extrapolating these results to countries in which there are still many untapped opportunities for investment in higher potential areas, as in much of Sub-Saharan Africa. In these cases there may be important tradeoffs from targeting public investment to dryland areas between national agricultural growth on the one hand, and regional poverty reduction on the other.

Financing Investments in Drylands

Financing public investments in infrastructure, agricultural research and the health and education of local people in dryland areas can be difficult because population densities are often low making the per capita investment and maintenance costs high. Low levels of income and few people also means there is limited capacity for financing these investments from local sources of revenue, and little chance of involving the private sector because the social and economic benefits are too low and diffuse to be adequately captured through any form of local user fees. Central governments and donors will have to provide most of the needed funds. On the other hand, local people can and often do invest in private investments that improve the productivity of their own resources.

STRATEGIES FOR DEVELOPING LESS-FAVORED LANDS

Dryland areas are very diverse in their agro-climatic conditions, and hence in their potential for agricultural growth. In some areas, agricultural development may not provide an economically viable basis for improving incomes and welfare, and solutions will have to be sought through encouraging the rural non-farm economy, and out-migration. These possibilities are most promising when the national economy is growing rapidly and is diversifying, and especially in areas closer to towns and good roads. Prospects are less promising in predominantly agrarian economies, since the rural non-farm economy is constrained by the limited local incomes available to support a more diversified economy. Without agricultural growth and access to new markets, incomes in these areas and the demand for non-farm goods and services will remain low.

Migration and non-farm diversification have always played an important role for people living in LPAs, and the drylands are no exception to this pattern. In the 19th and 20th centuries, very large numbers of people left marginal farming areas in Europe and migrated to the new lands being opened up in North and South America and Australia. But opportunities for such massive movements of people seeking a better life are much more limited today. Opportunities to diversify into productive nonfarm sources of income are also limited in many dryland areas. For these reasons, agricultural intensification will

need to remain a key element of the livelihood strategy of most dryland peoples. But, because of poor infrastructure, low to moderate yield potential, fragile soils and high climate risk, the strategy will typically need to be different from the high-input, monoculture approach of the green revolution that successfully transformed many more-favored agricultural areas. Dryland areas are very diverse and hence agricultural development strategies need to be tailored to local agro-climatic and socio-economic conditions, which help determine the options open to local communities [7]. A '*one size fits all*' approach is not likely to succeed. Nevertheless, certain key elements to guide appropriate agricultural intensification strategies for many drylands can be given:

Promote Broad-Based Agricultural Development

Broad-based agricultural development that reaches small and medium-sized family farms as well as large commercial farms should be promoted. There are few economies of scale in agricultural production in developing countries (unlike many agricultural processing and marketing activities), hence targeting family farms is attractive on both equity and efficiency grounds. Broad-based development strategies require that small and medium-sized farms receive priority in publicly funded agricultural research and extension, and that they obtain adequate access to markets, credit and input supplies. These requirements demand special attention at a time when markets and agricultural services are being privatized, since the high transport costs and thin markets of many less-favored areas do not make them attractive to private agents.

Improve Technologies and Farming Systems.

While some types of crop genetic research seem vital for dryland areas (e.g. improving drought tolerance, yield response to scarce plant nutrients, food nutrient content, and pest and disease resistance), and have given some favorable returns in the past [8], there is a growing consensus that any major productivity improvements will often first have to come from improved natural resource management (NRM) practices and technologies. NRM can lead the way in improving soil depth, organic matter, fertility and moisture content, expanding opportunities for higher yield response from fertilizers and improved crop varieties.

The drought risks and poor infrastructure and market access that characterize many dryland areas make the use of high levels of external inputs unprofitable, placing a premium on low external input (LEI) technologies. LEI technologies are typically labor intensive, both seasonally and in total, and this can be an important constraint on their uptake. Fallow and green manures also keep land out of crop production and composting and manuring competes for scarce organic matter with household energy use, both of which are difficult for many small farms. The challenge is to develop LEI technologies that boost both labor and land productivity. Some good examples are conservation tillage and vegetative barriers to harvest water and contain soil erosion, and improved crop varieties that utilize scarce nutrients more efficiently.

NRM research for less-favored lands should build on farmers' own indigenous knowledge and practical innovations. Some non-governmental organizations have been very successful in pursuing this agenda, and in working with local communities to overcome social and institutional constraints. The more effective linking of formal research to these kinds of grass roots development activities could also lead to real improvements in the relevance and uptake of much NRM research. But sustained growth in on-farm productivity will also require improvements in crop germplasm, and crop and livestock disease and pest control. Without continuing improvements in knowledge and genetic resources in dryland areas, productivity will quickly stagnate again. The potential to breed higher yielding varieties in many less-favored lands may be constrained by the low yield potential of the existing range of genetic material. Existing material has often been selected by man and nature for robustness under harsh and risky growing conditions, and has little genetic potential to achieve high yields. Transgenic biotechnology may prove an essential tool for achieving the wider crosses that will be needed [9].But this kind of research is not likely to be undertaken by the private sector and it will take public funding or public research to provide it.

While improved technologies for food crops are often much needed in the drylands, sustained increases in per capita incomes will hinge critically on diversification into higher value agricultural products, and non-farm activities. With the right policies and investments, bringing increased access to markets and greater production possibilities, many dryland areas could actually do quite well. Unlike most rainfed crops, livestock, agroforestry and some horticulture can often prosper in areas with poor soils and climate; and some less-favored areas can become important eco-tourist attractions, for local and international visitors. Rapid national economic growth, as in Asia, is also creating new growth opportunities for non-farm activity in many dryland areas, including agroprocessing. Whether such emerging opportunities bring about a reduction in poverty depends, however, on the distribution of benefits from such new enterprises. Attracting high income tourists, for example, can lead to alienation of land and immiseration for local people unless they can fight for a share of the revenue generated, and decision-making regarding how the resources will be managed.

Ensure Secure Property Rights and Effective Institutions for Managing Natural Resources.

Farmers need assured long-term access to land if they are to pursue sustainable farming practices and to make long term investments in improving and conserving resources (e.g. tree planting, manuring, terracing and contouring for soil and moisture conservation). Most indigenous land tenure systems found in dryland areas not only provide farmers with adequate tenure security, but also seem to evolve effectively towards greater privatization of rights as population and commercialization pressures increase. In these cases, the appropriate role for governments is to seek ways of strengthening them and facilitate their adaptation to changing circumstances, rather than imposing a new system. Legal registration of land by community groups and simple measures for recording land transactions and resolving disputes can often

increase security by reducing land disputes between and within communities [10]. By contrast, registration of individual plots will only be worthwhile in areas of high population density, where land has a high value, where formal lending institutions are also well developed, and land is already effectively privatized. It may also be required in areas of new settlement, where there are no indigenous land tenure systems and disputes over ownership and boundaries are common [11].

Many dryland resources are owned and managed as common property (e.g. grazing, woodlands, water, and wetlands), because this provides a more effective way to manage a resource where it is difficult to exclude other users, maintain flexible responses to drought, and ensure equitable access for all members of the community. But if these resources are to remain in common ownership, and avoid being privatized or over-used, government needs to recognize local rights and capacities to manage these assets. Often, governments have undermined indigenous institutions by nationalizing important common property resources, such as rangeland and forests, while being unable in practice, to manage them effectively. As a result, many common property resources have degenerated into open access areas. There is now increased acceptance that the most successful institutions for managing common properties are likely to be local organizations, run by the resource users themselves. Government policy needs to support local management by such groups.

Conserving or improving natural resources often requires collective action by users, even when the resources are not commonly owned. Examples include organizing neighboring farmers to invest labor in terracing their common water catchment, and joint planning of biological pest control. In many places, collective action by farmers is a normal part of life. Elsewhere, greater support is required – institutional, socio-economic, technical – to organize farmers into effective and stable groups [12]. Non-governmental organizations have sometimes played a key role in helping communities to overcome these constraints.

Ensure That Risks Are Managed Effectively.

Farming in dryland areas is risky. When the rains fail, crop and livestock losses cause great hardship and often, increased impoverishment. Dryland peoples have developed a range of strategies to minimize and cope with such risks. These include maintaining a diverse cropping pattern, keeping several different kinds of animal, and following a mobile and flexible strategy that allows new opportunities to be seized. Social networks and kinship links provide one of several means by which people hedge their bets. Those seeking to intervene to support dryland livelihoods need to understand the wide range of strategies currently being pursued and how best they might be further supported.

Risks of rainfall failure may discourage farmers from investing in major land improvements and from adopting higher yielding technologies, unless these bring with them lower levels of vulnerability. Agricultural research can help reduce risk, for example, by improving drought or pest resistance in crops and helping develop better ways to conserve soil moisture. Investments in irrigation and watershed development can reduce drought exposure while also increasing productivity.

Additionally, governments can help farmers cope with severe drought by providing safety net programs, and by facilitating the development of credit and insurance arrangements that provide cash in times of need. Such interventions need to be designed to assist farmers and herders better manage risk and improve their productivity and incomes, but without creating incentives that lead to environmental degradation. The experience with feed subsidy programs in the West Asia and North Africa region had had mixed results. While they have helped protect incomes and food security in drought years, they have also had negative impacts on the way resources are managed (e.g. encouraging excessive stocking rates and the abandonment of traditional grazing practices that took animals away from the worst drought affected areas [12]. Better alternatives could be area-based rainfall insurance and the development of more accurate and accessible drought forecasting information [13].

Invest in Rural Infrastructure and People.

Less-favored areas are often poorly placed to compete in liberalized markets because of their restricted access to markets and high transport and marketing costs. The public sector has an important role to play in building and maintaining roads in these areas, and in promoting expansion of private transport, marketing, input supply and financial services that are competitively priced. Investments in electricity and telecommunications are also needed if the private sector is to grow. Investments in clean water and the education and health of local people not only increase their productivity in agriculture, but enhance their opportunities to diversify into nonfarm activities, including out-migration to better paying jobs. The results from the India and China studies cited earlier show that these kinds of public investments in low-potential areas can yield favorable growth as well as reduce poverty.

Provide the Right Policy Environment.

Many countries are implementing market reforms, including price and trade liberalization, as a way to improve the overall performance of their agricultural sectors. But these reforms have had mixed impacts on drylands and other less-favored areas because of their weaker infrastructure and high transport costs. Where the agricultural sector has been distorted by industrial and urban-biased macro-economic, trade and sectoral policies, ongoing policy reforms may lead to improved terms of trade and increased market opportunities for all areas. But if market reforms are not matched by appropriate levels of investment in local infrastructure, they can be quite destructive for many low-potential areas. For example, market reforms have reduced the availability of

inorganic fertilizers and increased their cost in many poorer regions of Africa. The resultant reduction in their use, often from very modest levels to begin with, is making it harder for small poor farmers to maintain the fertility of their soils. In those dryland areas that previously benefited from extensive subsidies and market protection, as in much on the WANA region, liberalization policies have led to an immediate reduction in farm incomes and worsened market access [14].

Transitional policies, such as targeted subsidies and safety-net programs, will be necessary to soften the negative impacts of market reform in dryland areas. Farmers need time to adjust their farming systems to new market conditions and opportunities. For example, in WANA farmers will need to shift to livestock feeding systems less reliant on inputs which were previously subsidized. They may require help to rehabilitate rangelands, and diversify into alternative forms of land use, such as tree crops and dairying. Subsidies should be phased out over a number of years rather than in one abrupt step as has often occurred.

Strengthen Public Institutions.

Many of the public institutions that service agriculture and rural areas have neglected drylands and other low-potential areas. They are often inadequately skilled to address the problems of dryland regions, and have chosen to focus on irrigated and high-potential rainfed areas, where agricultural research and extension has been reasonably effective at promoting green revolution technologies. But a different approach is needed in the drylands, which takes a multi-disciplinary, and farmer oriented set of methods, with particular attention paid to natural resource management. Similar biases in favor of high potential areas have existed in rural credit and insurance institutions.

While public agencies responsible for forests and rangelands have often been more active in dryland areas, they have pursued top-down approaches to the management of these resources. Since local users have been excluded from any real stake in their ownership and management, these resources are often degraded, while the relevant government agents are completely unable to regulate resource use on the ground. Recent experience with community based natural resource management initiatives shows great promise for re-locating rights and responsibilities for grazing and woodlands within the local community [15].

The development of dryland areas will require significant changes in the objectives and operational modalities of many public agencies. More participatory approaches that confirm the rights of local people to manage resources are required. This will require political will and very different incentive structures and skills within public institutions, with greater emphasis on strengthening the abilities of local people.

Another problem plaguing the effectiveness of public institutions has been their inability to coordinate relevant activities in rural areas. Key functions are compartmentalized within different ministries (environment, agriculture, livestock), and at different levels of

government (local, regional and national). There is rarely an effective institutional mechanism for coordinating their plans and activities. Integrated development projects attempted to overcome this problem, but with few exceptions they were never successful in moving the coordination beyond the planning stage. Coordination units at the highest level of government (e.g. in the prime minister's office) have rarely brought improved practice, and more effective solutions probably require greater devolution of authority to local governments. The current enthusiasm for decentralization in many parts of the world may provide a very valuable opportunity to get more integrated policy initiatives working at local level.

CONCLUSIONS

Governments and donors should look favorably at the benefits from investing in dryland areas. These include both social and environmental benefits, as well as improvements in agriculture and the broader rural economy. Addressing the complex challenges faced by people in dryland areas will not be easy or inexpensive. It will typically require significant policy and institutional changes, which acknowledge and strengthen local rights and responsibilities. Public funds are needed to invest in agricultural research, rural infrastructure, human capital, and capacity building for local communities. Success will depend on building stronger linkages between agricultural researchers, local government, farmers, community leaders, non-governmental organizations, national policy makers and donors. Many successful and innovative partnerships have already been formed in some drylands, and these need to be encouraged and given time to mature. All this will require a long-term commitment, and a level of perseverance on the part of policy makers and donors, which may be more than the current culture within government and international institutions might allow.

ENDNOTES

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STRATEGIES FOR SUSTAINABLE AGRICULTURAL DEVELOPMENT IN THE EAST AFRICAN HIGHLANDS

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ABSTRACT

Low agricultural productivity, land degradation and poverty are severe interrelated problems in the East African highlands. While the proximate causes of such problems are relatively well known, the underlying causes are many and complex, and depend upon many site-specific factors that vary greatly across the diverse circumstances of the region. Thus, no "one-size-fits-all" policy, institutional or technology strategy is likely to suffice to generate sustainable development. While common elements of successful strategies do exist, such as security and macroeconomic stability, the appropriate portfolio of investments in physical, human, natural and social capital will likely be different in different circumstances.

In this paper, we argue that the appropriate strategy for sustainable development depends greatly upon the "pathways of development" that are feasible in a given location. Development pathways represent common patterns of change in economic livelihood strategies, such as continued semi-subsistence mixed crop-livestock production or commercialization of high-value perishable crops. We argue that such development pathways will be largely determined by three factors determining comparative advantage: agricultural potential, access to markets, and population density. Based on a typology of situations in the East African highlands using these variables, we develop hypotheses about the potential pathways of development in different situations, and the policy and institutional requisites to achieve sustainable development of such pathways. We also argue that the choice of development pathway largely conditions the opportunities for particular resource management technologies, and develop hypotheses about the technological strategies that may be feasible within particular development pathways.

We conclude the paper with hypotheses about the priorities for policy intervention to achieve sustainable development in the East African highlands. Among these, we suggest that the highest priority for road and irrigation development should be areas close to urban markets with high agricultural potential; that development of input and output markets and credit systems will be most critical in such areas; that increasing food security through increased food crop production or other means is likely to be a key to realizing the potential for more commercial production; that subsidies on the costs of transporting fertilizer to remote, high-potential, food deficit areas should be considered as a lower cost alternative to food aid; and that intensified and more private use of hillsides and grazing areas for sustainable uses such as tree planting may have potential to achieve more rapid and sustainable development of lower potential areas. We emphasize that these are only hypotheses, and that policy research is needed to assess their validity in different contexts of the East African highlands.

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STRATEGIES FOR SUSTAINABLE AGRICULTURAL DEVELOPMENT IN THE EAST AFRICAN HIGHLANDS

John Pender, Frank Place, and Simeon Ehui*

1. INTRODUCTION

In Sub-Saharan Africa, the nexus of population pressure, low and declining agricultural productivity, and unsustainable use of natural resources threatens a downward spiral of increasing poverty and land degradation unless effective strategies to reverse the spiral are identified and implemented (Cleaver and Schreiber 1994). These problems are particularly severe in the East African highlands. Average population density is more than 1 person per hectare in the highlands and well over 2 persons per hectare in many areas. Most farm households attempt to subsist on less than 1 hectare of land and incomes of much less than $1 per day. Cereal yields are well below yields attained in other parts of the world (averaging little more than 1 tonne per hectare for most cereals), while yield growth has been slow or in some cases, declining over the past several decades (Hoeckstra and Corbett 1995). Livestock productivity is also low compared to other parts of the world. For example, milk yields are less than 4 liters per day in the highlands (Winrock International 1992). These trends are all the more distressing because agricultural potential is quite high in much of the East African highlands, with sufficient rainfall and suitable soils to support much more intensive and profitable agriculture than currently exists.

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The problem of land degradation is particularly severe in the East African highlands. Mining of soil nutrients and high rates of soil erosion contribute to low and declining agricultural productivity and extreme poverty throughout much of this densely populated region. Estimated soil nutrient losses exceeded 80 kg of N, P_2O_5, and K_2O per cultivated hectare in 1983 in Ethiopia and Kenya, and were nearly 70 kg per hectare in Uganda (Stoorvogel and Smaling 1990). Similar large negative nutrient balances have been found at the district and farm scale in the highlands of Kenya (Smaling et al. 1997). FAO (1986) estimated that one-half of the arable lands in the Ethiopian highlands are moderately to severely eroded. Estimated soil erosion on cropland averages 42 tons per hectare per year in the Ethiopian highlands, though it is much higher on steeper slopes and for some crops (Hurni 1988). More than 6 million hectares of additional cropland and pasture in the Ethiopian highlands may become unusable (with less than 10 cm of soil depth left) between 1985 and 2010 if estimated erosion rates continue (Sutcliffe 1993). Although there is some controversy about the economic costs imposed by these problems (especially erosion), a conservative estimate of the annual costs of soil nutrient depletion alone is $100 million (Bojo and Cassells 1995). The gross discounted cumulative cost of erosion in Ethiopia has been estimated to be as high as $1.25 billion (Kappel 1996). Less information on erosion is available for other East African highland countries, although it is clear that the magnitude of the problem is substantial in these countries as well (Braun et al. 1997).

The proximate causes of these problems are well known (Bojo and Cassells 1995; Sanchez et al. 1997): increased cultivation on steep slopes, inadequate vegetative cover on croplands, deforestation, overgrazing, burning of crop residues and dung for fuel, low

use of inorganic fertilizers or integrated nutrient management, declining use of fallow, and limited adoption of soil and water conservation measures. Underlying these proximate causes are many more fundamental factors, including population growth, poverty, insecure land tenure, limited access to markets and credit, risks associated with the use of inputs and new technologies, and limited farmer knowledge of appropriate technologies in some cases. Government policies and institutions affect most of these causes. For example, market liberalization, credit policies, input supply policies and infrastructure investment have a large impact on opportunities to use inorganic fertilizers (Bumb and Banaante 1996). Land tenure policies may affect security of tenure, land fragmentation, and access to credit, and hence affect incentives and ability to invest in land improvements or to use inputs (Place and Hazell 1993). Education affects population growth and poverty. Education, research and extension policies can affect farmer knowledge about specific natural resource problems (e.g., types of nutrients required) and appropriate technologies to address such problems.

Given the complexity of factors influencing land degradation and the diversity of situations existing in the East African highlands, no single package of technologies will be able to address all of the problems. Similarly, no "one-size-fits-all" policy strategy will suffice to generate sustainable development, although there will be common elements to successful strategies in all cases, including macroeconomic stability, a competitive market environment, land tenure security, and investments in physical, human, natural and social capital. Much of what distinguishes different strategies will be differences in the portfolio of such investments that are needed in different circumstances.

The objectives of this paper are to begin to identify such strategies, to suggest what kinds of strategies are appropriate for different types of situations, and to consider the policy and institutional requisites for these strategies to be successful. The suggestions will be offered as hypotheses rather than as firm conclusions, since substantial empirical research is still needed to investigate the feasibility and desirability of the suggested strategies and supporting policy and institutional interventions.

In this paper, we argue that the nature of land degradation problems and appropriate means of addressing them will depend upon the broader development pathway that is pursued. For example, in areas where commercial crop production is occurring, the potential to address soil nutrient depletion using large inputs of inorganic fertilizer will be much greater than where production is likely to remain mainly subsistence-oriented. The latter situation will require lower use of external inputs, although opportunities for integrating small amounts of purchased inputs with local sources of inputs should not be overlooked.

We also argue that the policy and institutional strategy, particularly the appropriate mix of public and private investments, should be linked to the pathway of development. For example, areas where a commercialization pathway is viable may require development of input and output markets through private or public investment in transportation and marketing facilities, credit, etc. Appropriately targeted and sustained research and technical assistance will be important to all strategies, but especially where a low external input (and knowledge intensive) pathway is pursued.

The appropriate development pathway depends upon the factors that determine local comparative advantage. Three factors of particular importance in this regard are

agricultural potential, population density, and access to markets. Accordingly, we consider development pathways suitable to different circumstances along these three dimensions, and present examples from the highlands of Ethiopia, Kenya, and Uganda.

In the next two sections we present a brief overview of the agricultural context and the policy environment in each of these three countries. In section 4, we consider possible development pathways for different situations and in section 5, we consider the policy and institutional strategies to facilitate such pathways. In section 6, we offer tentative policy conclusions and directions for further research.

2. AGRICULTURE IN THE EAST AFRICAN HIGHLANDS

As mentioned above, there is considerable diversity in agricultural potential and the nature of agriculture across the East African highlands. Here we briefly consider the situation in Ethiopia, Kenya, and Uganda.

ETHIOPIA

The Ethiopian highlands account for nearly half of the highlands of Africa, and three-fourths of the highlands (over 1200 m.a.s.l.) of the three countries being considered (Braun et al 1997). The highlands range in annual average temperatures from 20-22°C in the lower elevations to 10-12°C in the higher elevations (3,000-3,400 m.a.s.l.). Annual rainfall ranges from about 600 mm in the northern highlands to over 2,000 mm in the southwestern highlands (Technical Committee for Agroforestry in Ethiopia 1990). Based upon climate, three agroecological zones have been identified: the drought-prone low-potential cereals (LPC) zone, mainly in the north (mainly 90-150 days growing period);

the high-potential cereals (HPC) zone, mainly in the central highlands (usually more than 180 days growing period); and the warmer and more humid high-potential perennials (HPP) zone in the southwest highlands.

The dominant soil types in the Ethiopian highlands are nitisols, vertisols, cambisols and luvisols (ibid.). Nitisols dominate in the HPP zone. These soils have very good agricultural potential, though their low phosphorus content and high capacity for P-fixation makes addition of phosphorus a necessity. Vertisols and luvisols are most common in the HPC zone. Vertisols have high nutrient retention and water holding capacity, but they are heavy and difficult to plow, and prone to waterlogging in the rainy season and cracking in the dry season. Cambisols and luvisols are most common in the LPC zone; these soils are generally of poorer quality. The soils in much of the northern and eastern highlands are very shallow, while soils are much deeper in the western and southern highlands (Hurni 1988; Braun et al. 1997). There are of course substantial variations within these zones.

More than four-fifths of the population of Ethiopia resides in the highlands, due to the cooler climate, greater rainfall, and lower incidence of pests and diseases affecting both humans and livestock. The highlands account for only 36 percent of the area of the country. The average population density in the highlands is nearly 100 persons per square km, including both urban and rural residents (ibid.). The infrastructure is very poor. With only 0.4 km of roads per 1,000 residents (World Report 1998), Ethiopia has among the lowest road densities in Africa (Ogbasellasie 1995; Ahmed and Donavan 1992), and most of the roads are in very poor condition. The railway line connecting Addis Ababa to the port in Djibouti is very old and in poor condition. Less than 200,000

hectares of land are potentially irrigable in the highlands, and the actual area irrigated is much less than this (Ogbasellasie 1995). Education levels are very low; the rate of adult literacy in the rural Ethiopia highlands (including Tigray, Amhara, and Oromiya, the main highland regions) was only 15 percent in 1994 (CSA 1995). Postal and telecommunications facilities are very limited, and electricity is virtually nonexistent in rural areas. On the positive side, there has been substantial investment in grain storage facilities in the past 20 years in response to the famines.

Agriculture in the Ethiopian highlands is dominated by very small scale mixed crop-livestock subsistence farms, usually operating less than 1 hectare (Ogbasellasie 1995). Due to population pressure and several land redistributions conducted since the fall of Emperor Haile Selassie in 1974, farms larger than a few hectares are rare, except for state farms established by the Derg regime. The most important food crops are teff, barley, wheat, sorghum, maize, and enset ("false banana"). The dominant cash crop, and most important export of Ethiopia, is coffee. Livestock, especially cattle and small ruminants, are very important in all parts of the highlands. Ethiopia has the largest livestock herd in Africa, and the vast majority of these are in the highlands (Winrock International 1992). Livestock are valued as a source of draft power, a store of wealth and source of status, for the meat and milk they provide, and for their contribution to soil fertility and household energy supply (dung) (ibid.).

Several major farming systems have been identified in the highlands, including the enset-coffee-cereals-livestock system and the forest coffee-enset-livestock system at middle altitudes (up to 2,500 m) in the HPP zone, the enset-barley-livestock system at high altitudes in the HPP zone, the mixed cereal-livestock system in the middle altitudes

of the HPC and LPC zones, and the barley-livestock system at higher altitudes in these zones. Use of fertilizer and improved seeds is very low in all of these systems, although these have been increasing rapidly in the past few years in the HPC zone as a result of a large extension program to promote intensified cereal production. As a result of population pressure, fallowing (for longer than the dry season) is rare. Farmyard manure and crop residues are traditional sources of soil nutrients, but are becoming increasingly scarce as shortages of fuelwood have necessitated the burning of dung and crop residues, especially at higher elevations in the low-potential zone. Although use of inorganic fertilizers has expanded rapidly in recent years as a result of a widespread extension effort, only about one-third of Ethiopian rural households used fertilizers in 1995, and the average level of use was only 11 kg per hectare, compared to 48 kg per hectare in Kenya and 97 kg per hectare worldwide (Mulat et al. 1997; FAO 1998). As a result of these factors, declining soil fertility is a problem in all systems, but especially in the LPC zone (Technical Committee for Agroforestry in Ethiopia).

Soil erosion is a severe problem in sloping areas, especially in the northern and central highlands where vegetative cover is very low and soils are already very shallow. Erosion is most severe on cultivated lands, averaging 42 tons per hectare per year on currently cultivated lands and 70 tons per hectare per year on formerly cultivated degraded lands (Hurni 1988). Erosion is likely much higher where teff is grown on sloping lands, because farmers plow several times to prepare a fine seed bed for this crop. Conservation measures have been widely promoted throughout the Ethiopian highlands (especially the northern highlands) through Food for Work projects and annual

compulsory work campaigns.[1] The emphasis has been on construction of physical structures such as terraces and bunds. Evidence of the productivity impacts of these structures is mixed. In more humid areas, they have not been found to increase crop yields significantly (in some cases reducing yields), because they reduce crop area, sometimes harbor pests, and other problems (Herweg 1992). In drier areas, such structures have been found to have much more beneficial impacts on productivity because they help to conserve soil moisture (Berhanu 1998).

KENYA

The Kenyan highlands stretch from the eastern slopes of Mt. Elgon southward through Nyanza province to the Tanzanian border and eastward through a narrow section of the rift valley and then expanding once more to cover the Aberdere range, Mount Kenya, and environs to the south and east. In total, the highlands cover approximately 18 percent of the land area. The highlands generally include the better agricultural areas and as a consequence population densities are high. It is estimated that 64 percent of Kenya's population resides in this relatively small area and many local areas have population densities in excess of 1,000 inhabitants per square kilometer (Braun et al. 1997). Most highland areas enjoy two rainy seasons, the long season from March to June and the short rainy season from October to December. Average annual rainfall is generally over 1,200 mm with much higher amounts reported in the higher elevations near Mount Kenya. The climate in the western highlands is warm year round with average temperatures of 21°C. In the higher elevation central highlands, temperatures are somewhat cooler, with average high temperatures reaching as low as 18°C in certain months of the year.

[1] Currently 20 days of compulsory work are required per year in Tigray.

Soils throughout the highlands are generally deep, well drained, clay-loams and are considered of medium to high agricultural potential. Nitisols dominate in the central highlands and are derived from volcanic rock. The central highlands are characterized by moderate to steep sloping land and thus there is a need for soil conservation measures to ensure continued productivity of soils. As discussed in more detail below, there are not widespread problems of soil infertility in the central highlands due to the commercial nature of agriculture and farmer reinvestment in land. In western Kenya, there is a major problem of nutrient depletion in the otherwise high-potential ferralsols, acrisols, and nitisols. For example, phosphorus has been found to be severely depleted (Olson P levels below 5 ppm) in widespread soil testing (ICRAF 1997). In addition, some of the soils are high phosphorus fixing, implying that much of the phosphorus in the soil is not available to plants (Sanchez et al. 1997). Nitrogen is another major limiting nutrient and potassium deficiencies are also reported. These are not inherent characteristics of the soils, but rather a result of many decades of continuous cropping and nutrient export with little nutrient input.

Throughout most of the highlands, land registration and consolidation exercises had taken place in the 1960s. In central Kenya, the results of this were single-parcel farms of between 3 and 8 hectares. In the sloping areas, these normally stretched from a ridge down a slope to a bottom valley area. After a generation or so of land subdivision, average farm sizes generally range from 1 to 4 hectares. Relative to other rural areas, this region generates high agricultural income and households are able to educate their children, many of whom take up jobs in the non-agricultural sector, partially easing the pressure for land subdivision. The updating of titles following transfers of land is

commonly practiced in this area relative to the western highlands (Place and Migot-Adholla 1998). In the western highlands, farms are more or less the same size, with the exception that in some of the most densely populated areas, farm sizes of below 1 hectare are common. In both areas, the most common form of land acquisition is through inheritance. Some purchasing of land takes place, but renting of land, though growing in significance, has not traditionally been important. In both areas, there is much off-farm activity as some family members will seek employment in the major cities.

Two important distinctions between the western and central highlands are the higher elevation and closer proximity to Nairobi (and the shipping port) of the central highlands. The higher elevation has permitted the productive cultivation of perennials such as coffee and tea, and the proximity to Nairobi has provided a ready market for cash activities such as dairy production. In the central highlands there is consequently a wide range of both cash and food crops grown. The major cash crops are tea (in the higher elevations), coffee, miraa (a stimulant), macademia nuts, fruit trees such as avocado, and vegetables. The major food crops are maize, beans, irish potatoes, bananas and an assortment of vegetables. In addition, livestock production, mainly for milk, is extremely important and in most areas over 80 percent of households own cattle (Minae et al. 1988). Consequently, sizeable land area is devoted to production of fodder, such as napier grass (Murithi 1998).

Farmers market coffee and tea through cooperatives, the local tea and coffee societies, and their widespread establishment has facilitated expansion of these commodities. The area under tea production has steadily increased to where Kenya is now the world's second largest exporter of tea. Coffee production remains an important

provider of foreign exchange but production levels have been more volatile. Dairy has been a major growth industry both during the monopoly period of the Kenya Cooperative Creameries (KCC) and since the liberalization of the sector in the early 1990s. Horticulture is also important in the central highlands. Flowers are restricted to larger farmers but smallholders are engaged in pyrethrum, tobacco, french beans, macadamia, and other fruits and vegetables.

One of the benefits of the cooperatives was to provide credit for inputs and sometimes other investments. This meant that as long as output prices were attractive, farmers normally had the interest and capacity to apply fertilizer inputs to their cash crops. For coffee, for instance, Kenyan farmers normally add nutrient inputs, as opposed to farmers in Uganda. The access to credit also had spillover effects into other crops and investments such as education. Thus, one of the features of the central highlands is the development of a highly diversified and intensified agricultural system. There remain poor households, but opportunities to improve livelihoods through agriculture abound.

The case of western Kenya is different. There are only isolated areas suitable for production of cash crops such as coffee or sugarcane. There is a sizeable regional demand from a large rural population and the presence of several small cities, but the distance to the largest cities and key tourist areas is relatively long and transport costs high. As a result, in comparison with the central highlands, the profitability of agriculture has traditionally been lower and farmers have in turn reinvested very little in agriculture. The general description is of low-input semi-subsistence farming systems. Maize and bean systems dominate, but in some areas bananas are common and in others sorghum and millet can be found. There is also some growing of cassava and sweet

potato. The higher valued crops in the system are the vegetables such as french bean, kale, cabbage, onion, pepper, and tomato. Tea is grown in some parts of the western highlands, though not as common as in the central highlands. Livestock (particularly crossbreeds) are also not as common as in the central highlands, and are normally confined to the wealthier households who utilize them for milk, manure, and sometimes ploughing. Yields of most crops are low and households normally must buy additional food to supplement production. In addition, acute demands for cash, for education fees for example, force households into selling food crops at low prices following harvest and buying them later at much higher prices. Western Kenya is a net importer of food.

UGANDA

The highlands of Uganda are mostly in the southwestern and western part of the country and in the east. The highlands (above 1,200 m.a.s.l) account for 27 percent of the land area of Uganda and 38 percent of the population (Braun et al. 1997). Population density averages 105 persons per sq km, including urban and rural areas. Population density is over 250 persons per sq km in parts of the southwestern and eastern highlands, which are the higher altitude areas. The climate is relatively humid and moderately warm, with annual average temperatures ranging from about 24°C at the lower elevations to 15°C at the higher elevations (over 3,000 m.a.s.l.). Annual rainfall ranges from about 1,000 mm to over 2,000 mm, and there are two growing seasons with over 180 growing period days in nearly all of the highlands.

The major soil types in the highlands include ferralsols in the Lake Victoria crescent and andosols, lithosols and nitisols in the southwest and east (Braun et al. 1997). Ferralsols are moderately deep and fertile, but with high acidity. Andosols are

moderately deep to deep and highly fertile. Nitisols are deep with moderate fertility but high acidity. The nitisols of the region are capable of supporting continuous cropping by renewing soil fertility through weathering (Hoekstra 1988).

Many rural areas of Uganda are relatively accessible by roads, and the density of roads and railroads—about 1.6 km per 1,000 persons (U.S. Library of Congress 1992), is relatively high compared to many other African and Asian countries (Ahmed and Donovan 1992). However, many of the roads are in poor condition. Rail service to port is unreliable, particularly through Kenya (World Bank 1996). In addition, the availability of vehicles and transport services within Uganda is limited and expensive, and fuel costs are high. Irrigation is little used in Uganda, despite the presence of sizeable wetland areas (Place and Otsuka 1997). There is limited capacity of storage and processing facilities, especially for perishable commodities (World Bank 1996).

Education has traditionally been given high priority in Uganda, though educational attainment is low compared to more developed parts of the world. Adult literacy was 57 percent in rural Uganda in 1992 (ibid.). There has been substantial expansion of the public school system since the late 1980s, although many problems limit the quality of education.

The major food crops produced in the highlands of Uganda include bananas and plantains, maize, sorghum, finger millet, cassava, sweet potatoes, and various pulses. Coffee is the most important cash crop, accounting for most of Uganda's export earnings. Cattle are important in parts of the highlands, but are found mainly on larger farms in lower elevations where population densities are lower. Small ruminants are more common at higher elevations (Hoekstra 1988).

A wide variety of farming systems exists. Intensive banana, coffee and maize production is common near Lake Victoria. Near Kampala, there is also increased uptake of horticulture crops such as vanilla, passion fruit, and pineapple. Banana, coffee, cattle, field beans, and maize are common in the western highlands. North of Jinja, fewer bananas are produced, and finger millet, cassava, and maize are common. Annual food crops dominate in the higher elevations of the southwest and include potatoes, a major export from the region. In the eastern highlands around Mt. Elgon, coffee-banana-cassava and banana-maize-coffee systems are common (Hoekstra 1988; Braun et al. 1997).

Most farms are less than 2 hectare in size in the Lake Victoria area and in the montane food crop systems in the southwest and east. Farms are somewhat larger in the cattle producing zones in the west, though still generally smaller than 15 hectare (Hoeckstra 1988). Most farms are semi-subsistence in orientation, producing most of the food supply for the household. Fallowing of one year or more is not practiced on smaller farms, and is declining where there are larger farms due to population pressure.

Declining soil fertility is a problem across much of the highlands, as a result of declining use of fallow, very low use of fertilizer, and limited use of manure. Low use of fertilizer may be due in some cases to low yield response to fertilizers, which has been found in many fertilizer trials (Braun et al. 1997). In some soils, accumulation of nitrogen occurs in the subsoil, and deep rooting crops or trees may be very useful to recycle nutrients into the topsoil (ibid.). However, low fertilizer use is also due to limited availability and high costs of fertilizer. Contributing to these problems are information

and marketing difficulties resulting from a weak extension service and high transport costs of fertilizers, which come through the port of Mombasa.

Soil erosion is a serious problem in the densely populated and steeply sloping highlands of the southwest and east (ibid.; Kamugisha 1993). Soil conservation measures were widely practiced prior to the early 1970s, promoted by educational programs and often enforced by local administrators. However, as a result of years of political turmoil, breakdown in former administrative structures, and population pressure, soil conservation is now much less common, and many of the older investments have been destroyed or seriously deteriorated (Zake 1992).

3. POLICIES AND INSTITUTIONS AFFECTING HIGHLAND DEVELOPMENT

Here we consider the effects of recent changes in the policy environment on development in the highlands, and the major policy and institutional constraints that still appear to inhibit development potential.

ETHIOPIA

Since the end of the civil war in 1991, the Ethiopian government has taken great strides towards liberalizing the economy and setting it on a path towards sustainable long term growth. The exchange rate has been devalued and has stabilized, and the foreign exchange market largely deregulated. Government spending and the money supply have been held under control, bringing inflation to under 5 percent (World Report 1998). Tax rates have been reduced and efforts undertaken to broaden the tax base. The banking

sector has been deregulated, and together with reduced inflation, this has allowed positive real interest rates on savings to help mobilize savings. Private banks are now allowed to compete with the Commercial Bank of Ethiopia, though the CBE still controls 90 percent of the market. Most price controls, trade restrictions, and restrictions on the labor market have been eliminated. Export taxes have been eliminated, except the coffee export tax, which is a major source of revenue to the Federal Government. Privatization of nearly half of the formerly state-owned enterprises has been completed (Ethiopian Herald, April 28, 1998), though most of the larger enterprises and state farms are still owned by the state. These changes have contributed to strong economic growth, averaging 6-7 percent per year over the past six years, and to elimination of the government deficit (World Report 1998).

A key element of the new policy strategy is to decentralize political power and administrative decisions from the Federal Government to the regions. Regional governments now raise some of their own revenue and execute their own plans and budgets, though a sizable fraction of their revenues still comes from the Federal Government. Within the regions, local municipalities (woredas) have their own elected councils and executive committees, responsible for developing their own plans and budgets as well as implementing the policies of the Federal and regional governments. Although woreda councils develop their own budget proposals, these must be approved by the regional government; thus a substantial degree of authority is maintained at the regional level. Below the woreda level are peasant associations, kebeles or tabias, which are composed of a few villages. These are the lowest administrative units in Ethiopia, and their local councils are supposed to develop their own plans, budget proposals, and

develop and enforce by-laws governing use of common resources, etc. According to some informants, this process of decentralization is furthest advanced in Tigray, where it has been built upon the philosophy and structures established by the Tigrayan People's Liberation Front during the civil war.

Although good progress has occurred, there still exist policy and institutional constraints to sustained development in the Ethiopian highlands. Chief among these are unresolved issues about land tenure, limited infrastructure development, limited competition in input supply markets, constrained access to rural credit, capacity limitations in the research and extension system, and lack of coordination between programs promoting increased agricultural production and programs promoting conservation objectives.

Under the new Ethiopian constitution, all land is the property of the state, and it may not be sold or mortgaged. The right of peasants and pastoralists of free access to land is guaranteed. The constitution also guarantees the right of individuals to improvements they make to land, including the right to bequeath, transfer, remove, or claim compensation for such improvements if the right of use expires. Although the constitution has resolved some issues, it seems to create other ambiguities and does not address some important issues. Given the scarcity of land, it is not clear how peasants' right of free access to land can be assured in practice, and what effect this may have on tenure security of those currently possessing land. Nor is it clear how much land peasants are entitled to. These issues have been left to the regional governments to resolve, and there have been important differences across the regions. In Tigray, a new land policy was established in 1997 stating that there will be no further redistributions of land except

where major infrastructure investments such as irrigation projects necessitates it. In Amhara, by contrast, a general redistribution was just completed in 1998, and no policy has been established regarding future redistributions. The Oromiya government is reportedly considering a redistribution. Given these circumstances, tenure insecurity may be more of a constraint to land improving investments in Amhara and Oromiya than in Tigray.

Another issue that is up to the regions to decide is the policy towards land leasing. Tigray's new land policy allows leasing for up to two years for traditional uses, and up to 10 years if the lessee makes significant investments. There is reportedly no restriction on lease terms in Amhara, while in Oromiya, peasants may only lease out half of their land for up to three years. Such restrictions may constrain efforts to reduce land fragmentation, limit farmers' ability to obtain sufficient income from farming, limit incentives to invest in land improvements, and constrain peasants' ability to take advantage of better economic opportunities outside of farming or in other locations. The prohibition on land mortgaging in the constitution of course reduces farmers' collateral and hence reduces their access to collateral-based credit, though alternatives such as peer group monitoring are possible and being used in Ethiopia.

Constraints on rural credit appear to limit use of purchased inputs and investments. According to officials from different parts of Ethiopia, the demand for rural credit greatly exceeds the supply. Part of the reason for this is undoubtedly the limited development and capacity of rural financial institutions. Due to their politicization by the Derg regime, many farmers reportedly prefer to avoid dealing with service cooperatives, and few organizations have stepped in to provide rural credit. In many areas, non-

government organizations, such as the Relief Society of Tigray (REST), are the main source of credit. Until 1998, maximum interest rates on loans by such institutions were regulated by the National Bank of Ethiopia, although these restrictions have been eliminated. Minimum interest rates on deposits are still regulated (6 percent), as are the maximum loan sizes by rural financial institutions (5,000 Birr). The loan size restrictions limit the usefulness of such institutions in financing investments and lead to small lending volume per borrower and per branch, causing administrative and other fixed costs to be high relative to the value of loans.

Absence of credit for marketing or other purposes also may constrain rural development, farmers' incomes and food security. Rural credit institutions currently require agricultural input loans to be repaid at harvest time, forcing farmers to sell when prices are low, rather than storing and selling when prices are higher and food is more scarce. There does not appear to be any government policy inhibiting such institutions from extending loans for a longer period (e.g., for one year rather than six months), which could help to facilitate storage and orderly marketing. Allowing credit specifically for marketing, storage facilities, and processing facilities could further promote the development of a competitive output marketing system. The absence of credit for consumption purposes, which serves as a form of insurance, also may inhibit productive development (as well as food security) by causing farmers to be highly risk averse when considering use of new technologies and inputs.

Credit constraints also inhibit investment in livestock. Few smallholder livestock producers receive formal credit in Ethiopia (Freeman et al. 1998a). Freeman et al. (1998b) have shown that a one percent increase in credit to purchase crossbred dairy

cows leads to a 0.6 percent increase in milk productivity on credit constrained farms and a 0.4 percent increase on non-constrained farms in Ethiopia. Such differences in the marginal productivity of working capital suggest that targeted livestock credit schemes to those most in need could have important efficiency as well as equity benefits.

Limited infrastructure development is another major constraint. Three-fourths of highland farm households lived more than a six-hour walk from an all-weather road in the early 1980s, and the situation may be little improved today (FAO 1986). This obviously restricts farmers' ability to participate in market transactions, and explains the predominance of subsistence farming in the Ethiopian highlands. Without improvements in market access, impacts from price liberalization, improved technologies, and improved availability of inputs and credit may be negligible for farmers in remote areas, because high transportation and marketing costs renders their production essentially non-tradable. The Ethiopian government and donors recognize the importance of the issue, and plans have recently been announced to invest 19 billion Birr (nearly $3 billion) in road improvements over the next five years (Ethiopian Herald, April 30, 1998). However, these funds are reportedly to be used mainly for improving the highway system, not the rural roads. An ambitious program to construct small-scale irrigation structures in drought prone areas with good irrigation potential is also underway, under the Sustainable Agriculture and Environmental Rehabilitation Program (SAERP) initiated by the U.N. Economic Commission for Africa. This program initially planned to construct 500 microdams irrigating about 100 hectare each in Tigray alone, although the plans have been scaled back as a result of capacity constraints and a more realistic assessment of the availability of suitable sites. While decisions have been made about the general

magnitude of such infrastructure investments, important decisions remain about how to target and implement them. In addition, better integration of different infrastructure programs may be needed. There appears to be little integration of the road construction and irrigation investment programs for example, even though these investments may be highly complementary.

The limited degree of competition in agricultural input markets also may be an important constraint to increased use of inputs. Presently, there are only three or four suppliers of agricultural inputs, with the dominant one, the Agricultural Input Supply Enterprise (AISE), owned by the government. There have been complaints by one of the private suppliers about favoritism shown by some regional governments towards the government supplier and its affiliates, though this is disputed by the regional governments (Mulat et al. 1997). Much of the problem may be that input markets have only recently been deregulated (the retail market was deregulated in 1997 and the wholesale market in 1998), and it will take some time for competition to flourish. There appears to be little involvement of traders or retailers in marketing agricultural inputs at present. Part of this may be due to uncertainty and unfamiliarity of these agents in marketing inputs, though transport costs and the need for credit to finance working capital are probably also important constraints.

Investments are also needed to increase the capacity of the research and extension system. Substantial progress has been made by the Ministry of Agriculture in implementing the Sasakawa-Global 2000 approach to extension (emphasizing use of fertilizers and improved seeds of cereal crops on 0.5 hectare demonstration plots), with impressive results. Between 1995 and 1998, demonstrations were conducted on about

600,000 plots, in most cases more than doubling crop yields (World Report 1998; Quinones et al. 1997). Extending this approach to a much larger number of farmers in the highlands will require substantial investment in training staff and farmers, and likely also some consideration of how to appropriately target and adapt these technologies (especially in moisture-stressed environments). The long-term success of these efforts will also require addressing the constraints to competitive input supply, credit, crop storage, marketing, processing and diversification discussed above, lest farmers become discouraged by unavailable inputs or rapidly falling output prices just as the program is bearing fruit. In many ways, technological success will create more challenges for policymakers than failure.

Another key issue is the need for greater integration of such productive technologies with efforts to conserve soil and water. Many of these efforts are conducted by separate programs with different objectives, resulting in poor coordination of the approaches (Hans Hurni, personal communication). This is unfortunate, since the complementarities between soil and water conservation and productivity enhancing measures can be substantial. For example, the returns to soil and water conservation structures will be much higher if they enable farmers to use fertilizer and improved seeds, by conserving soil moisture and reducing losses of such inputs through runoff. This complementarity of course also increases the returns to using fertilizer and seeds. To realize these potential benefits, greater integration of these approaches is needed in both research and extension packages.

KENYA

The Government of Kenya implemented a structural adjustment program beginning in 1986 and elements of this program are still being carried out such as the privatization of state enterprises. The reforms have targeted both macro-economic areas as well as sectoral areas, including agriculture. The government relaxed foreign exchange regulations and by 1995, the private sector could move currencies relatively freely. Tariff rates were reduced on many goods and the import/export sectors were freed up from excessive licensing restrictions. The shilling was allowed to be market determined (with the typical stabilization influence by the central bank) and interest rates were also freed to market forces. After the elections in 1992, the government ceased the printing of money to finance government shortfalls and was forced into meeting imbalances through borrowing. Following this, inflation has increasingly been under control, averaging at or below 10 percent since 1996. Real interest rates, on the other hand, increased dramatically as the government had to pay high interest rates in order to raise the significant amount of funds it required. Much of the government debt was held by commercial banks which tended to choke off domestic private lending. The high real interest rates attracted foreign funds and this helped to maintain a strong shilling over this time (1995-1999). The recent macro-economic indicators have generally been well received by the World Bank and IMF.

The government has had difficulty in funding its planned public expenditure program. Government revenues have almost annually been disappointing with much evasion of tax. When the IMF also withdrew its financing mechanism, the government has had to respond by reducing expenditures. This has meant that infrastructure revitalization and development has been slowed. The El Niño rains of 1997-98 further

damaged the poor infrastructure. Funds for agricultural research and extension have also been tight, and have relied to a large extent on donor support. The government has reduced costs by retrenchment in some ministries and in parastatals. The Kenya Revenue Authority has also recently been given more latitude to collect taxes and in 1998 tax collections actually exceeded target levels. The government has also introduced cost-sharing mechanisms in many sectors such as education and health.

In agriculture, important policy areas include inputs, credit, output, research and extension, land tenure, and land management. The agricultural input sector in Kenya has been one of the bright spots. Even prior to SAP, Kenya had abandoned subsidies for fertilizers and other inputs. Following liberalization, the government has slowly allowed competition in the sector to grow. The fertilizer sector, though already quite competitive relative to other countries in Africa, was decontrolled in 1990 and the number of importers and distributors has reached 23 by 1997 (Nyoro 1999). In response, the number of types of fertilizer on the market has increased four-fold. The seed sector also involves several major firms that compete with the Kenya Seed Company. The government has long had an interest in increasing the availability of credit to farmers. State supported credit is channeled through the Agricultural Finance Corporation (AFC), the Coffee Marketing Board, and the Kenya Tea Development Authority. The AFC though does not lend to smallholder farmers (a farmer must have at least 5 hectares of land). As in Ethiopia, lending to the livestock sector is constrained in Kenya. For example, Freeman et al. (1998b) found that a 1-percent increase in credit for purchasing crossbred dairy cows leads to 1.6 percent increase in milk productivity on credit constrained farms and 0.9 percent increase in productivity on non-constrained farms.

Private financial institutions rarely lend for agricultural purposes and when they do, only to large farmers with considerable collateral. Recent years have seen the launching of micro-finance projects, but only a few have targeted agriculture. Despite these mechnisms, it is estimated that only 10 percent of credit goes to agriculture while it contributes over 30 percent of GDP (Mwangi 1999).

There has been increased devolution of control and participation in the marketing of output by the state, but this has been a slow and rough process. Maize, the most important food crop has been largely freed from government regulation. Price supports and movement restrictions have disappeared. The National Cereal Produce Board (NCPB) still exists with the mandate to stockpile foodstuffs for national food security, but there is a thriving private sector that buys and sells maize throughout Kenya. Moreover, the NCPB itself has become a commercial enterprise and has reduced staff by 65 percent between 1993-98 (Mwangi 1999). The Kenyan government is still highly involved in the marketing of coffee, tea, sugar, and meat. Government parastatals are the sole buyer for tea and coffee, which are especially important in the highlands. Producer prices generally follow world prices and therefore Kenyan coffee farmers have not been spared the shocks of volatile world coffee prices. Production of coffee fluctuates widely in response to prices and as well to the speed of payment by the coffee board, which has often been slow in the past. The Kenya Tea Development Authority, on the other hand, has performed relatively well and tea area has continued to expand among smallholders in Kenya. For both coffee and tea, marketing outlets are well distributed through key growing areas in the highlands. The dairy sector had been tightly controlled by the Kenya government through the mid-1990s, when restrictions of selling milk to the

parastatal, Kenya Co-operative Creameries (KCC), were eased. KCC now buys a small share of total milk production and is in negotiation with a foreign firm to form a joint venture. The state still has strong influence on prices and incentives for some crops through their import policies, which in the case of maize, sugar, and wheat remain politically influenced.

Research, extension, and other agricultural information services in Kenya, while not up to the resource levels of Asian countries, compare favorably with other African countries. Agricultural research has a legacy of emphasizing cash crops for the larger farmers, but the Kenya Agricultural Research Institute has now decentralized into many locations to focus on the particular needs of smallholder farmers in those areas. Kenya has pursued the Training and Visit approach to extension and this has had poor results in some areas due to low extension worker to farmer ratios and limited transport resources. The government, however, is a supporter of new approaches and has facilitated the introduction of the catchment approach for soil conservation and the many innovative methods used by an array of NGOs.

Land tenure is largely secure for rural households and this is particularly the case in the highlands. Thus, farmers' willingness to invest is not hampered by uncertainty of land rights. The government has also spearheaded efforts to promote sustainable agriculture through the establishment of the permanent presidential commission on soil conservation and afforestation. In response, production and distribution of tree seed and seedlings was actively promoted and farmers throughout the highlands continue to plant trees for various purposes. The Ministry of Agriculture embarked on an ambitious soil conservation program in the late 1970s and the National Soil and Water Conservation

Program is recognized globally as one of the most successful conservation program, now reaching 100,000 farmers per year.

Kenya has long adopted a strategy to increase local level planning. Thus, sectoral plans are developed with inputs from district level plans. While this decentralization has been in place for some time, unlike in Uganda and Ethiopia, there has not been much movement towards actual devolution of power. The executive branch retains most political power and continues to make appointments at local administrative levels and it these appointments who provide most of the inputs into local planning. The state had, until 1996, also appointed the directors of the Kenya Farmers Association. The executive branch also develops strategic plans for the country. Recognizing the continued high rural population growth rates and continuing miniaturization of farms, the government has set a goal of becoming a semi-industrialized nation within the next few decades. There will be considerable obstacles in meeting this challenge, and widening the tax base to ease rates of taxation and interest will be among the first tasks. Public investments in transport, energy, and communication infrastructure will also be required. There will be keen competition for scarce funds from both the urban and rural sectors, most notably in social programs for education and health.

UGANDA

Since taking power in 1986, the National Resistance Movement of President Museveni has implemented one of the farthest reaching programs of structural adjustment in Africa (World Bank 1994). After a brief experiment with foreign exchange and price controls failed (inflation reached 380 percent by May 1987), the Museveni government changed course and became an enthusiastic supporter of stabilization and adjustment, in

some instances moving the process faster than even expected by the IMF and the World Bank (Nygaard et al. 1997). Foreign exchange markets have been completely liberalized since 1993. The money supply and public spending have been tightly controlled, domestic price controls have been eliminated, most quantitative trade restrictions have been eliminated, the banking sector deregulated, many state-owned firms privatized, and tariffs rationalized and reduced to some extent (ibid.; World Bank 1996). The government is now investing in improving the nation's badly deteriorated infrastructure, as well as increasing investment in health, education and the agriculture sector.

The government has also moved forward with political reforms. A new constitution was adopted in 1995, and the first direct presidential elections held in 1996. Although political parties are not allowed, policymaking in Uganda is open and participatory, contributing the government's ability to build popular support for implementing such difficult policy changes (Nygaard et al. 1997). The government is now pursuing a policy of decentralization, giving greater control over the civil service and local tax revenues to local councils at the district and sub-county levels.

These changes have brought some impressive results. Peace has been restored to most of the countryside, and the government is popular even in some stronghold areas of previous governments. Economic growth averaged more than 6 percent per year (in real terms) between 1987 and 1996 (ibid.). Inflation has been brought under control, and is now under 10 percent per year. The exchange rate has stabilized and substantial international reserves have been accumulated since the early 1990s. Domestic investment has increased. In 1996, the U.S. Agency for International Development

concluded that Uganda's accomplishments were "better than anticipated," creating "a fundamentally different environment for economic growth" (ibid.).

Despite these accomplishments, major challenges remain to be solved. Poverty is still severe in Uganda; two-thirds of the population live on less than $15 per month, the minimum considered necessary to meet minimum food requirements (Ministry of Planning and Economic Development (MPED 1997). Social and nutritional indicators in Uganda are among the lowest in the world (Nygaard et al. 1997). The AIDS epidemic has reached alarming proportions; an estimated 110,000 people died of AIDS in 1995, and the numbers are projected to increase for the next several years (ibid.).

The problem of poverty is particularly acute in the rural areas. The benefits of rural growth are not yet broadly shared in the countryside, where low-input semi-subsistence farming still dominates. Since 1987, per capita incomes in rural areas have increased less than 1 percent per year (Opio 1996), and food production per capita is still below the pre-1971 level (World Bank 1996). A combination of dry weather and crop disease pushed some rural communities to near famine conditions in 1997 (Nygaard et al. 1997).

There is substantial untapped potential in agriculture in Uganda. Yields on research stations are twice as high for beans and five times as high for maize as on farmers' fields (MPED 1996). Fewer than 30 percent of farmers use improved seed varieties and almost no farmers use fertilizer (ibid.). In part, this reflects low farmgate prices resulting from high transport costs and marketing margins: in 1993/94, farm prices averaged only 17 percent of retail prices for maize and 33 percent of retail prices for beans (ibid.).

In recognition of this potential, the Government of Uganda has decided to pursue a strategy of agricultural modernization as the linchpin of its strategy to eliminate poverty and ensure sustainable and rapid economic growth. The overall objective of the strategy is to transform smallholder agriculture from a subsistence to a commercial orientation, with greater total factor productivity, lower unit production and marketing costs, greater use of high yielding varieties and modern inputs, more diversified production of commodities with higher value and higher income elasticities of demand, and increased exports of traditional and non-traditional commodities (Government of Uganda 1998). Some of the key priorities of the modernization strategy include investing in infrastructure, increasing the role of the private sector in all commercial agricultural activities, decentralizing government functions, improving research-extension-farmer linkages, and implementing land reform.

With regard to infrastructure, the government has initiated a 10-year Road Sector Development Program, which will invest an estimated $1.5 billion on road improvement (ibid.). This will focus principally on the main roads, but also includes a component for rural feeder roads. In 1998/99, the government will spend Shs. 25 billion (about $18 million) for maintenance of feeder roads, more than double the previous level, and about Shs. 14 billion ($10 million) for rehabilitation of feeder roads. Despite these investments, the level of investment in rural roads is much less than that called for in the original version of the Modernization Plan (ibid.); consequently the state of rural roads is likely to remain poor for some time to come. Steps are also being taken to reduce taxes that affect transport costs; for example, the tax on petrol has been reduced by half (to Shs. 150 per litre) since 1997. The government has decided not to invest in construction of irrigation

infrastructure, although it will finance development of irrigation information and capacity building for smallholders in water harvesting methods.

Increasing the role of the private sector is a fundamental element of the modernization strategy. The government has clearly indicated that it will not be involved in the direct production or supply of agricultural inputs, in providing credit subsidies, or in processing or marketing outputs. Agricultural research for commercial crops, such as coffee, is to be financed increasingly by producers, and public extension services will not be provided to commercial farms. The government hopes that the private sector will develop largely on its own, facilitated by appropriate intervention to ensure peace, security and a stable macroeconomic environment; and to provide necessary regulations, infrastructure, and effective technology packages.

Another fundamental element of the strategy is the policy of decentralization. Together with increased reliance on the private sector, this is associated with a reduced role for the central government in agriculture. In line with this, the staff of the Ministry of Agriculture, Animal Industries and Fisheries (MAAIF) has been reduced from 1,400 to around 280. Local governments (districts and sub-counties) are now primarily responsible for planning and implementing agricultural programs and projects. Under the Local Governments Act of 1997, districts are now responsible for providing agricultural extension, land administration, and protection of forests and wetlands, while sub-county governments are responsible for provision of ancillary field services in agriculture, efforts to control soil erosion and protect local wetlands, and enforce other local regulations relating to natural resources and wildlife. Local governments are empowered to assess

and collect taxes and use revenues for their own purposes, with at least 65 percent of locally collected revenues to remain with the sub-counties.

This decentralization holds great promise of making government programs and expenditures more responsive to local priorities. This may mean, however, that agricultural activities receive less priority than might be desired by the central government, at least in the near term. For example, only three out of 32 districts whose 1997/98 budgets had been analyzed by MAAIF had allocated more than 3 percent of their budget to agriculture (ibid.). In addition, there is a great need for the central government to help develop the capacity of local governments to handle the many functions they now perform. The central government will also need to be involved in programs and projects having broader impacts across districts, such as development of highways and the communications network. These needs appear to be adequately anticipated by the government, although implementation will undoubtedly pose significant challenges.

Decentralization will play a major role in the process of improving research-extension-farmer linkages. With extension now the responsibility of the districts, extension priorities will be more in line with local priorities of farmers. The linkages between the district extension agencies and the National Agricultural Research Organization (NARO) have not been fully worked out yet. This is to be accomplished by establishing Zonal Agricultural Research and Outreach Centres (ZAROC), which will be involved in adaptive research and on-farm demonstrations. Despite the decentralization of extension services, extension will be funded mainly by the central government. The top priority in the agricultural budget plan for the next five years is extension services for smallholders, with expenditures for extension expected to more than double, while

research expenditures will grow much more slowly (ibid.). This is because extension has been neglected in Uganda, with spending on extension as a percentage of GDP lower than in other Sub-Saharan African countries.

Land reform is another major priority in the Modernization Plan. The Land Act of 1998 repeals earlier land laws; ensures security of tenure to owners of land held under customary tenure, freehold or leasehold; ensures security of tenure to long-term occupants of mailo land, and provides procedures for converting customary or mailo land to freehold or leasehold tenure. In the past, there have been conflicting claims to mailo land by occupants and owners, and the Land Act was intended to settle this issue. Long term (longer than 12 years) occupants of mailo land are provided a secure and inheritable use right, and rent is limited to be no greater than Shs. 1,000 per year (less than $1). This appears to be intended to encourage mailo owners to sell their interest in the land to the occupants, since the rents they receive are very minimal. In addition, the law provides for a Land Fund to be established, to help smallholders and land occupants to acquire and register land under secure tenure. Implementing this land reform will entail substantial costs to finance land purchases, register or title land, adjudicate disputes, resolve conflicts, etc. In the long term, the land reform may enhance tenure security and the development of land markets, though in the near term it may create difficulties as the procedures and problems are sorted out.

Other priorities for modernization include development of rural credit institutions, development of agricultural input and processing industries, improving access to export markets, fisheries and forestry development, and others (ibid). The Modernization Plan also incorporates government activities related to these priorities, although funded at

much lower levels than road development, extension, research, or land reform. Despite some expenditures on capacity strengthening in developing rural credit institutions, limited development of the rural financial system will likely remain a drag on agricultural development for the near future. Contributing to the problem is the very low rate of savings in Uganda (only 1 percent of GDP in 1994 (World Bank 1996)), which also limits the ability of the government to finance infrastructure and other investments without large foreign grants or borrowing. Mobilization of rural savings, as well as provision of credit services, will need to be a high priority of non-governmental organizations and the private sector if these problems are to be overcome.

4. STRATEGIES FOR SUSTAINABLE DEVELOPMENT

Over the past decade, a consensus has begun to emerge about many common features required for successful development strategies in Africa, most of them following standard neoclassical prescriptions (Delgado 1995; World Bank 1994; Cleaver and Schreiber 1994). General peace and security are needed to allow a climate favorable to production and investment. Macroeconomic policies that ensure a low and stable inflation rate are needed to reduce risks and allow development of the financial system. Foreign exchange and trade policies should be liberalized to avoid a bias against tradable goods. Competition should be allowed to develop in domestic markets to promote efficient allocation of scarce resources.

Although this consensus is very helpful in encouraging governments to stop doing things that have had negative impacts on development (such as foreign exchange and domestic price controls), it is less helpful in providing guidance to governments on what

they should do. A useful general principle to guide government action is to undertake those actions that yield high social net returns and that would not be done as well by some other means in the absence of government action. According to this principle, governments should intervene mainly to provide public goods (goods such as research or rural roads whose benefits are largely nonrival and nonexcludable, and hence not adequately provided by private markets); to address other market failures such as externalities (such as caused by environmental pollution or water use), missing markets (such as absence of credit and savings markets), and imperfect competition (such as monopoly power); or to address equity considerations such as problems of deep seated poverty.

To move from this general principle to specific actions, it is helpful to think of different pathways of development that may be appropriate in different circumstances. As mentioned in the introduction, the appropriate pathway of development depends upon current and potential comparative advantage. The returns to alternative policy and technology strategies in different locations will depend upon the potential comparative advantages. For example, investments in research and extension linked to adoption of improved cereal varieties and heavy use of inorganic fertilizer are likely to yield much higher returns where rainfall is relatively assured than in drought-prone areas where use of such inputs can be very risky. Highly labor intensive methods of soil and water conservation, such as building terraces or composting, are more likely to be adopted in more densely populated and less commercialized areas, where the opportunity cost of labor is low. Adoption of animal traction technologies is likely to yield higher returns in areas with heavy clay soils than in areas with light, erodible soils. Strategies relying on

heavy use of purchased inputs and credit are unlikely to be successful in remote areas where high transport and marketing costs make subsistence agriculture the dominant development pathway, even if they are able to cause substantial improvements in productivity. Similarly, commercial dairy production is likely to develop in peri-urban areas but not in remote areas.

Many factors combine to determine comparative advantage and the appropriate response to it. We will focus on three factors that we believe are critical: agricultural potential, access to markets, and population pressure. Agricultural potential is an abstraction of many factors—including rainfall, altitude, soil type and depth, topography, presence of pests and diseases, and others—that influence the absolute (as opposed to comparative) advantage of producing agricultural commodities in a particular place. There are of course variations in potential depending upon which commodities are being considered. Furthermore, agricultural potential is not a static concept but changes over time in response to changing natural conditions (such as climate change) as well as human-induced conditions (such as land degradation). For simplicity of exposition, however, we will sweep aside these important considerations and discuss agricultural potential as though it was a one dimensional and fixed concept. In reality, the multi-dimensional and dynamic nature of agricultural potential should be considered when developing more specific strategies of development than will be possible in this paper.

Access to markets is critical for determining the comparative advantage of a given location, given its agricultural potential. For example, a community with an absolute advantage in producing perishable vegetables (i.e., total factor productivity in vegetable production is higher there than anywhere else), may have little or no comparative

advantage (low profitability) in vegetable production if it is far from roads and urban markets. As with agricultural potential, market access is also a multi-dimensional and dynamic concept (distance to roads, condition of roads, distance to urban centers, degree of competition, access to transport facilities, etc.), but we will treat it as a single predetermined variable (though subject to change through investments in roads, for example).

Population pressure affects the labor intensity of agriculture by affecting the land/labor ratio, and may also induce innovations in technology, markets and institutions, or investments in infrastructure (Boserup 1965; Ruthenberg 1980; Hayami and Ruttan 1985; Binswanger and McIntire 1987). Population pressure thus affects the comparative advantage of labor intensive pathways of development, as well as returns to various types of investments. We take average population density as an indicator of population pressure, although one could argue that population density per unit of arable land would be a better indicator. Absence of comparable data on this latter indicator makes it difficult to use in practice, however. To some extent, differences in agricultural potential will account for differences in arable land per total area of land (i.e., the fraction of arable land is likely lower in areas with lower agricultural potential, controlling for population density).

These three factors interact with each other in complex ways. Population density tends to be higher where there is greater agricultural potential or greater market access, since people have moved to such areas in search of better opportunities. On the other hand, population pressure may have contributed to land degradation, reducing agricultural potential from what it once was. Market access tends to be better where there

is higher population density, since the per capita costs of building roads are lower and the benefits higher in such circumstances. Market access also tends to be better where agricultural potential is higher, since the returns to developing infrastructure are greater. Despite these interrelationships, there is still substantial independent variation of these factors in the East African highlands. Given such variations, and the fact that these factors change relatively slowly over time, it is useful to consider how different combinations of these factors influence possible development pathways.

We can classify the situations of the East African highlands into a maximum of eight types, considering "high" and "low" levels of each dimension. We recognize that there is an unavoidable element of arbitrariness in defining these terms. "High agricultural potential" refers to areas with more than 1,000 mm of annual rainfall, at medium altitude (less than 3,000 m elevation), and with soils suitable for agricultural production with minimum investment (excluding very thin soils, vertisols, highly acidic soils, and those which are high P-fixing). This includes most of the highlands of Uganda and Kenya, and most of the High-Potential Perennial and High-Potential Cereals zones of Ethiopia. "High market access" refers to areas relatively close to an urban center and with access to an all-weather road and transport facilities. Although relative to other parts of Africa, population density is high in all of the highlands, we consider "high" population density to mean greater than 175 persons per square kilometer. This includes most of the highlands of Kenya and southwestern Uganda, and some of the highlands of Ethiopia (Braun et al. 1997).

Examples of these categories are presented in Table 1. One of the possible categories—high agricultural potential-high market access-low population density—is

Table 1 Possible pathways of development in the East African Highlands

Agricultural potential	Market access	Population density: High	Population density: Low
HIGH	High	*Central Kenya, parts of Western Kenya, Eastern Uganda* - High input cereals - Perishable cash crops - Dairy, intensive livestock - Non-perishable cash crops - Rural nonfarm development	???
	Low	*Southwestern Uganda, parts of Western Kenya* - High input cereals - Non-perishable cash crops	*Southwestern Ethiopia* - High input cereals - Non-perishable cash crops - Livestock intensification; improved grazing areas
LOW	High	*Parts of Central Tigray* With irrigation investment: - High input cereals - Perishable cash crops - Dairy, intensive livestock Without irrigation investment: - Low input cereals - Rural nonfarm development	*Parts of Northern Ethiopia* With irrigation investment: - High input cereals - Perishable cash crops - Dairy, intensive livestock Without irrigation investment: - Low input cereals - Livestock intensification; improved grazing areas - Woodlots - Rural nonfarm devt.
	Low	*Parts of Northern Ethiopia?* - Low input cereals - Limited livestock intensification - Emigration	*Much of Northern Ethiopia* - Low input cereals - Livestock intensification; improved grazing areas

relatively uncommon, for obvious reasons. The opposite case—low agricultural potential-low market access-high population density—also is relatively uncommon, though examples may exist in parts of northern Ethiopia. There are parts of this region with low agricultural potential and population density but high market access, such as in central Tigray close to the major towns of Adwa and Axum. Areas with low agricultural potential, low market access, and low population density exist in much of the northern highlands of Ethiopia. Examples of areas with low-potential, high market access and low population density include parts of southern and eastern Tigray close to the major towns of Mekelle and Adigrat. Areas with high agricultural potential, high market access and high population density include central and much of western Kenya, parts of southern and western Ethiopia (especially non-vertisol areas close to Addis Ababa), and the highlands near Mt. Elgon in the east of Uganda. Areas with high agricultural potential, low market access and high population density include parts of the southern and western highlands of Ethiopia, western Kenya, and much of southwestern Uganda. Areas with high agricultural potential, low market access and low population density include much of the southern and western highlands of Ethiopia.

Possible pathways of development in these different situations are also presented in Table 1. Commercialization of perishable crops such as fruits and vegetables is profitable (and is occurring) mainly in areas of high-potential and high market access. Dairy production is also developing in the same regions, because of the high perishability of milk and the need for adequate feed supplies, which can be supplied in higher potential areas. Due to lower transport costs, feed markets can emerge in such areas, making it possible to intensify dairy production. As feed supplies become available, intensive beef

fattening and poultry and pig production (where pork consumption is not prevented by religious restrictions, as in Ethiopia) close to urban areas are also potentially profitable opportunities, regardless of the agricultural potential of the area (Jahnke 1982). High-value, but less perishable, crops such as coffee and tea are also being produced in some areas of high market access, though the profitability of some of these crops are less dependent on close proximity to the urban market than on proximity to processing facilities. Increased production of cereals and other food crops based on high use of improved seeds and fertilizer is being promoted throughout most of the highlands through extension programs, although the potential for this approach is of course greatest in the high-potential areas with good market access. Rural nonfarm development, strongly linked to agricultural production through development of input supply and agricultural processing industries and demand linkages for rural services, is also likely to contribute substantially to development in high-potential, high access areas.

Areas with high agricultural potential but low market access have more of a comparative advantage in producing high-value (relative to their volume) non-perishable commodities (such as coffee or tea) that can be transported over relatively long distances. Given the high costs and risks of depending on imported food into such areas, farmers are likely to continue producing most of their own food crops until improvements in roads and transportation services, as well as increased production of food crops in other regions, allow imported food to be more economical and less risky. At this stage of development, complementary linkages between crop and livestock production are important, with animals providing a source of draft power, manure and food protein, and crop residues an important source of feed (McIntire et al. 1992). Thus, intensified

livestock production may be beneficial as well, particularly in lower population density areas with more available land to provide fodder. There is good potential for adoption of purchased inputs, financed by sales of cash crops or livestock, as a way to improve local food supplies as well as income. This can result from use of inputs on both types of crops, and by freeing up land and labor from food crop production for cash crop production. However, where perennial cash crop production is not yet well established or not very profitable (but potential exists), the need for subsistence food production may undermine the ability to take advantage of such cash crop potential. For example, the Technical Committee for Agroforestry in Ethiopia (1990) reported that forest coffee production was declining in high-potential areas of Ethiopia as a result of population pressure and expanded food crop production. This is particularly likely to be a problem in higher population density areas, since the subsistence food constraint is likely to be a more binding constraint to cash crop production the more scarce land is (controlling for agricultural potential and distance to market).

In lower potential areas, such as the moisture-stressed highlands of northern Ethiopia, adoption of more input-intensive cereal production is still very limited, and likely to remain so except where irrigation investments are being made. Where irrigation investments are occurring and market access is good, commercial production of cereals and cash crops such as vegetables is also feasible (and is occurring, for example, near new microdams being constructed in northern Ethiopia). Increased production of cereals and fodder in irrigated areas may also enable intensive dairy production to begin in areas close to cities. Investments in irrigation are likely to yield lower returns in areas without good market access, unless irrigation is used for production of high-value (to weight)

crops. As in areas of high-potential but poor market access, sales of such high-value crops could help to finance purchase of agricultural inputs. Also as in that case, higher population pressure in poor market access areas is likely to make adoption of such high-value crops more difficult, due to the need to produce food locally.

In non-irrigated low-potential areas, the agricultural options are more limited. There may be potential to build upon the soil and water conservation investments being made in moisture-stressed areas, by promoting targeted and limited use of fertilizer and improved seeds to the parts of the fields where soil moisture is greatest. However, such a limited and adaptive approach is not presently being pursued. For this approach to be economically feasible, sources of income to finance input purchases are needed. Where population density is high, farms in such low-potential environments are unlikely to be able to produce sufficient surplus to finance purchase of inputs. Thus this will be most feasible closer to urban areas where off-farm sources of income are available, where rural industries such as mining are developing, or where seasonal migration (or remittances from permanent migrants) is common. In vertisol areas, as in many parts of central Ethiopia, increased food crop production depends upon investments to address the problems of drainage and waterlogging. While technologies have recently been developed to address these problems (such as the broad bed maker), adoption is not yet widespread (Gezehegn and Heidhues 1998). Factors inhibiting adoption of the broad bed maker include appear to include inadequate training in its appropriate use, limited availability of complementary inputs (especially seed and fertilizer), and low output/input price ratios resulting from removal of fertilizer subsidies and poor infrastructure (ibid.).

In low-potential areas with low population density, expansion of livestock production may offer development potential. Livestock convert low-value inputs into higher value products such as meat and hides, and are relatively easy to transport to market. Achieving this potential may require the strengthening of collective action institutions which would encourage investments in improvements of grazing lands, perhaps by planting and managing fodder grasses and trees. Tree planting activities in degraded lands may also provide opportunities for significant incomes and welfare improvement where market access is relatively good. In Eastern Tigray, for example, one village (Echmare, in the Gulomakeda woreda) started allowing private tree planting on degraded hillsides in 1992, through its own initiative. In contrast to the poor management of community woodlots in the region, private management has been very good (including watering the seedlings during the critical part of the dry season) and survival rates are reportedly as high as 90 percent. Additional areas of the degraded land have been allocated in almost every year since 1992, and households are now beginning to harvest the mature eucalyptus trees planted in the first years, which are worth 30 to 50 Birr ($5 to $8) per tree. Visual observations suggest that each household has at least 20 trees surviving in each plot allocated, or at least 100 trees in total; representing a substantial increase in household wealth in this village.[2]

The most difficult case for which to identify development pathways are areas with low agricultural potential, far from markets, high population density and without

[2] For purposes of comparison, an ox is reportedly worth about 900 Birr in this village. Thus the increment in wealth represented by a mature stand of 100 trees would be much greater than ownership of two oxen, which is a key indicator of wealth in the Ethiopian highlands.

irrigation or significant off-farm sources of income. In some cases, particularly close to forests (such as in parts of Eastern Tigray), bee-keeping is an economic activity. Small ruminants can be efficient users of available fodder resources, and can be transported long distances to market, though intensification of their use will be limited by availability of fodder or grazing materials. Tree planting on degraded lands, as mentioned above, and continued investment in soil and water conservation structures (particularly given relatively low opportunity costs of labor and the greater benefits of such technologies in drier areas) also may have significant potential to improve land productivity. Nevertheless, these seem unlikely to solve the long-term poverty problem facing such communities. Emigration is likely to be an important element of the strategy for survival and development in these areas.

5. POLICY AND INSTITUTIONAL REQUISITES

The policy and institutional requirements of sustainable development will depend upon which development pathways are pursued. Here we consider some of the critical constraints affecting the pathways discussed in the previous section, and the policy and institutional requisites to address these constraints. We also consider some of the implications of these pathways for sustainable land management.

HIGH EXTERNAL INPUT INTENSIFICATION OF FOOD CROP PRODUCTION

The first requirement of this pathway is the availability of food crop varieties that will respond well to fertilizer and other inputs in the conditions of the East African

highlands. The initial success of the Sasakawa-Global 2000 program in high-potential areas of Ethiopia (Quinones et al. 1997), and the high maize and bean yields demonstrated in research sites in Uganda (Nygaard et al. 1997), demonstrate the availability of such varieties, especially for maize.

To have the broadest and most sustainable economic impact, promotion of such technologies should account for local potentials and economic conditions as much as possible. As discussed previously, small farm sizes and uncertain rainfall (especially in moisture-stressed areas) can make allocation of half-hectare plots to new technologies a very risky strategy. This is less of a concern where rainfall is relatively assured or irrigation exists, but many farmers even in these circumstances still may prefer to adopt a more gradual or diversified approach, which may be precluded by a fixed package approach such as being promoted in Ethiopia. In addition, adaptive and participatory research is needed to develop more targeted recommendations for integrated nutrient management practices; taking into account available sources of organic matter, local sources of phosphate rock, and potential for leguminous crops or trees (Quinones et al. 1997; Sanchez et al. 1997). The priority for such research in the near term should be high-potential areas where this pathway is most feasible. For the longer term, continued basic research is needed to develop varieties that are suitable under lower potential conditions, such as in moisture-stressed environments or in acid soils.

Even without targeted nutrient management recommendations based on adaptive research, agricultural extension programs can improve the usefulness of their efforts by allowing a more flexible approach and learning from farmers. Although the fixed package of Sasakawa-Global 2000 has demonstrated some impressive results, even more

impressive results might be possible if farmers are given more opportunity to experiment with alternative mixes of inputs, and the results of such experiments are used to inform the development of more site-specific recommendations.

The availability of inputs (especially seeds and fertilizer) must also be assured. In some cases (e.g., in Ethiopia), inputs are sold by the extension program. While this is attractive as a way of demonstrating the benefits of using such inputs, this is something that can be as or more effectively provided by competitive input markets, at least to places with good market access. The longer-term goal should be to promote development of such markets. This is largely a matter of removing obstacles to such development, such as eliminating foreign exchange and import restrictions, deregulating prices, and avoiding interventions by local authorities in private marketing of inputs, as reportedly has occurred in parts of Ethiopia. Mulat et al. (1997) estimate that improvements in the competiveness of the input marketing system in Ethiopia resulting from such changes could reduce the average farm level price for fertilizer (relative to unsubsidized prices) by nearly 20 Birr per quintal (about 8 percent).[3] Other positive efforts that can help develop such competitive markets include investments in road construction and improvement and facilitation of the availability of credit to private wholesalers and retailers to finance purchase of storage and marketing facilities and working capital stocks.

In remote food deficit areas where substantial improvements in market access are not likely in the near future, consideration of the most effective means to address poverty and food security should include consideration of subsidizing the cost of transporting inputs to these areas (perhaps by continuing government provision to these areas). Since

[3] One quintal equals 100 kg.

1 ton of fertilizer can yield 3-7 tons of additional grain in higher potential areas (Mulat et al. 1997), it is much cheaper to subsidize the cost of transporting fertilizer than grain (through food aid) to such areas as a means of addressing food deficits. Subsidies are of course costly and difficult to maintain as a long-term strategy, but are a lower cost alternative to providing food aid to relatively high-potential, remote, food-deficit areas. There also can be difficulties in targeting subsidies, if farmers try to resell the fertilizer to other areas where fertilizer is not subsidized. This potential problem would be minimized, however, if the subsidy were only on transport costs. The longer term solution for such areas is to invest in improved infrastructure and transport services, but people still must be able to feed themselves in the near term.

Of course, exporting substantial quantities of grains from remote areas is not likely to be economical due to high transportation costs, and should not be promoted through subsidies. For example, it may require a two-day round trip for a farmer to take a quintal of grain by donkey to the nearest market from remote areas in Ethiopia. The opportunity cost of this trip (including the farmer's time and additional feed) could easily be 10 to 20 Birr, possibly approaching 10 percent of the value of the grain sold. Probably more important, farmers in remote areas may simply be unable to sell substantial amounts of grain, even if they produced a surplus, due to limited ownership of pack animals and carts. Thus, it is not a good idea to subsidize fertilizer imports to areas that are not facing food deficits, since the impact will be to produce a local surplus and depress local prices.

In areas with high-potential and good market access, subsidies for inputs should be avoided. Such areas are likely capable of producing and marketing sufficient surplus production to pay for inputs purchased without subsidies. The main constraints to

increased input use in such areas may be limited access to credit and limited information where extension systems have not functioned well, as in Uganda.

In moisture-stressed areas with otherwise suitable soil conditions (particularly areas close to roads and markets), high priority should be given to irrigation investments where irrigation potential exists. The drought prone areas of southern Tigray close to Mekelle are a good example of such a situation, and in fact this is where SAERT is focusing much of its investment in constructing microdams. In more remote areas with irrigation potential, priority should be given to investments in roads as well as irrigation, since marketing constraints may otherwise undermine the ability to reap the full benefit of irrigation investments.

In all areas where a high external input pathway is pursued, development of rural savings and credit institutions is critical to the long-run sustainability of the effort. As discussed earlier, rural credit institutions are poorly developed in most of the highlands, and practically non-existent in Uganda. Efforts to develop such institutions should focus on areas where there is good potential for a high input strategy. The greatest immediate need is of course for short-term credit simply to finance the input purchases. However, where surplus production and trade is possible, marketing credit to allow farmers to store and market grain during the dry season is also very important. Related to that, credit to finance investment in grain storage and facilities is needed where inadequate capacity exists. Adequate regulation of private grain warehouses, for example through licensing and bonding, is also needed to assure quality and reliability of the grain stored. Given such regulation, private warehouse receipts could serve as reliable collateral for marketing or other kinds of loans. In areas with sufficiently large production and good

market access to support grain milling, credit or equity to finance such investments will also be needed. The development of equity markets in the highland countries may be helpful in this regard, as is maintaining a policy environment favorable to domestic and foreign investment in industry.

The high external input pathway may facilitate more sustainable land management. Investments in soil and water conservation will be more attractive to private farmers since the value of land and the need to minimize losses of valuable inputs through erosion and runoff will be increased. In addition to direct benefits where such intensification occurs, indirect benefits in other areas can also result, as increased supplies of biomass reduce pressure on forests and grazing areas, and increased incomes provide alternatives to expansion of production onto marginal lands.

The impacts of this strategy on restoring soil fertility are not assured however. Soil fertility can be restored through increased use of fertilizer together with greater production of organic material. However, a net increase in soil mining may occur even with greater use of fertilizer, as a result of increased losses through erosion, leaching and quantities harvested. For example, recent estimates from western Kenya show greater nutrient mining on farms where there was more commercial orientation in food crop production, suggesting that the profitability of using fertilizers in food crops may be insufficient to prevent such depletion (de Jager et al. 1998). Further research is needed on this issue.

In summary, to fully realize the potential benefits of a high external input strategy of increasing food production, adequate attention must be paid to factors affecting the feasibility and profitability of input use, including infrastructure, extension, input

availability, credit, and marketing facilities. In some cases where persistent food deficits exist, subsidies on the costs of transporting inputs should be considered as a lower cost alternative to food aid, until these other constraints can be overcome (IFPRI 1995).

LOW EXTERNAL INPUT INTENSIFICATION OF FOOD CROP PRODUCTION

In lower potential areas without irrigation, the return to using external inputs, particularly fertilizer, is likely to be much more limited. The strategy for intensifying food crop production therefore must rely on a low (not zero) external input approach. In moisture stressed areas, a critical need is to conserve and use the available soil moisture as efficiently as possible, in combination with integrated use of limited amounts of inorganic fertilizer with organic nutrient sources.

In northern Ethiopia, where the moisture stress problem is severe, soil and water conservation structures such as stone bunds and terraces are very common, and there may be good potential to increase production through better management of water and nutrients where these structures exist. For example, it might be possible to significantly increase production with limited risk by targeting use of fertilizer and manure in the vicinity of conservation structures, where soil moisture is greater. However, the fixed package approach of the current extension program has not encouraged such site-specific experimentation. In addition, little adaptive research has been conducted to explore the potential of such integrated approaches to conservation and productivity improvement.

Research is also needed to better understand the potential for improving soil productivity through integrated use of organic and inorganic fertilizers in different settings (Palm et al. 1997). Organic sources vary greatly in terms of their biomass productivity and nutrient content, their interactions with soil moisture and inorganic

sources of nutrients, and their impacts on productivity; and these issues are not yet well understood in Sub-Saharan Africa (ibid.). For example, application of organic materials may reduce nutrient availability to crops by immobilizing nitrogen, especially if the ratio of carbon to nitrogen in the organic materials is high. Organic materials can also increase pest problems. On the other hand, they may increase nutrient availability by reducing phosphorus fixation, and improve soil physical properties and water holding capacity. It is also important to recognize that many organic "sources" of nutrients (such as crop residues or manure produced from grazing crop residues) only recycle nutrients within the farming system, and do not add to the stock of nutrients in the system. As important as such recycling is to help slow the rate of nutrient depletion, it cannot restore soil fertility. Biological nitrogen fixation by leguminous plants, uptake by trees of nutrients that are unavailable to crops, and transfer of biomass from outside the farm do increase the stock of nutrients available to the farming system, and can be very important components of a low external input strategy. However, these strategies cannot adequately restore phosphorus where it is depleted (Sanchez et al. 1997). Thus, some use of inorganic fertilizer is an essential component of strategies to restore soil fertility and increase agricultural productivity, especially where phosphorus depletion is a major problem.

A critical constraint on increased use of organic material in low-potential areas is the shortage of such material and high demand to use it for other purposes (particularly in high population density areas) such as burning of dung and grazing of crop residues. It is thus difficult to address the soil fertility problem in such areas without addressing the larger problem of a shortage of biomass. One way to address this issue is to make better

use of degraded lands and communal grazing areas to produce biomass. As the experience in the village of Echmare in Eastern Tigray discussed earlier indicates, there is substantial potential to increase production of trees on degraded lands, helping to relieve local shortages of wood for fuel and construction materials, as well as generating substantial income and wealth. The key to success seems to be to provide the right set of incentives. The community approach to planting woodlots has yielded limited benefits in Ethiopia, whereas allowing individuals to receive private benefits from tree planting (with secure tenure) shows promise of achieving impressive results. The regional governments of Tigray and Amhara have been sufficiently impressed by the potential of the private approach that they have made private allocation of wastelands for tree planting a part of their land policies.

The impact of these new policies remain to be seen, but if they do result in a substantial increase in tree planting and harvesting from wastelands, more manure and crop residues can be recycled into crop production as fuelwood becomes more available. As the general biomass shortage is reduced, the need for the most rapidly growing species (generally eucalyptus) will decline, and other kinds of trees, such as fruit trees, legumes, and fodder producing trees may become more attractive to plant. This will increase opportunities for improving soil fertility and intensifying livestock production, as well as generating income directly from tree products.

Improved management of pasture and grazing areas also could yield substantial benefits. For example, area enclosures are being used to allow regeneration of natural grasses and trees in many parts of the Ethiopian highlands. These are showing good results in terms of regeneration, but there are common complaints from farmers that they

are not benefiting from the biomass being produced (where cut and carry or controlled grazing systems have not been established). In addition, enclosures tend to increase pressure on other unprotected areas, so the net impact on resource degradation is not necessarily positive. To help ensure that positive benefits are achieved and felt by farmers, more intensive management of grazing areas, such as planting and managing improved grasses and trees, is needed. This could be approached by allocating such lands for private grazing use or through better collective management of enclosures.[4]

Because of economies of scale in protecting grazing areas and risk spreading advantages of using them collectively, privatization of such lands may not be optimal (Baland and Platteau 1996). However, attaining the benefits of collective management requires effective institutions at the local level. Such institutions do not necessarily arise spontaneously, even when the net benefits of effective collective action are large (ibid.). Government or other external intervention can help to catalyze the development of such institutions, though this requires a cautious approach that respects local autonomy and concerns. Heavy-handed intervention from external agents can undermine the development of such institutions, causing increased dependency on the regulatory role of such external agents, and possibly increased conflicts in the community. Research is needed to better understand the conditions under which effective institutions for managing grazing lands arise and become sustainable in the East African highlands, and how governments and NGOs can help to promote rather than undermine this development. Where this does occur, intensified livestock production, improved soil

[4] More productive pasture areas are often allocated to private individuals in Ethiopia.

fertility management, and increased incomes will also likely occur.

Organic sources of crop nutrients can also be generated on cropland. Many practices have been developed for this purpose, such as hedgerow intercropping, improved fallows, green manures, composting, and planting of fodder or multi-purpose trees (Cooper et al. 1996). High population density and remoteness from markets favors more labor intensive practices (such as hedgerow intercropping or composting) since opportunity costs of labor are lower in such circumstances (ibid; Ehui et al. 1990). However, the potential of such approaches is limited by the scarcity of water in the low-potential highlands. High population density and small farm sizes will limit more extensive practices, such as improved fallows and planting trees. In land scarce settings, planting of trees may be most feasible in particular niches, such as in the homestead plot, on bunds and on plot boundaries. However, planting on boundaries and bunds can create problems by competing with crops for water and light on the owner's as well as neighbors' fields (ibid.).[5] There are also possibilities of temporal niches, such as improved fallows during the short rainy season.

Despite these possibilities, the potential for increasing flows of organic nutrients into food crop production from such sources is probably lower than the potential offered by better management of grazing lands and wastelands, at least in lower population density settings as in much of northern Ethiopia. In very high population density, low-potential (non-irrigated) areas, the options for increased organic matter production are

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[5] These problems are particularly acute for eucalyptus, which has led the governments of some regions in Ethiopia to ban planting of eucalyptus in farmland. The competition between eucalyptus and crops is one reason farmers may prefer to plant eucalyptus in sole stands and near homesteads, rather than along field boundaries.

probably relatively limited. In such cases, development of woodlots, even on farmland, may be a better option for sustainable land use and reducing poverty (particularly where market access is relatively good and farmers have access to off-farm sources of income). The ban on planting eucalyptus trees in farmland adopted by some regions in Ethiopia may eliminate this as a feasible option, since eucalyptus is by far the preferred tree because of its ability to grow rapidly, produce valuable products, and regenerate even in very dry conditions.[6] Furthermore, discussions with farmers suggest that many believe that the ban is on planting any kinds of trees, and not just eucalyptus. In any case, it is not clear why policies relating to planting trees in farmland could not be set by local communities rather than regional or national governments, since the impacts are localized.

Tenure insecurity on farmland may also undermine investments in tree planting, manuring, soil and water conservation structures, and other land improvements. In the East African highlands, this issue appears to be of greatest concern in Ethiopia where land redistributions are still a threat (excluding Tigray). Problems of insecurity may be greatest for women, who are normally producers of food crops, but who are often not allowed to make decisions on long-term land investments, such as tree planting. Restrictions on long-term leasing, as in the Oromiya region may also reduce such investments where leasing is common. Land fragmentation, as is common throughout much of the highlands, is likely a major constraint to investment in manuring, mulching,

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[6] It is not clear how well this ban is being enforced. One can readily observe eucalyptus trees planted in farmlands in various parts of northern Ethiopia. Nevertheless, the policy may be limiting tree planting by increasing the risks of doing so.

or other approaches requiring transport of bulky materials to distant fields. Fragmentation may also prevent investments in land improvements such as planting fruit trees or constructing soil bunds, since these may be subject to theft or damage by neighbors if not easily supervised. For example, Olson (1995) reports cases of farmers in the Kabale district of southwestern Uganda surreptitiously undermining terraces on plots of their upstream neighbors, thus "harvesting" some of the fertile soil that had accumulated in the terrace. Restrictions on land sales and leasing, as exist in Ethiopia, contribute to the land fragmentation problem. However, the example from Uganda, where such restrictions do not exist, suggests that reform of land policies would not necessarily solve it.

Livestock grazing practices also can have a significant impact on the feasibility of some kinds of land improving investments. For example, free grazing on farmland after the harvest is common in much of the Ethiopian highlands. This likely limits the ability of farmers to invest in planting many kinds of biological measures to control erosion and restore soil fertility, since such measures may be destroyed by grazing or trampling. Thus, improvements in management of farmlands may depend upon changes in the grazing system and improvements in the management of grazing areas.

Other issues such as fertilizer and input credit supply are less important where a low external input strategy is pursued than where a high input strategy is pursued, since such areas will have lower demand for these inputs. Nevertheless, these areas should not be neglected in this regard since the small amounts of inputs and credit they use may be highly important. Other kinds of credit, particularly credit for productive nonagricultural purposes (such as petty trading) and for consumption purposes may be highly important

in addressing problems of poverty and food insecurity. Development of road infrastructure, storage facilities and the output marketing system will be less important to such areas as suppliers of food, but critical to them as net importers of food.

INTENSIFICATION OF LIVESTOCK PRODUCTION

The most widespread technical constraint to intensified livestock production in Sub-Saharan Africa is the availability of feed (McIntire et al. 1992; Winrock International 1992). In the densely populated highlands, the prospects for relaxing this constraint through increased forage production in farmlands is limited (except where high-value dairy production exists), given the scarcity of land and food (McIntire et al. 1992). Except in less densely populated parts of the highlands, the potential for increased fodder production in communal grazing areas and wastelands is also limited, as discussed above. Imported feed and feed concentrates are likely to be of limited use, except in very commercialized systems such as dairy production in Kenya. Thus, the prospects for livestock intensification (especially in mixed crop-livestock systems common in Ethiopia) may depend substantially upon the success of intensification of cereal production, which can greatly increase the quantity and quality of crop residues available as a feed source, as well as freeing up land to be used for increased forage production. This implies that the policy and institutional requisites of cereal crop intensification discussed above are also critical to livestock intensification.

Other important constraints to intensified livestock production in the East African highlands include animal diseases, limited stock of improved breeds, limited availability of veterinary services and other inputs, poor infrastructure, and limited market and institutional development (Winrock International 1992). While it is desirable to address

all of these constraints wherever they are binding, priority should be given in the near term to places where there is substantial commercial potential and where the feed constraint is not binding. For example, improved dairy breeds are not likely to be used where adequate feed cannot be assured or only limited commercial potential exists, given their cost and greater demand for feed. Returns to investment in veterinary services, infrastructure and marketing facilities will be much greater where commercial potential exists and feed is adequate than elsewhere. Thus, such efforts should be targeted in the near term to areas close to urban markets, particularly where dairy potential exists, since the returns to this activity are relatively high (McIntire et al. 1992; Jahnke 1982).

Significant opportunities for export of live animals exist in East Africa, especially in Kenya and Ethiopia. Traditionally animals are exported from these countries to satisfy demand for live animals (especially small ruminants) in the Middle East. Therefore policies to further facilitate export markets of live animals will be appropriate. Development of the export markets will require significant investments in infrastructure (e.g., ports and roads) as well as investment in research to improve feed availability and the elimination of animal diseases. Further expansion of export markets for live animals will diversify the source of export earning which are largely dependent on traditional cash crops such coffee and tea.

Development of dairy cooperatives may be a critical component of a strategy to develop dairy production in areas of high market access. Because of the bulky, highly perishable, and easily contaminated nature of fluid milk, the transaction costs and risks involved in marketing milk are very high (Staal et al. 1997). Dairy cooperatives help to reduce risks and transactions costs facing individual producers by pooling risk, reducing

unit costs due to economies of scale in collection and transport, making inputs available, and enhancing their bargaining power. They reduce costs faced by processors by reducing milk acquisition costs and assuring the quality and reliability of the supply. In addition, dairy cooperatives may contribute to the development of social capital; for example, by investing in education and health facilities.

Dairy cooperatives have played a potent role in dairy development in Kenya. The government of Kenya has promoted dairy development for many years through the Kenya Cooperative Creameries (KCC), which acts as a stable market outlet for smallholder dairy producers and private cooperatives. This undoubtedly contributed to the success of dairy development in Kenya, but has had problems in recent years as poor financial performance of KCC (due in part to policies of pan territorial and pan seasonal pricing) caused delays in payments to private cooperatives and producers (ibid.). The Kenyan government liberalized the dairy industry in 1992, eliminating KCC's monopoly on processed milk sales (but not on raw milk sales) in urban areas.[7] This liberalization, together with KCC's difficulties, led to more rapid development of private dairy marketing cooperatives (ibid.). Despite the liberalization, policy distortions continue to inhibit the competitiveness of the dairy sector in Kenya, particularly the monopoly power of the KCC (Staal and Shapiro 1994). Lack of credit to finance transport and processing equipment, and excessive government regulation of private cooperatives may also be important constraints (Staal et al. 1997).[8] Further market liberalization and provision of

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[7] Although the restriction on selling raw milk in urban markets was not officially eliminated by the 1992 liberalization, many private producers and cooperatives began selling raw milk directly to consumers after that (Staal et al. 1997).

[8] For example, all expenditures by cooperatives of over KSH 5,000 (less than $100) must be approved by the District Cooperative Officer, and approval of the Ministry

credit for the private marketing sector could help the cooperatives to develop even further.

Dairy cooperatives are much less common in Ethiopia. Almost all milk is marketed through informal channels in the Addis Ababa milkshed; only 12 percent is sold to the parastatal Dairy Development Enterprise (DDE) (ibid.). As a result, substantial differences in prices received by different producers and paid by different buyers exist. Large producers receive higher prices than smaller producers, urban producers higher than peri-urban, and all producers are willing to accept lower prices if selling to larger and more reliable customers (ibid.). Controlling for these differences, farmers with more capital are able to obtain higher prices than poorer ones. These findings suggest that development of cooperatives could help promote smallholder dairy development in Ethiopia, by helping to reduce transactions costs and achieving economies of scale. The Smallholder Dairy Development Project, funded by FINNIDA, has begun to promote development of milk groups for processing and marketing in peri-urban areas of Ethiopia.[9] Preliminary results from a recent survey of such groups suggest that there are substantial variations in their performance and viability, influenced by many factors (Nicholson et al. 1998). One factor that appears to be particularly important is economies of scale; the largest group studied obtained the highest prices for dairy products and was the most profitable (ibid.). Thus, changes in farmer attitudes towards participation in cooperatives are likely to be an important determinant of their success in

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of Cooperative Development is required to appoint and dismiss key cooperative management positions (ibid.).

[9] Perhaps because of the negative impression farmers have of cooperatives from the politicization of service cooperatives under the Derg, dairy cooperatives are called "milk groups" in Ethiopia.

Ethiopia. As in Kenya, removal of bureaucratic obstacles to cooperative development and availability of credit could help facilitate cooperative development.[10] Availability of crossbred cattle also must be assured. Government provision of information about market opportunities and prices and capacity building in cooperative management could also be very helpful.

Development of other intensive commercial livestock enterprises such as beef fattening and poultry and pork production is constrained mainly by the need for low-cost feed, though religion also plays a strong role with regard to pork consumption. Where domestic feed supplies are limited, avoiding restrictions on imported feed concentrates could help such enterprises to develop. Once demand for such concentrates becomes sufficiently developed, and domestic production of cereals increases sufficiently, local production of feed concentrates may become profitable. Ensuring a policy environment attractive to foreign and domestic investors could be an important element in facilitating such development.

Development of such commercial intensive livestock industries would greatly increase the availability of manure. Given the high cost of transporting manure, the direct impacts on soil fertility would be limited mainly to areas close to the urban markets where these industries develop. However, the increase in supply of such organic material might be used to develop domestic industries supplying more concentrated fertilizer or fuel, which could have a significant impact even in areas further from the urban market.

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[10] For example, government agencies in Ethiopia are reputed to have claimed ownership of dairy processing equipment purchased by groups of producers under dairy development projects (ibid.).

An attractive policy environment could also help facilitate investment in this type of venture.

In more remote areas, focusing on increased fodder production (through increased cereal production, forage crops and/or fodder trees) may be the greatest opportunity in the near term. Given improved fodder production, there will be opportunities to promote increased productivity in small ruminant production, particularly in lower population density settings, together with improved grazing land management. Public measures to control or eliminate animal diseases are justified in remote areas as well as commercial areas for both efficiency reasons (due to the public goods nature of the investment) and to address rural poverty and food insecurity.

COMMERCIAL PRODUCTION OF PERISHABLE CASH CROPS

Where there is very good access to markets and irrigation or sufficiently reliable rainfall, intensive commercial production of perishable fruits and vegetables can be very profitable. As with intensified livestock production, the ability to pursue this strategy may depend upon the success of increased productivity of cereal production, though for a slightly different reason. Risk averse farmers with very little land are usually reluctant to gamble on new and highly risky crops, however potentially profitable, unless their food security is assured (von Braun et al. 1991). Such assurance need not depend only on local food production though. For example, small farmers in western Kenya are adopting vegetable crops and importing maize from Uganda. Open trade policies thus can be very helpful in allowing such commercialization to occur. Nonfarm income can also provide sufficient food security to allow commercialization to occur (ibid.). But in cases such as in much of central Ethiopia and parts of Uganda, where a potential comparative

advantage in cereal production exists, realizing that potential can be an important first step towards enabling farmers to diversify into higher value products. Thus the requisites of high-external input intensification of cereals also most likely help to promote intensive production of perishable cash crops in such cases. At the same time, income earned from such cash crop production can help farmers intensify food crop production, by enabling them to purchase more inputs. Thus increased cash crop production and increased food crop production may be mutually reinforcing strategies.

One important constraint may be lack of knowledge about such products, especially their market potential. Technical assistance, emphasizing market opportunities for different crops as well as crop management, can be very important. With fresh horticultural products, local markets can quickly become saturated, causing dramatic price declines.[11] It is critical for farmers to be aware of the potentials and problems of alternative crops, so that they can diversify their production. Information on prices in local markets, announced over radio, could also be helpful.

Such technical assistance need not come only from government extension agents however. In other parts of the world, farmers often obtain advice from other farmers, input suppliers or traders. As the input marketing system develops, local suppliers will become more knowledgeable and able to provide advice to farmers. Providing training to suppliers as well as farmers could help this process. For some things, however, technical assistance probably must be provided (or at least financed) by governments, due to incentives facing private suppliers. For example, integrated pest management and

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[11] On a field trip to a microdam site near Axum in Tigray, farmers recounted how the price of tomatoes fell from 8 Birr/kg to 2.50 Birr/kg and the price for peppers fell from 6 Birr/kg to 3 Birr/kg after the previous harvest.

organic farming methods may not be adequately promoted (relative to their potential benefit) by private input suppliers, since these methods may reduce their sales of agrochemicals. Training is also needed on proper use and disposal of pesticides, which are likely to be much more widely used where horticultural development is occurring. Taxes on pesticides, so that their private cost reflects their social cost accounting for negative externalities, would help to promote safer and more efficient use of pesticides, while generating revenue for governments.

Another important role for the state in promoting horticultural crop development is to open up international trade in seeds. The role for research on new varieties may be more limited than for cereals or other major crops, due to the wide variety and relatively small amounts produced of any particular horticultural crop.

Where irrigation is used in production of cash crops, conflicts may arise over access to water and management of irrigation systems. Well functioning institutions are needed to allocate use rights and enforce responsibilities. As with institutions to manage grazing lands (discussed above), such effective institutions may not arise spontaneously, but may be catalyzed by appropriate interventions by external agents (Baland and Platteau 1996). On the other hand, external intervention may undermine the effectiveness of local management and increase the potential for conflict (ibid.). Thus a careful approach to promoting development of such institutions is warranted, taking full account of local conditions and concerns before investing in irrigation schemes or identifying the strategy to address issues of rights and responsibilities. For example, one microdam was recently completed by SAERT in Tigray, even though the former users of land flooded by the new reservoir have not yet been allocated any land in the command area. Such a

situation could cause serious difficulties to the households who have lost land and lead to conflicts that undermine confidence in the overall effort, which otherwise appears to be achieving impressive results. In other cases in Tigray, local community councils have been very involved in such decisions from the outset, and land in the command area has been allocated to all affected households; resulting in broad support for the effort.

Available input supply and credit to finance input purchases are of course important for producers of horticultural crops, as they are for high input production of cereals. Given the high expected returns to such inputs, linking future credit to repayment of past loans can provide a strong incentive to repay. However, since such crops are highly risky (particularly price risk), lenders may be reluctant to lend as much as farmers desire where collateral is limited, as in Ethiopia where land cannot be mortgaged. Where land can be mortgaged, farmers may be reluctant to borrow due to the risk involved, even if the expected profits are high. Alternative institutional arrangements, such as sharecropping and contract farming, can be used as a means of reducing risks and obtaining access to short term capital.

Tenure insecurity, restrictions on leasing, and land fragmentation may limit commercialization of perishable cash crops for the same reasons cited earlier in discussing factors affecting investments in land improvement. These factors are particularly important with respect to planting fruit trees, which of course require long-term tenure security, and protection against theft or being cut for fuelwood. Where such security is lacking, investments in fruit trees are likely to be limited to plots near the homestead.

Where there is potential for developing processing and/or export, the availability of cold storage, processing and transport facilities may be critical constraints. The availability of electricity is one factor that may constrain the development of such facilities. Where electricity is not available, storage facilities and processors may use diesel generators, although the costs may be high, especially where fuel taxes are high. Commercial credit or equity capital also will be needed. Provision of infrastructure and lines of credit for such purposes and maintaining a policy environment that facilitates private investment are thus likely to be very important to achieve this potential. Development of processing can also promote contract farming or cooperatives, since processors will seek to assure themselves a reliable supply.

There is good potential for sustainable land management where horticultural production is occurring, but there are also risks. Such high-value, labor-intensive production may reduce pressure on land by providing farmers' sufficient income on a smaller area of land. It can contribute to agro-biodiversity and help to reduce pest problems if used in rotations with primary staple crops (Pingali and Rosegrant 1995). Horticultural production can encourage investment in soil conservation by increasing returns to such investments. For example, Tiffen et al. (1994) found a strong association between adoption of horticultural crops and construction of bench terraces in the Machakos district of Kenya. The cash income generated by horticultural production also provides incentive and ability to purchase fertilizers, which may restore soil fertility. This effect is not assured, however, since multiple cropping of horticultural crops can rapidly deplete soil nutrients even when increased fertilizers are applied. Education and extension efforts can help to address such problems, though farmers may simply find it

too risky or costly to apply sufficient amounts of fertilizer to avoid this problem. Other potential problems include contamination of soil and water and human health risks caused by agrochemicals, and increased conflicts over water. Applied research and extension related to integrated pest management, integrated nutrient management, and water management are critical to minimize such risks and attain the greatest possible benefits from this development strategy.

HIGH-VALUE NON-PERISHABLE PERENNIAL CROPS

Given the time lags required to receive the benefits of investment, expansion of production of high-value perennial crops such as coffee and tea where land is scarce depends upon first assuring food security. Since areas with a comparative advantage in such non-perishable crops will tend to be further from markets than dairy or horticultural areas, relying on imported food is likely to be more costly than local production. Increased food production therefore must be high priority for such areas, with the goal being elimination of local food deficits and freeing up of scarce land for the production of higher value crops. The policy and institutional requisites thus include those discussed earlier to achieve high input intensification of cereal production, including consideration of subsidies on the transport cost of fertilizer in the near term until food deficits are eliminated and income from perennial crop production is growing.

Many of the requirements for other commercial strategies mentioned earlier are also important for high-value perennials. Investment in roads, land tenure security, and land transactions (to reduce fragmentation) are critical. Research and extension to promote use of improved varieties and improved management is needed. Some of this can be (and is) financed by fees on commercial producers; however, there may still be a

need for public sector research and extension to reach small producers using low technology methods, such as producers of forest coffee in Ethiopia. Promotion of private nurseries (for example, through availability of credit) can be helpful. Credit to finance inputs and purchase of tree seedlings can also be helpful. Development of processing facilities and assuring adequate capacity utilization of such facilities is important, especially for tea (von Braun et al. 1991). The need to assure a sufficient quantity and reliability of supply to make such facilities profitable contributed to the attractiveness of large plantations established by colonial settlers in Kenya. Development of alternative institutional arrangements more appropriate to smallholder production, such as cooperatives or contract farming, can help to achieve the same goals. Large processing facilities are less necessary for coffee than tea if coffee is sold in unwashed form, but the value-added in the local economy is reduced. To be able to tap this potential, substantial investments in coffee washing facilities are now occurring in coffee producing areas of Ethiopia (Ethiopian Herald, May 7, 1998). Maintaining a policy environment conducive to development of cooperatives and such investments in processing are key to attaining the potential of this strategy.

The benefits of development of high-value perennial crops for the sustainability of land use can be substantial. As with annual horticultural crops, the income generated can help reduce pressure to continue producing or expanding onto marginal lands and allow greater use of inorganic fertilizers, while the increase in land values encourages investments in land improvements.[12] In contrast to annual cash crops, high-value

[12] For example, coffee has played a key role along with horticultural crops in promoting more profitable and sustainable land use in the Machakos district of Kenya (Tiffen et al. 1994).

perennials are a less erosive land use. Where coffee is grown in shaded conditions, there is good potential to plant other kinds of trees for soil fertility management, fodder and/or fruit production, increasing the benefits for land management and farm incomes. There is evidence from western Kenya that soil fertility depletion is lower where perennial cash crops such as coffee and tea are grown than where annual food crops are grown for commercial purposes (De Jager et al. 1998). As with horticultural crops, however, there are risks posed by increased use of agrochemicals in the production of such crops. Thus, extension and training will play an important role in promoting appropriate practices of integrated soil nutrient management and integrated pest management.

RURAL NONFARM DEVELOPMENT

In areas close to roads and markets, rural nonfarm activities are usually an important source of employment and income (Delgado et al. 1994; von Braun et al. 1991). Where commercial agricultural production is expanding, as in central and parts of western Kenya, linkages to agricultural input supply, processing, and trading are particularly important. For example, off-farm income exceeds half of total income for farmers in western Kenya (the proportion is higher for lower income farmers), and much of this comes from small enterprises engaged in such agriculturally related activities (Crowley et al. 1996). Thus many of the requisites for this strategy are the same as those discussed above for the commercial agricultural development strategies.[13]

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[13] Other kinds of rural nonfarm development may be related to development in mining, manufacturing (e.g., textiles and leather goods), and construction (related to development in other sectors). These types of development have some of their own requirements, which will not be discussed in detail here.

Beyond development of commercial agriculture, the key requirements for this strategy include development of infrastructure (especially roads and electricity) and transportation facilities, education and vocational training, availability of credit and savings to help finance small startup enterprises and equity capital for medium and larger enterprises (access to credit usually not a problem for larger enterprises). It is important to maintain an environment conducive to investment; for example, by reducing delays in licensing procedures, facilitating purchase or long-term leasing of land and buildings by enterprises in urban and peri-urban areas, reducing taxes and broadening the tax base. Restrictions on labor mobility caused by restrictions on land sales or leasing in rural areas (as in Ethiopia) can also be an important constraint inhibiting migration of workers to areas where employment demand is high. However, shortages of skilled workers resulting from low education and inadequate training facilities is probably a more critical constraint. High priority should be given to improved education in all areas, and to establishing training facilities where potential for nonfarm development exists.

The impacts of nonfarm development for sustainable land management are less direct than the effects of the agricultural development strategies, but may be larger and more profound in the long run. Nonfarm income enables households to save and to overcome capital market imperfections that may cause households to discount the future heavily and limit their ability to invest in commercial crop production, inputs or land improvements (Crowley et al. 1996; Reardon et al. 1996; Pender and Kerr 1998; Clay et al. 1995). Such development can provide farmers an alternative to continuing depletion of soil, forests and other resources (Pinstrup-Andersen and Pandya Lorch 1995). On the other hand, nonfarm development may reduce farmers' incentive to invest in land

improvement, by increasing the opportunity cost of their time (Pender and Kerr 1998; Clay et al. 1995). It is thus important to promote less labor intensive strategies of land management—such as planting trees rather than annual crops—in areas where nonfarm employment opportunities are increasing the value of labor. Land policies that limit farmers' ability to plant trees—such as the periodic land redistributions, restrictions on land sales and leasing (limiting ability to reduce fragmentation) and the ban on planting eucalyptus trees in farmland that exist in parts of Ethiopia—may thus have a particularly onerous impact where rapid nonfarm development is occurring.

EMIGRATION

Related to nonfarm development is the strategy of emigration, both seasonal and permanent. Areas with low agricultural potential and low market access are likely to be particularly large sources of outmigration, though emigration from all areas of the rural highlands is likely given the high population density and small farm sizes. The feasibility of this strategy depends largely upon nonfarm development; thus the requisites of the strategy include the requisites of nonfarm development. There is also potential for seasonal rural-rural migration within the highlands from low-potential areas to higher potential or irrigated areas during the dry season, and in some cases there may be potential for permanent rural-rural migration to reduce disparities in across locations (though generally high population density throughout the highlands makes this difficult).

The need for education and training for people in areas of outmigration should be emphasized. Land tenure is also a key issue affecting migration. People without secure tenure are unlikely to risk losing their land by taking jobs in the city. The scope for permanent rural-rural migration is also affected by host area tenure policies affecting

opportunities for land purchasing or leasing. This will be less important with regard to seasonal migration, although availability of land to establish housing for seasonal immigrants is important. Education policies also can affect possibilities for inter-regional migration: for example, different languages are now being taught in different regions of Ethiopia, which will likely increase barriers to inter-regional migration.

6. CONCLUSIONS AND HYPOTHESES

In this paper we have argued that the policy and institutional requirements for sustainable development depend upon the pathway of development that is pursued, and that the appropriate development pathways depend upon the factors determining potential comparative advantage—especially agricultural potential, access to markets and population pressure. Several generic development pathways have been identified, including high external input intensification of food production, low external input intensification of food production, livestock intensification, commercial production of perishable (mainly horticultural) crops, commercial production of high-value non-perishable (mainly perennial) crops, rural nonfarm development, and emigration. We have argued that success of the commercial agricultural development pathways is largely conditional upon increased food crop production, particularly in areas with poor market access with potential for high-value perennial crop production. Opportunities for intensified commercial production of crop and livestock products are very good in much of the highlands, where agricultural potential is high. The opportunities for agricultural development in low-potential areas are more limited, although there appears to be good potential to increase the overall productivity of land use through better management of

grazing lands and wastelands, particularly in lower population density areas where substantial areas of such lands are still present. In higher population density, low-potential areas with good market access, there may be good potential for investments in irrigation or rural nonfarm development (though rural nonfarm development may need to depend upon linkages to sectors such as manufacturing or mining where agricultural potential is low). In high population density, low-potential areas with poor market access, emigration is bound to be a major element of people's livelihood strategies.

Although many policy prescriptions are valid in general, consideration of the key constraints likely to be binding in the different situations discussed suggests a number of hypotheses about where public policy and investment priorities should be placed:

1. The highest priority for road development should be areas relatively close to urban markets where there is high agricultural potential or high irrigation potential. The highest priority for irrigation development is also in these areas; particularly dryer areas, although supplemental irrigation in higher rainfall areas can also be very valuable. Such development could enable intensive production of food crops, high-value perishable cash crops, and dairy products. Where irrigation investment is occurring, adequate attention must be given to institutional issues, such as how water will be allocated and how losers will be compensated, prior to physical construction.
2. Where such commercial potential exists, food security is a key to allowing farmers to exploit the opportunities available. Where farmers have substantial off-farm income, they may be willing and able to specialize in

cash crop production. However, where such opportunities are more limited (or more limited for income farmers), the risks associated with cash crop production may require increases in food productivity to enable greater cash crop production. Increased cash crop production may also help promote increased food crop production (by enabling purchase of inputs), so that both food and cash crop production may increase for some time before greater specialization occurs. Similar complementary growth of food crop and dairy production may occur in the early phases of development. Research and extension programs should recognize and exploit such complementarities.

3. Assuring adequate provision of inputs and credit, and development of the marketing system are critical to all commercial strategies. Development of processing facilities and marketing institutions (such as cooperatives and contract farming), facilitated by a supportive policy environment, are needed. Research and extension programs will need to take a broader focus, emphasizing market opportunities for new commodities, management of animal health, integrated pest management, and integrated soil nutrient management.

4. Second priority for road development should be high-potential areas further from markets, especially where population density is high. There is good potential for intensified production of high-value perennial crops in these areas if roads are adequate. However, achieving this potential first requires assuring food security, which is likely to be most economical

by increasing productivity in food crop production. For the near term, subsidies on the cost of transporting fertilizer and other inputs to such areas (if they are food deficit areas) should be considered as a lower cost alternative to food aid. As food deficits are eliminated and increased income from perennial crops generated, such subsidies should be eliminated. More generally, there is a need to increase the availability and ensure competitive prices of agricultural inputs. A high priority for such areas is also elimination of land redistributions and avoidance of restrictions on land sales or long term leasing, so that the problems of land tenure insecurity and land fragmentation can be reduced.

5. For low-potential areas without good potential for irrigation (especially with lower population density), priority should be placed on promoting increased productivity of all land, including grazing lands and wastelands. Cautious efforts are needed by governments and NGOs to catalyze development of local institutions in order to intensify management of grazing lands. Contingent upon intensified grazing land management, some intensification of livestock production is possible. Increased production of small ruminants may be a particularly profitable strategy. Allocation of wastelands and sloping lands for private tree planting has potential to substantially reduce the biomass shortage in some areas, as well as increasing household wealth and incomes, though the potential for income generation is greater closer to markets. In the near term, food aid may be needed in such areas, though priority should be given to

developing alternative sources of income as well as increasing land productivity.

6. For low-potential areas with good market access, good opportunities for rural nonfarm development may exist, though these may depend upon non-agricultural activities, such as manufacturing and mining, given low agricultural potential. Priority should be on investment in infrastructure (especially electricity), availability of credit to finance startup enterprises, and education and training of the labor force.

7. For low-potential areas with poor market access (especially with high population density), emigration should be facilitated. High priority should be placed on education and training. Allowing land sales or long-term leases could also help to facilitate emigration and less intensive use of the land.

It is important to emphasize that these are only hypotheses, based upon theoretical considerations and a very limited amount of empirical evidence. Furthermore, there is certainly substantial variation within the broad types of situations discussed, and across households having access to different resource endowments. Addressing problems of poverty, low agricultural productivity and resource degradation will therefore require strategies that address the needs of the poor as well as the more well-endowed. Nevertheless, identifying the broad strategies of development that are feasible can help to identify and recommend targeted strategies for specific situations. Making recommendations about specific strategies will require more detailed information about the costs and benefits of alternative strategies in different situations, the priorities and

concerns of key stakeholders, and other factors that will determine the likely success or failure of such recommendations. Policy research is needed to address these issues. We hope that this paper will help to provide impetus and guidance to such research.

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