



# Livelihoods, Forests, and Conservation in Developing Countries: An Overview

WILLIAM D. SUNDERLIN

*Center for International Forestry Research (CIFOR), Bogor, Indonesia*

ARILD ANGELSEN

*Agricultural University of Norway, Ås, Norway*

BRIAN BELCHER

*Center for International Forestry Research (CIFOR), Bogor, Indonesia*

PAUL BURGERS

*University of Utrecht, Netherlands*

ROBERT NASI

*Center for International Forestry Research (CIFOR), Montpellier, France*

LEVANIA SANTOSO

*Center for International Forestry Research (CIFOR), Bogor, Indonesia*

and

SVEN WUNDER \*

*Center for International Forestry Research (CIFOR), Belem, Brazil*

**Summary.** — In the growing literature at the interface of rural livelihood improvement and conservation of natural forests, two overarching issues stand out: (1) How and to what extent use of forest resources do and can contribute to poverty alleviation and (2) How and to what extent poverty alleviation and forest conservation are and can be made convergent rather than divergent goals. This article summarizes and evaluates the state-of-the-art knowledge in these domains of thought and identifies priorities for future research.

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## 1. INTRODUCTION

This article concerns itself with two problems in developing countries: poverty and the disappearance of forests. Poverty is a colossal challenge with 2.8 billion of the world's 6 billion people living on less than \$2 a day (World Bank, 2001, p. vi); there is a large and widening inequality among countries with an average

income in the 20 richest countries 37 times higher than that in the 20 poorest countries

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(World Bank, 2003, p. 2); and, in spite of recent progress in reducing income poverty, there is a weak record in meeting Millennium Development Goals in the areas of primary education, gender equality, and child mortality (World Bank, 2004, p. 2). Forests have been vanishing. In the course of the last 8,000 years, the earth's forest cover has been reduced by almost half from 62 million km<sup>2</sup> to 33 million km<sup>2</sup>, and much of this loss has occurred in the last three decades (Bryant, Nielsen, & Tanglely, 1997, pp. 1 & 9). During 1990–97,  $5.8 \pm 1.4$  million ha of humid tropical forests were lost each year, and  $2.3 \pm 0.7$  million ha of forests degraded (Achard *et al.*, 2002, p. 999).

That poverty should be considered a grave problem requires little justification. However, it is necessary to explain why deforestation and forest degradation are a problem because these phenomena have been part and parcel of a process of agricultural expansion and economic growth which, arguably, has benefited billions of people. The disappearance of natural forests in developing countries is a problem, among other reasons, because it negatively affects the livelihoods of people dependent on forest products and services (e.g., Brosius, 1997; Maruyama & Morioka, 1998; Poore, 1986); forests play a key role in the world carbon cycle (WRI, 2000, p. 99); forests have the highest species diversity and endemism of any terrestrial ecosystem in the world (WCMC, 2000, pp. 108 & 197; WRI, 2000, p. 99); many aspects of the stability, functioning, and sustainability of global ecosystems depend on the diversity of plant and animal species (Tillman, 1997, p. 109) and the world's biodiversity functions as a "genetic library" that supports important human welfare functions such as the improvement of existing crops, introduction of new crops, and the creation of medicines and pharmaceuticals (Myers, 1997, p. 271).

These two problems are related and should be examined jointly to attain better solutions. Although research over the past decade has de-emphasized and questioned simplistic links being made from poverty to forest degradation, poverty remains part of the mix of acknowledged causal factors. Still, one should keep in mind that the converse of poverty—a high standard of living—can also be a cause of forest destruction. The opposite link, that the disappearance of forests can have adverse livelihood effects both directly (Brosius, 1997; Maruyama & Morioka, 1998; Poore, 1986) and indirectly, is now increasingly appreciated.

Among the indirect effects, land use change (mostly deforestation) accounts for 20% of annual carbon releases to the atmosphere (Houghton, 1997, p. 178; IPCC, 2000, p. 5, as seen in WRI, 2000, p. 101) and the effects of added carbon release, build-up of greenhouse gases, and climate change are expected to fall most heavily on developing countries and on the poor in those countries (AfDB *et al.*, 2003, p. x).

One aspect of the relationship between these two problems tends to go unnoticed, and yet it is fundamental to conceptualizing solutions. Severe rural poverty and remaining natural forests in developing countries tend to share overlapping space. The scant documentation of this phenomenon can be summarized as follows. The chronic poor will be the majority of those in deep poverty by 2015 (Hulme, 2003, p. 399), and the chronic poor tend to live disproportionately in remote rural areas (Bird & Shepherd, 2003, p. 591; Hulme & Shepherd, 2003, pp. 410–411, 417; McKay & Lawson, 2003, p. 431).<sup>1</sup> The World Bank has observed that a large share of people suffering from extreme poverty live on "fragile" lands, including arid zones, slopes, poor soils, and forest ecosystems (World Bank, 2003, p. xvi). Two hundred and forty million people live in forested areas, constituting 18.5% of the 1.3 billion people living on environmentally fragile lands (World Bank, 2003, p. 60).

About one-half of India's 350 million poor people are concentrated in three states where natural, physical, social, and human capitals are low,<sup>2</sup> and the greatest poverty is experienced among people in forest-based economies; 84% of India's "tribal" ethnic minorities live in forested areas (Mehta & Shah, 2003, pp. 499, 501). In China, there is an overlap between severe poverty counties and counties with abundant forest resources (Zhou & Veeck, 1999, p. 82). In Vietnam, there tends to be a correspondence between the incidence of poverty at the district level and areas of remaining natural forests (Sunderlin & Huynh, 2005).

We believe there is an underlying logic to this converging geography of poverty and natural forests. We see five elements of this logic:

—People and the forests they live in or nearby are in some cases "islands" of comparative stability that are *relatively* untouched by rapidly changing socioeconomic systems. These people and forests tend to be located in remote areas where the reach of the market economy and tech-

nological progress are inhibited or slowed; away from urban areas, seaports, large roads, and other infrastructural projects;<sup>3</sup> and often in relatively inaccessible upland and hilly areas. People in these areas have low levels of “rent” resulting from ecological conditions and/or limited market access and services.

—Some forest dwellers are traditional/indigenous peoples whose dependence on forests is deeply rooted in history and long predates modern social change. Their poverty is often primordial and therefore not necessarily an outcome of contact with modern economies, as may be the case for other forest dwellers.

—Others are rural in-migrants who colonize the “forest frontier” as a source of new agricultural lands and other economic opportunities, though often they are not the poorest of the poor.

—Forests have long been a refuge for relatively powerless and poor rural people fleeing war and conflict.

—The open-access/low barriers to entry character of many forests is a “pro-poor” characteristic that make them a means of survival and a magnet of economic opportunity for people with limited options.

We recognize that there are many areas of chronic poverty without forests, and some forests without chronic poverty in developing countries. The important point is that there are a large number of poor people living in forested areas, and there is a correlation between chronic poverty and remaining areas of natural forest.

In connection with this partial spatial convergence of the rural poor and remaining natural forests, there tends to be a reciprocal relationship between the rapid transformation of rural livelihoods and the character (quantity and quality) of forested landscapes. This link suggests that we must take forests into account in improving the livelihoods of people who either choose to live in forested areas, or have no option but to continue doing so. We recognize that for some people living in forests, the key to livelihood improvement is to leave the forest environment (e.g., *Levang, Dounias, & Sitorus, 2003*). This reciprocal link also implies that improved forest management requires attention to the livelihoods of people living in forests.

On the basis of these linkages and empirical data on the dependence of the poor on forest resources, one would suppose that attention to forest resources would figure prominently in general poverty alleviation strategies such

as Poverty Reduction Strategy Papers (PRSPs). Yet by and large, they do not. In many PRSPs, forests and forestry are totally absent (*Oksanen & Mersmann, 2002*). Is this low profile of forests in poverty alleviation planning justified? This article is aimed partly at answering this question.

This article aims to synthesize key knowledge with regard to two questions: (1) “To what extent can forests be relied on to support poverty alleviation in developing countries?” and (2) “Can the use of forests for poverty alleviation be compatible with efforts to conserve what remains of developing country natural forests?” To answer these questions, we draw on some of the key secondary literature and also on our experiences and reflections as researchers addressing these issues.

The article will be structured as follows. In Section 2, we summarize key terms and concepts and in Section 3, the theories relevant to answering these two questions. Section 4 looks at the potential for poverty alleviation through use of forest resources. Section 5 analyzes the compatibility of forest-based poverty alleviation and forest conservation. Section 6 identifies key unresolved issues requiring further research, and Section 7 summarizes and concludes the article.

## 2. KEY TERMS AND CONCEPTS

The first step for examining livelihood improvement through forest use and protection is to define what we mean by “livelihood,” “poverty,” “poverty alleviation,” “forest,” “forest-based poverty alleviation,” and “conservation.”

In keeping with recent trends, we agree that to understand the multidimensionality of rural livelihoods and poverty, one needs to go beyond quantitative measures of cash income. In this respect, it is important to recognize the inherent tensions between the conceptualization of poverty, which tends to require an appreciation of complexity, and the measurement of poverty, which requires simplification to be applicable in a useful way (*Angelsen & Wunder, 2003, pp. 10–11*). The need for adequate measurement is especially important in the context of forests where forms of income generation tend to be highly diverse and where much takes place outside the cash economy.

Following *Ellis (2000, p. 10)*, we define *livelihood* as that which comprises: “... the assets (natural, physical, human, financial, and social

capital), the activities, and the access to these (mediated by institutional and social relations) that together determine the living gained by the individual or household." This definition stresses the means rather than the outcomes. Poverty is a typical outcome-based measure of livelihood performance.

*Poverty* can be defined as a pronounced deprivation of well-being related to lack of material income or consumption, low levels of education and health, vulnerability and exposure to risk, lack of opportunity to be heard, and powerlessness (World Bank, 2001, p. 15). Following this definition, *poverty alleviation* can be defined as a successful lessening of deprivation of well-being (FAO, 2003, p. 61), or successful prevention of increase in deprivation.

In this article, the term "forest" refers broadly to all kinds of forests, ranging from relatively untouched "natural" ones to those with high levels of intervention and management. "Natural" forests are the focus of most conservation concern, though highly managed forests can also be an important source of biodiversity. This article gives little attention to trees on farms, while recognizing that such production systems are important for livelihoods.

We define *forest-based poverty alleviation* (FBPA) as use of forest resources for the purpose of lessening deprivation of well-being on either a temporary or lasting basis. FBPA is almost never a stand-alone process. Poverty alleviation broadly speaking tends to be based on a wide variety of economic activities including agriculture, pastoralism, and nonfarm employment, among others.

Modifying the terminology used by FAO (2003, p. 61), we specify two types of poverty alleviation, applied at the household level, in association with forest resources.<sup>4</sup> These are —*Poverty mitigation or avoidance*, that is, the use of forest resources to meet household subsistence needs, to fulfill a safety net function in times of emergency, or to serve as a "gap filler" in seasonal periods of low income,<sup>5</sup> in order to lessen the degree of poverty experienced or to avoid falling into poverty; and

—*Poverty elimination*, that is, the use of forest resources to help lift the household out of poverty by functioning as a source of savings, investment, accumulation, asset building, and lasting increases in income and well-being.

We recognize that these subdefinitions of poverty alleviation are abstractions on a continuum

and that, in the "real world," there are complexities not adequately conveyed by these definitions. For example, in the boom and bust cycles sometimes witnessed in forest economies, poverty "elimination" might only be temporary.

In principle, there are four ways in which FBPA can be realized. First, it can be realized by converting forests to nonforest land uses such as permanent agriculture.<sup>6</sup> Second, it can be realized by assuring access to forest resources and achieving this either by protecting the existing benefits that forests provide to rural people, or by redistributing access to, and benefits from, forest resources. Third, it can be realized by making transfer payments to forest dwellers who protect forests' environmental services. Fourth, it can be realized by increasing the value of forest production through technologies that increase physical forest output; higher prices for forest products (including better market access); increased processing and forest-based value-adding activities; and the development of new products.

We define forest *conservation* as the successful protection, improvement or creation of specific forests, and/or specific forest functions and services. Forest conservation can be motivated to protect, improve, or create functions and services that benefit people living in a given forest, or people living far from forests, or it might presuppose the right to survival of threatened life forms and habitats and not presume human benefit at all. In the context of livelihood improvement, forest conservation is conflictual because the interests of forest stakeholders are frequently at cross purposes. Forest dwellers might seek forest conversion to improve their livelihoods, whereas this might conflict with species protection campaigns. Conversely, protection of local forests might be vital to the well-being of forest dwellers, whereas the forest in question might be threatened by nearby construction of a major road through it for the "greater good of society".

### 3. THEORY

Can forests be used to effectively generate income and employment that will make poor people better off? When this happens, is it possible to avoid irreversible depletion of stocks of natural resources, including forests? In this section, we summarize some of the theories that serve as a conceptual foundation for addressing these questions. We examine the role of forests in

socioeconomic development, the social and political characteristics of people living in forested areas, reasons for use of forest resources at the household level, reasons why it is important to situate the use of forests in a “societywide” perspective, and theories on the evolution of forest cover.

(a) *Socioeconomic development, livelihood modes, and forests*

In the course of time, livelihood modes have changed in association with forest use in forested landscapes. In Table 1, we present a basic typology of livelihood and forest change with respect to the transition from hunting and gathering, to swidden cultivation, and sedentary agriculture at the forest frontier.<sup>7</sup> This typology, while subject to many exceptions to the pattern described, and while not capturing all relevant modes of human–forest interaction, nonetheless serves as a useful theoretical backdrop for later discussion.

Table 1 specifies the following with respect to forests: type of livelihood, characteristic main type of forest use, forest density, mode of use of forest resources (use value versus exchange value), and the extent of household dependence on forest resources. In hunting and gathering populations, the characteristic main type of forest use is as a source of food (capture and collection of forest fauna and flora). With the turn to swidden cultivation, forest lands serve as a source of agricultural lands whose fertility is maintained and restored by forest ecosystems in a system of rotational fallow. With the turn

to permanent agriculture at the forest frontier, forest lands tend to serve as a source of new agricultural lands that are not part of forest fallow systems. Certain forest uses are common to the three stages—for example, forest-based environmental services such as water provision and maintenance of genetic resources, timber for construction of shelter, firewood, and the use of medicinal plants. Especially in the latter two stages, forests are also typically relied on as a source of products (timber and NTFPs) that are sold for cash income.

While the three stages tend to be loosely sequential in the historical sense, the boundaries between them are often indistinct. For example, many rural households tend to combine swidden and sedentary cultivation, and hunting and gathering remains important for many farmers engaged in swidden and sedentary cultivation. The great majority of the world’s forest-based populations are concentrated in categories B and C.

As we pass through the transition from hunting and gathering to sedentary agriculture, forests tend to become less dense and forest cover decreases not only in association with growing population densities and higher market demands, but also in association with changing types of forest use by local populations. There are, however, significant exceptions where forest cover and density increase. This is driven by a wide variety of factors including local population decline, out-migration, and adoption of agroforestry systems that include trees that have regenerated naturally (e.g., cocoa, shaded extensive coffee systems, and jungle rubber).

Table 1. *Types of forest-based livelihood modes and associated attributes of forest use*

| Type of livelihood                          | Associated attributes of forest use  |                    |   |  |
|---|--|--------------------|---|--|
|   | Main type of forest use  | Density of forests | Mode of forest use                          | Forest product income as share of total income |
| A. Hunting and gathering                    | Food: capture and collection of forest fauna and flora   | High               | Use value: high<br>Exchange value: low      | High   |
| B. Swidden cultivation                      | Source of agricultural land restored by forest fallows<br>Use and marketing of forest products | Medium             | Use value: medium<br>Exchange value: medium | Medium   |
| C. Sedentary agriculture at forest frontier | Source of new agricultural land<br>Marketing of forest products                                | Low                | Use value: low<br>Exchange value: high      | Low  |

In the course of this transition, populations in forested landscapes typically become more integrated with the market economy as the reach of capitalist development is extended. In association with this, forest resources tend to have a high use value (direct use in the household) and low exchange value (income through sale) in the earlier stage, and conversely, low use value and high exchange value in the later stage. But there are important exceptions to this overall pattern. Some hunters and gatherers have gotten substantial cash incomes from forest products dating back to centuries. And conversely, in recent times, there are remote locations where use values predominate.

The proportion of overall household income (whether through use or exchange) from forest resources tends to decline through these stages. This is a reflection not just of increased income opportunities in agriculture and other domains, but also of decreased availability of types of forest resources that might have been abundant in the past.

For many people, the transition described here ends in disappearance of forest resources in the household income portfolio. And yet for many millions of others, dependence on forest resources persists. As population grows and as arable land becomes more scarce, marginal people may choose to move to fragile lands (including forests) and remote locations. Because of the low quality of agricultural soils, forest-based income opportunities may be more attractive. Further, there are attributes of some forest resources that make them attractive to the poor, especially as regards their safety net functions. Finally, there are changing political and economic circumstances that are creating forest-based income opportunities that did not exist before. (This is discussed in greater detail later on.)

(b) *Social and political characteristics of forest-dependent people*

A large portion of the people who are the subject of this overview article (and of the special issue) are swidden cultivators and/or sedentary agriculturalists in forested regions (i.e., in categories B and C in Table 1). But there are other relevant livelihood modes that are not portrayed in this typology. Among them are agriculturalists and pastoralists in open and dry woodlands, smallholders focusing on the cultivation of domesticated forest products (timber, poles, firewood, NTFPs) on woodlots or in agroforestry gardens, and timber com-

pany workers, small-scale loggers, urban fuelwood sellers, and woodcarvers. Some of the latter may be in peri-urban areas, far from the forest frontier, yet to a degree, they are dependent on forest resources.

Forest-dependent people who are poor fall into three broad categories: The first is traditional/indigenous minorities living in their ancestral lands. Examples are the Kayapo in the Brazilian Amazon, pygmies in southeastern Cameroon, or the Punan in Indonesia. The second comprises people who have long lived in a given forest area, but are not considered traditional or indigenous. Examples are some of the Kinh people in Vietnam. The third is people who have been displaced in the course of rapid modern social change and have migrated to forested areas. Examples are *ladino* migrants in many Latin American countries, war refugees in eastern Democratic Republic of Congo, and transmigrants from Java and Bali to the Outer Islands of Indonesia. There is no rigid boundary between the above categories. For example, some traditional forest-based people are forced to relocate. The reasons for the poverty of people in these categories vary greatly. It should not be viewed as contradictory or paradoxical that poverty can be caused not just by isolation from, but also from contact with, the modern world economy. Likewise, some economic benefits result not just from contact with the modern world economy, but also from isolation from it.<sup>8</sup>

Forest-dependent people who live in or near forests tend to be politically weak or powerless. There is a history of competition with more powerful outsiders for access to the forest resources they depend on. The competitors include (1) the national governments seeking to nationalize natural forests, often in contravention of customary or traditional law; (2) forest concessionaires (often with ties to the military or national or local legislators); (3) agroindustrialists or other commercial farmers seeking land for expansion; (4) entrepreneurs seeking to appropriate high-value NTFPs; and (5) operators of mining concessions. In addition, infrastructure projects compete for the land natural forests stand on even if they do not involve direct competition for timber or other forest resources. The political weakness of forest-dependent people is reinforced by their geographic distance from urban centers where political alliances favoring forest conversion tend to be formed and maintained. We recognize that not all contact with "outsiders" places forest dwellers at a disadvantage. Some

forest dwellers collaborate with larger actors, forming alliances to jointly open up the frontier and exploit forest resources (Rudel, 1993). We also recognize that some of the most destructive competition for local resources is not limited to incursions by outsiders, but is internal to the community.

(c) *Some aspects of forest resource use at the household level*

Most rural poor people maintain diversified livelihood strategies both because they cannot obtain sufficient income from any single strategy to survive and to reduce risks. This is why most small farmers are not actually solely small agriculturalists, and many include forest products in their livelihood systems.

Household surveys and case study research demonstrate that the rural poor tend to be disproportionately dependent on forest resources in the sense that a higher proportion of their total income comes from forest resources (Vedeld, Angelsen, Sjaastad, & Berg, 2004, p. 37). This stands to the reason given: the spatial convergence of low-income populations and remaining natural forests; the historical trajectory described in Table 1; the greater access to nonforest income opportunities by those who are more powerful and resourceful; and the fact that low return forest activities serve as an employment of last resort.

(d) *The importance of a societywide view*

In order to adequately conceptualize the links between livelihoods and forests, it is important to have a societywide perspective. By this we mean that macroeconomic, macropolitical, technological, or demographic trends and other events outside the forest sector (sometimes called "extra-sectoral" factors) often have a determining influence on changes in modes of living and forest landscapes at the local level (e.g., Ndoye & Kaimowitz, 2000; Wunder, 2003a). It is important to underscore this point because it is striking how many analyses at the interface of livelihoods and forests give little or no attention to extra-sectoral factors.

Following the same logic, it is important for analyses of livelihoods and forests not to be limited to the site. Precisely because there is a geographical nexus between rural poverty and forests (see Section 1), it is important to overcome the temptation to focus on the site as the *only* relevant frame of reference.

(e) *Environmental Kuznets curve and forest transitions theories*

There is an emerging body of theory that claims economic development and conservation of forest cover are ultimately compatible goals. The environmental Kuznets curve (EKC) literature, which tends to rely on econometric analysis, says that environmental degradation displays an inverted-U shaped pattern over time (e.g., Grossman & Krueger, 1995; Shafik & Bandyopadhyay, 1992). It is low prior to economic development, increases in the course of economic development, and then decreases when income (GDP) reaches a certain level. Some writings analyze EKCs with regard to forests (e.g., Culas & Dutta, 2002; Madhusudan, Hammig, & Bhattarai, 2001; Patel, Pinckney, & Jaeger, 1995). Forest transitions (FT) theory, which relies on historical case studies, observes that forest resources tend to be abundant and healthy prior to economic development, then diminish and degrade as development proceeds, and then re-emerge in high-income countries (e.g., Mather & Fairbairn, 2000; Rudel, 1998). We will evaluate the merits of this theory later on.

There are various factors that can lead to higher incomes generating less pressure on forests. These include (1) increased agricultural productivity reduces agricultural prices and hence the profitability of production in marginal areas; (2) off-farm employment opportunities increase the opportunity cost of labor that might otherwise clear forests; (3) fossil fuels substitute for fuelwood, nonwood construction materials substitute for wood, and farm livestock substitutes for bush meat; (4) as incomes rise, so does the willingness to pay for recreation and other environmental services of forests; (5) higher per capita incomes are associated with more effective public regulatory systems; and (6) once the high value logs have been removed from an area, commercial loggers lose interest and forests can regenerate.

#### 4. THE POTENTIAL ROLE OF FORESTS IN POVERTY ALLEVIATION

In this section, we summarize information about the future potential for FBPA considering the opportunities and obstacles in different kinds of forest use, and the enabling conditions that may increase possibilities for pro-poor outcomes. This section condenses and modifies

information published elsewhere (Angelsen & Wunder, 2003; FAO, 2003). We emphasize that the list of principal forest uses given below is descriptive and not prescriptive.<sup>9</sup> It summarizes the past and present trends, examines some possible future uses, and is not meant to serve as a program for FBPA.

(a) *Principal forest uses*

(i) *Conversion of forests to agriculture*

As in past millennia, natural forests will continue to be converted to agriculture in developing countries to enable livelihood support. Forests have (indirectly) had an important role in increased levels of consumption over time. In energetic terms, the transition from hunting and gathering to agriculture represents a change from per capita appropriation of energy from 5,000 to 26,000 kcal per day (Bennett, 1976, p. 42). Forests and other forms of vegetative matter, through photosynthesis and their role in soil formation and restoration, have been one important foundation for the establishment and maintenance of agriculture. Worldwide, incomes have increased dramatically in part because forest cover removal, on either a temporary (swidden cultivation) or permanent (sedentary agriculture) basis, has allowed access to fertile soils.

In most developing countries, forests continue to be used for swidden cultivation, and forests continue to be converted to permanent agriculture. But natural forests will probably not continue to serve as an important driving force for improved average income worldwide in the way they have historically, for the following reasons. Although much land remains and much of it underlies forests, a lot of it cannot be converted to agriculture. This is because of its inaccessibility, relatively low quality, and vulnerability to erosion, among other reasons (Evans, 1998, pp. 2 & 200). Deforestation and "soil mining" will continue in areas that one might deem not rationally appropriate for agriculture. Technological change will alter the panorama of possibilities for productive agriculture, but diminishing returns on the availability of agricultural lands are evident worldwide. Most future gains in agricultural productivity will have to come from improved efficiency on existing agricultural lands and not expansion (Dyson, 1996, p. 117). Nevertheless, in many areas, there will be a continuation of the historical role of forests in wealth creation through predatory forest-product harvest-

ing and forest conversion, even if at a reduced scale compared to the past.

(ii) *Timber*

Historically, timber has served as an important catalyst to various kinds of economic activity. It is not only that timber has been used to build shipping fleets and railroads but also that wealth from massive timber extraction has been used as seed capital to establish economic enterprises and even empires outside the forest sector. For example, in Indonesia, Malaysia, and the Philippines, timber wealth served as a basis for political patronage systems linking heads of state, the military, and the private sector (Ross, 2001, pp. 191–192).

Timber is by far the most valuable commercial commodity in most forests. The value of international forest products exports from developing countries in 1998, excluding NTFPs, was \$10.4 billion (FAO, 2001, pp. 122–135).<sup>10</sup> There are three reasons why very little of this wealth has gone to people living in forested areas.

First, the poor are often statutorily excluded from access to timber wealth because of its high value and because they lack power to compete for access to high value natural resources. Although there have been some positive changes in recent years, forestry laws and regulations in many countries were written to assure privileged access to timber wealth and to prevent counter-appropriation by the poor.

Second, timber extraction and tree growing tend to be capital and skill intensive, and are sometimes aimed at specialized consumer markets. Tree growing for timber requires secure land tenure, which the poor often do not have (if they have access to land). It also represents a long-term, high risk investment whereas low-income people need short-term income and want to avoid risk (Wunder, 2001).

Third, although "trickle-down" effects of the conversion of forest capital have gone largely unmeasured over time, there is reason to believe little of this has reached the poor (see Section (vi) on "indirect benefits").

Two models of timber production can potentially help alleviate poverty, but both have deficiencies. One option is management of natural forests by forest villagers. However, its poverty-alleviation potential is undermined by weak and slow-changing institutions, rent capture by local elites, inconsistent laws and regulations, cumbersome bureaucracy, and lack of

control of downstream activities. The absence of real devolution of decision making and real tenure rights are two reasons why community forestry has, by and large, performed poorly in providing livelihood benefits (Fisher, 2003, p. 18). Another option is tree growing by smallholders, which can produce substantial income. This activity requires land and tenure security, which some smallholders classified as poor do have, but that the poorest of the poor by definition tend not to have.

(iii) *Nontimber forest products (NTFPs)*

There is a wide variety of NTFPs that are used for fuel, food, medicine, forage, fiber that have valuable chemical components or that are used for ritual purposes. The majority of NTFPs are consumed directly by collectors and their families. Some are important mainstays in the household economy. Others are used infrequently, but can be critically important as sources of food when other sources are unavailable. Such emergency foods can make a difference between life and death.

Many NTFPs are also produced for sale or barter. The extension of the market system to more remote areas has increased both the demand and the opportunity for increased cash incomes, and there is a growing international interest in various kinds of natural products, from herbal medicines to hand-crafted utensils and decorative items. Still, the majority of these products is sold in relatively small quantities (per producer, collective quantities can be very large), and for relatively low prices.

They are important for helping households meet current consumption needs, and are often relied on as the main or only source of cash income in a household to pay school fees, to purchase agricultural inputs, or to pay emergency medical costs, for example. Some NTFPs have large and reliable markets that are supplied by specialized producers (Belcher *et al.*, in this volume).

Discussions about NTFPs have been hampered by ambiguous and inconsistent definitions of the term, with debate about what kinds of products and what kinds of production environments to include (Belcher, 2003). But, no matter whether a narrow or wide definition is used,<sup>11</sup> there is strong evidence that the poorest of the poor around the world are those that use NTFPs the most (Neumann & Hirsch, 2000), that the poor frequently use NTFPs as an “employment of last resort” (Angelsen & Wunder, 2003), and that they serve an important

safety net function (e.g., McSweeney, 2004; Pandit & Thapa, 2004). This is because many wild NTFPs are available as common-property resources in traditional systems or as *de facto* open-access resources, in state forest lands for example. Many NTFPs are used with little processing, using low-cost (often traditional) technologies. As discussed earlier, areas of poverty and forest cover overlap, and so in certain places need and opportunity combine. Using the two-stage definition of “poverty alleviation,” most of this kind of use would be classified as poverty mitigation or poverty avoidance.

The same factors that tend to make NTFPs important in the livelihoods of the poor also limit the scope for NTFPs to lift people out of poverty. Markets for many of these products are small. Naturally reproducing products tend to be dispersed, with seasonal and annual fluctuations in quantity and quality of production. NTFPs produced in open-access regimes are highly susceptible to overexploitation. Remote settings with poor market access put producers in a weak bargaining position relative to traders who typically provide transport, market connections, and credit to NTFP collectors in classic patron–client relationships.

As Dove (1993) noted, in those cases where NTFPs have a high value, they tend to be appropriated by people with more power, more assets, and better connections—that is, the non-poor. This is especially true when market forces lead to intensified and specialized production. Homma (1992) developed a simple economic model that shows how high demand for NTFPs can over time lead to collapse of the naturally regenerating resource base, production on plantations outside of forests, and increased competition from synthetic substitutes. There is strong supporting evidence for this in empirical studies such as that by Belcher *et al.* (this volume). Intensified management of valuable products can create opportunities to increase earnings. Taking advantage of such opportunities, however, requires market access, secure tenure over the resource base, sufficient labor and capital to invest, the wherewithal to wait for that investment to mature (especially with slow maturing species), and entrepreneurial skills.

(iv) *Environmental services*

The environmental services of forests can benefit the local poor either directly (internalized benefits) or indirectly through transfer payment arrangements (compensation to local people for externalized benefits). Examples of

internalized benefits include safeguarding healthy forest ecosystems for the purpose of protecting the quantity and quality of local dwellers' water supplies (WRI, 2000, p. 101) or for maintaining or enhancing on-farm agricultural production by restoring fertility in agroforestry systems (Sanchez, Buresh, & Leakey, 1997). These direct benefits are mostly linked to the poverty avoidance/mitigation function of forest-resource use.

Until now, four types of direct payments for forest environmental services have been dominant: carbon storage, hydrological protection, biodiversity conservation, and recreational values. To date, they have been implemented on a small scale tropicswide, with most projects concentrated in Latin America. The external forest environmental benefits are being enjoyed by external users, yet usually they have not been paid for. Land-use change increasingly threatens the continuous provision of these benefits, since local land users have no incentive to take them into account. This provides the rationale for the incipient markets for environmental services.

Environmental service payments could become an important vehicle for poverty alleviation only if two conditions are met simultaneously. First, the markets would need to experience a take-off such that a significant number of poor people are made better off. There are factors working against such an expansion, including the fact that it takes time to change service-buyer attitudes and get people to pay for something they used to receive for free. The turnover in these markets is currently too limited to have an effect on poverty at the aggregate scale. Also, forests may not always be the most cost-effective way to provide a certain environmental service. For instance, it may be cheaper to address global warming by reducing emissions in sources outside the forest sector (Smith, Mulongoy, Persson, & Sayer, 2000).

However, ongoing forest degradation and conversion in the tropics will continuously decrease the supply of "free" forest environmental services. On balance, because the "free" services are disappearing, it makes payments for those vanishing services more attractive. We would thus expect the expansion trend to dominate, creating a substantial market expansion over time. However, policies that hinder or over-regulate these markets will risk reducing their potential for poverty alleviation.

The second precondition is that potential service providers who are poor must be well equipped to compete in these expanding mar-

kets. Skeptics have pointed to the high transaction costs of working with many (poor) smallholders, compared to the economies of scale of working with a few large landholders (Bass *et al.*, 2000; Smith *et al.*, 2000). A second main obstacle is that poor people often do not have formal and secure land tenure. This may limit their *de jure* ability to sign service-provision contracts. Moreover, restrictions on actual control over land, that is, the right and ability to exclude external intruders, may also *de facto* limit poor people's prospects to be reliable service providers.

While we expect all these caveats to be valid, some options may exist to reduce transaction costs that impede the poor from participating in payments for environmental services. For instance, recent changes in the Costa Rican environmental service payment schemes introduce bundled "group contracts" on an experimental basis, thus reducing enrolment transaction costs for small producers. It is possible that creative design and experimental applications can produce solutions that reduce obstacles to poor service producers' participation. Finally, one should remember that participation of the poor in environmental service markets that is limited in *relative* market-share terms can still be significant in its *absolute* contribution to income improvements. For instance, while forest-based tourism companies often gain disproportionately from benefit-sharing schemes with local communities, there is evidence that even small cash transfers can significantly raise incomes for local people in marginal areas with few alternative sources of monetary income (Gurung & Coursey, 1994; The Zimbabwe Trust, The Department of National Parks & Wildlife Management, & and The Campfire Association, 1994; Wunder, 2000, 2003b).

#### (v) *Employment*

In the late 1990s, there were 17.4 million employees worldwide in the formal forestry sector and about 47 million altogether, including formal and informal employment (ILO, 2001, p. 39). The scope for poverty alleviation through increase of forest sector employment is unknown.

#### (vi) *Indirect benefits*

We define indirect benefits as those forestry activities that assist poverty alleviation through multiplier and trickle-down effects.

*Local multiplier effects* related to timber concessions include local demand for food, goods, and services created by the presence of a

logging workforce; making of a logging road that opens remote forest dwellers' access to markets and improves possibilities for delivery of health services and education to them; and compensation to the community by the logging company for access to forest resources. But there are also possible associated negative consequences including destruction of natural forests and reduced availability of NTFPs; conflicts with logging companies; rising local prices associated with logging; and difficulties in adjusting to the collapse of the economic boom when the logging is done.

As stated in Section (ii), not much is known about the extent to which forestry contributes to poverty alleviation through *trickle-down effects*. Examples are the extent to which cheaper forest products make consumers better off, or how much the reinvestment of forest-derived economic rents (e.g., from timber) in other sectors benefits the poor. Timber in developing countries (measured in tens of billions of dollars) has clearly had an impact on economic growth, but this does not necessarily translate into a large contribution to poverty alleviation. The timber sector in many developing countries is often described as capital intensive, as having limited forward and backward linkages, as paying few taxes, and as repatriating its profits to other countries—suggesting low delivery of “trickle-down” benefits.

#### (b) *Enabling conditions*

In the recent past, new conditions have emerged that may provide impetus to forest-based poverty alleviation. Here we identify policy-driven, market-driven, and other conditions which—while in some cases two-edged—nonetheless provide some basis for assuming that a larger share of forest benefits may reach forest dwellers in the future.

##### (i) *Policy factors*

Decentralization of authority and resource control, now occurring in many developing countries, increases though by no means guarantees the possibility of greater local access to forest rents. Presumably, in the best of cases, greater local access to forest rents can assist poverty alleviation.

In the most forested developing countries, ownership or control of the forest estate by indigenous and rural communities has doubled in the last 15 years, and its share of the total is now approximately 25%; it will likely double

again in the next 15 years (Scherr, White, & Kaimowitz, 2004, p. 11; White & Martin, 2002, p. 7). As with decentralization, this process does not guarantee poverty alleviation but may improve its chances.

The trend toward democratization in many developing countries potentially increases the bargaining power of rural communities *vis-à-vis* the state and large enterprises. For example, in Indonesia, rural villagers are now freer to stake a claim to forest lands and resources than they were during the 30-year authoritarian Suharto regime. In Brazil, the rubber tappers were persecuted under the military regimes. Now, the Minister of Environment comes from the rubber tappers union.

Corrupt practices in the forest sector tend to work against the interests of the poor (e.g., Hill, 2000). Campaigns against corruption are increasing in developing countries in association with the trend toward democratization. To the extent they are successful, they might boost opportunities for the rural poor to get a larger share of forest wealth.

##### (ii) *Market factors*

Rapidly growing urban markets for forest products in developing countries provide new opportunities for smallholders, especially those who live in peri-urban areas. This is because many forest products are shipped in a quantity that is too large or are too easily perishable to be profitably shipped long distances, and because small farmers own or occupy many peri-urban areas. Increased scarcity of forest products, such as fuelwood, makes it more profitable to grow forest products on-farm.

Market deregulation and liberalization can favor FBPA in two ways: First, it can be a force behind eliminating regulations that have prevented growing trees on farms. Trees on farms have been more controlled than the growing of annual crops. Second, it can lead to reform of forestry marketing regulations that have tended to discriminate against small producers. However, trade liberalization does not always favor the interests of the poor, and government monopolies can easily be replaced by private ones. Thus, there is still a need for government intervention to protect vulnerable people against these negative effects (Mayers & Vermeulen, 2002, p. 4).

##### (iii) *Other factors*

In many tropical countries, after over-harvesting timber, concessionaires have not renewed

their concessions. This presents an opportunity for forest communities to intercede and compete for access rights before the remaining timber stock matures and becomes marketable.

Small portable sawmills with lower capital requirements should favor a more decentralized production system for sawn wood. This should make it easier to involve local entrepreneurs. Technological changes in the plywood industry allow the use of smaller diameter trees and more species. Given that control over less valuable commercial forests has been granted to local communities, at least in the past, this technological change could increase the value of these forests. However, this also risks speeding up deforestation by making new areas and species commercially profitable for logging.

The growing threat of global warming and biodiversity loss increases the likelihood that developed countries will be willing to compensate forest dwellers in developing countries for environmental services through carbon sequestration and conservation concessions.

## 5. POVERTY ALLEVIATION AND FOREST CONSERVATION

The challenge of reconciling livelihood improvement and forest conservation in developing countries is daunting and largely unmet. Some authors have argued that, due to a number of intrinsic characteristics of forests and forestry, the real scope for reconciling the two objectives is inevitably quite limited (Levang *et al.*, 2003; Wunder, 2001). In the course of the last several decades, rural incomes have on average increased in developing countries, yet natural forests have been disappearing at a high rate. The various site-level solutions that have been tried have fallen well short of their goals. While there have been some positive outcomes in community and social forestry (Antinori & Bray, in this issue; Fomete & Vermaat, 2001), there have been many failures (e.g., Malla, 2000; Mekonnen, 2000). As noted above, new creative approaches such as payments for environmental services are in their infancy and largely untested.

### (a) *What is to be done?*

What is to be done? One possible interpretation of the EKC and FT literature<sup>12</sup> is that it might be best to do nothing more than promote economic growth. The logic of such a po-

sition would be that reconciliation of poverty alleviation and forest conservation will take place, as a matter of course, in the process of socioeconomic development, so no forest-specific intervention is necessary or desirable at the level of the site. There are some elements of truth to this argument. A remarkable degree of natural forest restoration has taken place in many rich countries in tandem with increased levels of per capita income. Since 1950, agricultural intensification in Europe and North America has permitted the reconversion of 16 million ha of farmlands to forest, even as the population in those countries has increased by 170 million people (Grübler, 1994, p. 324). Case study research has been conducted on forest cover restoration in Denmark, France, Italy, and Switzerland (Fairbairn & Needle, 1995; Mather & Fairbairn, 2000; Mather, Fairbairn, & Needle, 1999; Mather, Needle, & Coull, 1998).

While recognizing that economic growth can potentially assist in reconciling poverty alleviation and forest protection, we reject this *laissez-faire* position, for several reasons. First, forest cover restoration in rich countries is largely predicated on high per capita consumption of fossil fuels which enables not just agricultural intensification, but also reduces dependence on agriculture, greater reliance on the urban sectors (service, manufacturing, industry), and wood fuel substitution, all of which reduce pressure on domestic forests in net terms. Because of risks posed by global warming, this level of fossil fuel consumption cannot be extended globally and is not tenable in the long term. Second, assumptions that developing countries can or should simply follow in the footsteps of the more "advanced" countries have been flawed in the past. Blind faith in the implications of the forest transition might follow in this naïve tradition. Third, even if forest cover does later increase, it will not be the same forest. A lot of diversity will undoubtedly be lost in the process. Fourth, even if the EKC or FT predictions hold true, the estimated EKC turning points occur at high GDP per capita levels (US\$4,000–6,000) (Wunder, 2003a, p. 377), and therefore, most tropical countries are decades away from their turning points. Much more damage would happen before those turning points are reached.

So what should be done instead? We argue that attempts to reconcile poverty alleviation and forest conservation should be carried out deliberately and systematically both at the level

of the site, with informed attention to endogenous dynamics, and also with due attention to international-, regional-, and national-level exogenous factors.

In giving attention to site-level/endogenous factors, we propose that—in spite of project failures—it is necessary to persevere, not just learning from the mistakes of the past, but also making fundamental course corrections suggested by the enabling conditions described above. It is also important to distinguish what changes *can* and *cannot* be achieved through attention to problems at the level of the site alone.

Giving attention to exogenous factors means research and policy attention to those macro- and meso-level causal factors that influence or may determine outcomes at the site level. The case of Gabon is instructive. The fact that incomes in Gabon are among the highest in all of Africa and Gabon's forests are among the best preserved in the world has almost nothing to do with deliberate planning of site-level outcomes. This convergence of poverty alleviation and forest conservation is mostly an accidental artifact of the country's high dependence on oil income and low population (Wunder, 2003a, pp. 84–129).

(b) *The need to conceptualize outcomes*

To maximize the possibility that site-level programs and projects will succeed, it is necessary to have a clear conceptual grasp of various positive and negative outcomes, and the reasons for them. Many plans of action aim for “win–win” outcomes, where livelihood improvements are matched by gains in environmental protection. Yet these plans of action rarely define “win–win” outcomes, nor those that fall short of “win–win.” We propose a sim-

ple, fourfold typology for understanding outcomes, as described in Figure 1.<sup>13</sup>

Are there key socioeconomic and biophysical characteristics associated with the four basic outcomes? Aggregation, comparison, and contrast of case studies can serve to identify broad patterns which in turn can be used to inform the policy process. The following observations about the tendencies may be useful in guiding such an undertaking.

*Win–win*: The relative scarcity of such outcomes in developing countries and tendency toward forest cover stabilization and restoration in developed countries begs the question: “Are high levels of per capita GDP at the national level, high levels of per capita consumption of fossil fuels, and high rates of urbanization the essential preconditions for systematic achievement of win–win outcomes in developing countries?” Perhaps not, because there are important exceptions to the rule, for example, the Yurimaguas multistrata agroforestry systems in Peru (ICRAF, 1997, pp. 39–69; Leakey, 2001, pp. 4–5); regrowth of trees in pastoral systems in Tanzania and Kenya (Barrow & Mlenge, 2003); and multistrata agroforestry systems in Sumatra, Indonesia based on the production of damar resins (Leakey, 2001, pp. 3–4; Michon, de Foresta, Kusworo, & Levang, 2000).

*Win–lose*: At the risk of over-simplification, this category is roughly synonymous with the history of agricultural and rural development. The expansion of agricultural lands over time has often been at the expense of natural forest cover and biodiversity, and the transition from hunting and gathering, to swidden agriculture and then to sedentary agriculture and pastoralism has often meant an increased consumption of natural resources and level of income over time (Figure 1).

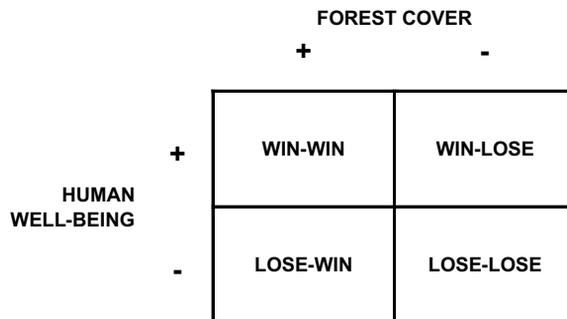


Figure 1. Fourfold classification model of human well-being and forest cover.

*Lose-win:* There are at least two circumstances that typify a lose-win outcome: (1) a situation in which communities have been forcibly excluded from access to forest resources they depend on, for conservation purposes, leading to deterioration of well-being; and (2) a situation in which war and conflict make farmers unable to maintain their farming practices for fear of victimization, resulting in declining well-being and natural restoration of forest cover.

*Lose-lose:* These outcomes are those variously described in the environmental literature as “the downward spiral of poverty and environmental degradation,” the “vicious circle,” or as “desperate ecocide.” Under these circumstances, there is a causal, reciprocal relationship between worsening social and environmental conditions. Note that the temporal dimension is important: What begins as “win-lose” may end up as “lose-lose” because of loss of the resource base. A common formulation of “lose-lose” involves outsiders exploiting and eliminating local forest resources, leading to livelihood decline. The classic case is large extensive cattle ranches in Latin America that produce little value per hectare, keep small farmers off the land, clear the forests, and often receive government subsidies. Poorly managed forestry concessions are another common example.

Although this model tends to be readily grasped by users and is attractive because of its simplicity, this simplicity incorporates ambiguities and shortcomings that must be well understood to avoid pitfalls in its use. The main problems are as follows:

—The real life conditions described by this model are never as “black and white” and rigidly categorical as the model implies. For example,

(a) In association with forest cover change, there can be considerable variability in win or lose livelihood outcomes from forest cover change, or no change at all, not just between groups within a given community, but also within households.

(b) The same person or household can both “win” and also “lose” in the livelihood sense from the same process of forest cover change. For example, deforestation can supply badly needed arable land at the same time that it can remove access to nontimber forest products and forest-based environmental services.

(c) Cashing in forest capital can give short-term gains and can imply long-term livelihood losses.

—An assumed relationship between well-being and forest cover may conceivably have little or nothing to do with local resource management practices and may instead be attributable to economic factors in the wider national or regional economy (*viz.* the Gabon example above). Appropriate application of the model requires a capacity to differentiate what effects are endogenous or exogenous to the site being analyzed.

#### (c) *Improved policy solutions*

The empirical characterization of the four-fold outcomes can be useful in efforts to improve policies designed to alleviate poverty and overcome forest management problems, in at least three ways.

*Linking desired (win-win) and undesired (lose-lose) outcomes to policy change.* Careful documentation and analysis of instances of win-win outcomes can serve to identify the necessary and sufficient preconditions for reproducing such outcomes. The same holds true in reverse for research and analysis of lose-lose outcomes. The more we know about the underlying causes of such cases, the greater our ability to design policies that either prevent or reverse such outcomes.

*How to minimize trade-off (win-lose and lose-win).* Useful applications of knowledge on win-lose and lose-win outcomes are more complex than the above, but potentially rewarding. The policy lessons would be guided by the analysis of these types of outcomes in terms of two principal types of solutions.

The first would involve reducing the tradeoffs and, in essence, seeking outcomes of the type “winning more and losing less” and “losing less and winning more.” The problem is that these types of solutions are likely to be costly and therefore not necessarily justifiable. The second would involve identifying the appropriate point on the trade-off curve, for example, the optimal level of well-being, or the optimal level of forest cover. The challenge of specifying “appropriate deforestation” according to biophysical, economic, and political criteria (Kaimowitz, Byron, & Sunderlin, 1998, p. 304) is an example of the latter. We recognize the inherent difficulty, if not the impossibility, of having various stakeholders agree on optimal tradeoffs, but believe clear information on the choices can help

avoid needless conflict and lay the groundwork for consensual solutions.

*Avoidance of the win-win and lose-lose fixation.* In some environmental analysis and policy documents, there is a tendency to focus on win-win and lose-lose outcomes, almost as if these were the only outcomes that take place in the real world. This tunnel vision originates in part from simplistic elaborations of the concept of sustainable development which assume an indissoluble link between improved livelihoods and alleviation of environmental problems. A linked assumption is that failure of poverty alleviation efforts surely leads to worsening of environmental conditions. Neoliberal prescriptions often assume that economic growth will jointly alleviate poverty and redress environmental problems, and conversely, that insufficient economic growth can worsen both problems. These assumptions tend to render the win-lose and lose-win outcomes theoretically invisible. This is unfortunate because, as we have seen above, the challenge of linking science to effective policy is in many ways more demanding in this realm.

## 6. FUTURE RESEARCH

Many potential interventions can enable a more successful use of forests for poverty alleviation. In this section, we concentrate on ideas for applied research to support such interventions. We believe policy interventions could be misguided if not founded on additional knowledge about the underlying issues. There are substantial information gaps concerning the degree to which forest resources can contribute to poverty alleviation, and the compatibility of FBPA and forest conservation objectives. Here we highlight some of the highest priority topics for research in three categories: (1) geographic location of poverty and remaining natural forests; (2) the potential role of forests in poverty alleviation; and (3) possibilities for compatibility of FBPA and forest conservation.

### (a) *Spatial and natural resource determinants of poverty*

Chronic rural poverty in developing countries is concentrated in remote, relatively inaccessible, and "fragile" lands, and this is where remaining stands of natural forest tend to be found as well. It is necessary to better understand the spatial affinity between poverty and

forests, its underlying logic, and its implications. Detailed geographic information systems (GIS) and field analysis will be necessary to better understand how many of the world's rural poor do in fact live in or nearby forests, and to what extent they depend on them. We take "dependence" to mean reliance on forests—in a manner that is either difficult or impossible to replace—for a portion of environmental services, subsistence needs, safety net and gap filler functions, and opportunities for poverty elimination. If there is in fact a substantial fraction of the world's poor living in and depending on forests, this should force a course correction in poverty alleviation strategies, given the rather light and uninformed attention to forest issues in current PRSPs and other poverty-related planning instruments. Such a discovery would highlight the relevance of FBPA in connection with wider poverty alleviation strategies, although there will still be circumstances where paths out of poverty will be preferred that do not rely on timber, NTFPs, payments for environmental services, etc. Through this kind of research, we need to better understand to what extent poverty and forest abundance are causally linked, and if they reflect other phenomena, for example, a remote location causing both high poverty and limited deforestation.

### (b) *The potential role of forests in poverty alleviation*

Angelsen and Wunder (2003, pp. 42–46) have identified five topics that require high priority attention.

The first topic concerns the use of forest products at the household level for subsistence and income. Although a range of rudimentary valuation and household economy studies exists, as yet few rigorous, quantitative studies have been conducted that explain exactly how and to what extent forest resources might help achieve poverty alleviation.

The second topic is small-scale wood-based processing enterprises, which is under-represented in the forestry literature. This might be expanded to address the link between forest resources and small and medium scale enterprise (SME) development.

The third topic is the potential for niche markets such as certified premiums for desirable production characteristics. Linked to this, it will be useful to explore the conditions needed for poor households to take advantage of the

opportunities that globalization and market liberalization provide.

The fourth topic is tree planting in smallholder or community partnerships with private enterprises. These opportunities will expand in those areas where wood supplies from natural forests are vanishing and where smallholders control a large share of land.

The fifth topic, payment for environmental services, is urgent because of the rapid recent growth of such initiatives, divided viewpoints on their utility, and a clear need for guidance on how to better include the poor in such programs. (Relatedly, see Grieg-Gran *et al.*, in this volume.)

(c) *Compatibility of FBPA and forest conservation*

Researchers have a grasp of what kinds of arrangements have enabled experimental or pilot project arrangements to work. But all too often, "successful" projects function inadequately as models for replications, for predictable reasons. They tend to receive a high financial and administrative subsidy for demonstration effects that can neither be extended indefinitely nor replicated at the same level of expense on a wide scale.

Field research is needed on the endogenous and exogenous factors that explain the fourfold outcomes defined earlier. Such research should be prioritized in forest communities that receive either no or low levels of outside intervention and guidance so that the findings have a substantially higher chance of being generalized to a larger population.

## 7. SUMMARY AND CONCLUSION

This article has summarized theory and knowledge with respect to two central questions at the interface of livelihoods and forests: To what extent can forests be relied on to support poverty alleviation in developing countries? Can the use of forests for poverty alleviation be compatible with efforts to conserve what remains of developing country natural forests? We recognize that we have just touched the surface of a vast topic, and that this article does not address all the important points that are relevant to this topic.

With respect to the first question, we emphasize three points in connection with improved strategic poverty alleviation planning. First,

the location of chronic rural poverty and natural forests tend to overlap. To the extent that this knowledge can be elaborated through further research, and that this overlap signifies forest dependence, the relevance of forestry in broad strategic planning for poverty alleviation is strengthened. Second, it is crucial to distinguish between the use of forest resources to prevent rural people from falling into (deeper) poverty *versus* their role in lifting people out of poverty in a lasting way. Third, there are intrinsic qualities of forest resources and the context in which they are used that tend to run counter to the goal of poverty alleviation, but there are important new enabling trends that might compensate for these undesirable qualities.

Are PRSPs justified in limiting their attention to forest resources? In a sense yes, and in a sense no. Limited attention to forest resources is partly justified in that many paths out of poverty do not involve continued use of forest resources. However, PRSPs and other antipov-erty policies can be greatly remiss in overlooking attention to forest resources, especially in areas where chronic poverty and forest cover tend to overlap. This is because forest resources are often important in poverty mitigation and avoidance, and there is often no substitute for these vital services, especially in remote areas. It is also because forest resources provide local environmental services for which there are often no substitutes, and because increasingly fewer remote areas overlie high quality agricultural soils, so land uses there can be better suited to forestry or agroforestry in perpetuity. Lastly, it is because some forest-conserving land uses may not only assist poverty mitigation and avoidance, but poverty elimination as well. It should be stressed that forest resources can be important for poverty alleviation even in places where forest cover is low, because they are vanishing. Scarcity produces higher economic returns. Marketing of wood products in peri-urban regions is a growing livelihood opportunity for this reason, and because of rapidly increasing demand.

With respect to the second key question, we conclude that efforts to reconcile FBPA and forest conservation should continue in the tradition of site-level research and development, but these efforts need to be integrated with an understanding of societywide effects. It cannot be assumed that economic growth will, in and of itself, bring about the win-win solutions implied in the EKC and FT literatures. This site-

specific work must give due attention to the distinction between endogenous and exogenous causal factors. Lastly, it is vital that this research and development distinguishes among various outcomes (win–win, win–lose, lose–

win, lose–lose) and that it does so at sites where there has been little or no programmatic intervention. This will help assure the relevance of research and enable replicability of good results.

## NOTES

1. Chronic poverty is defined as that which occurs “when an individual experiences significant capability deprivations for a period of five years or more” (Hulme & Shepherd, 2003, pp. 404–405).
2. These are areas of low “geographical capital.” Bird and Shepherd (2003, p. 592) explain that the notion of geographical capital “usefully highlights the importance of the spatial patterning of disadvantage,” and they define it as the natural, physical, social, and human capital of a particular area.
3. “Geographic conditions, particularly distance from seaports and urban centers, had a significant effect on a region’s pace of development in all countries until this century, and geography still has a strong impact on living standards of an area’s residents in most developing countries” (Bigman & Fofack, 2000, p. 21).
4. Relatedly, Ravallion, van de Walle, and Gautam (1995) introduced two concepts on the effect of public policies on poverty: (1) promotional effects, which help the poor escape poverty and (2) protective effects, which help the nonpoor from slipping into poverty.
5. “Safety net” and “gap filler” functions have different elements that include (a) seasonal employment in the off-season; (b) sources of food in the hungry season; (c) household consumption to reduce the need for scarce cash; (d) sources of emergency incomes in situations of individual or household tragedies; (e) sources of emergency incomes in situations of collective tragedies; and (f) savings for old age.
6. Not all the authors agree that forest conversion should be included in the definition of FBPA.
7. This typology is inspired in part by Byron and Arnold (1999).
8. An example is that some people in Indonesia fared better in the aftermath of the 1997 Asian economic crisis precisely because of their remoteness and distance from the modern economy.
9. A descriptive list recognizes that many forest uses (e.g., permanent conversion of forests to agriculture) imply destruction of forests over the long term, whereas a prescriptive list might explicitly incorporate forest conservation goals.
10. The contribution of the forestry sector to Gross Domestic Product (GDP) tends to be small in most developing countries. However, the value-added figure for the forestry sector significantly underestimates the total value since a large share of forest products is not registered. This is because forest resources are often used for subsistence and trade in local markets, or are harvested and traded illegally.
11. A narrow definition tends to focus on products extracted from natural forests, where the poor are clearly highly involved. A wider definition would also include cultivated, higher-value products, which tend to be produced by those relatively few NTFP producers who are better off.
12. The authors of EKC and FT literature do not make this argument. Moreover, they recognize that terminal forest cover is much smaller than initial forest cover, and has less biodiversity.
13. For useful elaborations of these kinds of typologies, see Prescott-Allen (2001), who provides a country-by-country index of data on well-being and the quality of the environment, and Bass, Hughes, and Hawthorne (2001, p. 54), who propose a nine cell model that includes a “no change” option on each of the two axes.

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