

Title:

Supporting Pathways to Prosperity in Forest Landscapes – A PRIME Approach

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Abstract:

In this paper, we develop a broad framework to conceptualize the multiple ways forests contribute to poverty reduction and inform interventions in forest landscapes. We identify five key strategies for reducing poverty in forest landscapes. These include: a) improvements in productivity (P) of forest land and labor; b) strengthened community, household and women's rights (R) over forests and land; c) regional complementary investments (I) in institutions, infrastructure and public services that facilitate poverty reduction for the forest poor; d) increased access to markets (M) for timber or non-timber forest products; and e) mechanisms that enhance and enable the flow of benefits from forest ecosystem services (E) to the poor. The practical utility of the framework is tested through a portfolio review of forestry lending by the World Bank Group, the largest public investor in the forestry sector. Its applicability to local contexts is illustrated through case studies from Vietnam, Albania, China, Mexico and Brazil, which highlight strong synergies among strategies: the most pronounced impacts are realized when more than one of these pathways are jointly pursued. We conclude with a discussion of critical issues that need to be addressed for poverty reduction to succeed in forest landscapes, including strong environmental safeguards as well as a rigorous monitoring framework drawing on gender-disaggregated socio-economic and remotely sensed information.

Keywords:

forests, poverty, productivity, rights, markets, gender

Highlights:

- This paper proposes a broad framework (**PRIME**) to help conceptualize the multiple ways forests might contribute to poverty reduction.
- These include strengthening **P**roductivity, **R**ights, regional complementary **I**nterventions, **M**arket access and returns from **E**cosystem services.
- The practical utility of the **PRIME** framework is tested through a review of the World Bank Group's (WBG) forestry lending from 2002 to 2015.
- The review shows that 79% of WBG forestry interventions included at least two **PRIME** strategies, though support for market access was limited.
- The applicability of the framework is illustrated through a diverse set of case studies, which highlight strong synergies between strategies.

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1. Introduction

For many households, particularly those in remote, forest locations, the movement from poverty to relative prosperity is likely to be a slow, even inter-generational, process. One economic strategy for such households is resource extraction (Angelsen 2010; Pacheco 2009; Fisher 2004). Many smallholders use forests for food, timber and other economic benefits (Brack *et al.* 2016, Hosonuma *et al.* 2012; Sunderlin *et al.* 2005). But whether such extractive activities contribute to *sustained* poverty reduction remains uncertain (Fisher 2004; Delacote 2009). Where growth in markets for forest products contributes to income generation, it is somewhat unclear what actions enable some households to move up the economic ladder (Angelsen and Wunder 2003; Scherr *et al.* 2004). Even less is known about the influence of forest-related interventions on household asset accumulation under differing socio-economic conditions. If we peer within households to focus on gender asymmetry, pathways out of poverty for women, who are often the most forest-dependent, are particularly obscure (Mwangi *et al.* 2011; Colfer *et al.* 2016).

These issues are important also from an environmental sustainability point of view. Deforestation and forest degradation are difficult to address without tackling the economic needs of households who live in and around forests¹ (Colfer *et al.* 2015; World Bank Group 2016a). Thus, conservation and development agencies have invested in a series of approaches – ranging from integrated conservation and development programs beginning in the 1980s (Brandon and Wells 1992) to plans for Reduced Emissions from Deforestation and Forest Degradation (REDD) (Corbera and Schroeder 2011; Angelsen 2008). The poverty reduction components of such

activities have met with uncertain success, often because of limitations posed by geography or because the interventions have not been adequate to address complex problems (Sunderlin *et al.* 2005; Wunder 2001; Barrett *et al.* 2011). There is now growing awareness of the benefits of landscape approaches, which typically bring together multiple stakeholders to reconcile competing social, economic and environmental objectives (Sayer *et al.* 2013; Reed *et al.* 2016). These different experiments suggest the need for a comprehensive framework for poverty reduction that considers the geographic constraints posed by remote forest areas and the interests of and tactics used by people to subsist and prosper in such landscapes.

From a poverty reduction and economic development perspective, the lack of clear evidence on pathways to prosperity for the forest-dependent poor poses important practical questions.² Should policies and programs promote non-forest opportunities for the poor or should existing uses of forests be strengthened? Can forestry productivity be adjusted such that the gains from timber harvests, non-timber forest products (NTFPs) and ecosystem services accrue to poor households? Do forest reforms strengthening community and indigenous rights enable poverty reduction? And, what risks do poverty-reducing economic investments pose to forests? These questions are not new (Wunder 2001; Sunderlin *et al.* 2005), and a rich literature has developed identifying the income that the poor obtain from forests (Cavendish 2000; Vedeld *et al.* 2007; Angelsen *et al.* 2014; also see Shepherd in this issue) and the role forests play in supporting food security and providing a safety net (Pattanayak and Sills 2001; Wunder *et al.* 2014). There is also growing evidence of the importance of forest ecosystem services in securing clean water, decreasing erosion and reducing the effects of storms (Bennet *et al.* 2009; Barbier *et al.* 2011; Braumann *et al.* 2007) -- benefits that are particularly important to the poor. We build on this literature to ask what combination of critical investments in people, resources and institutions can

enable forests to go beyond a supportive role to play an even bigger part in sustainable poverty reduction.

In forest landscapes, households may be stuck in location-determined poverty traps, making it difficult for them to emerge from poverty even amid country-wide growth and economic development (Jalan and Ravillion 2002; Barrett *et al.* 2011; Kray and McKenzie, 2014; Barbier and Hochard 2016). A decline in poverty in remote rural areas may require specific strategies to overcome geographic constraints (World Bank, 2007; Barbier and Hochard 2016). Thus, forest-poverty reduction may entail support for livelihoods based on economic goods and services from forests (e.g. timber, NTFPs and ecosystem services), and complementary investments that enable the poor to overcome location-based limitations. While the presence of geographic poverty traps is well-known in development economics, the literature that ties the presence of poverty traps to forest-poverty, so-called poverty-environment traps, is somewhat limited (Barbier 2010; Barbier and Hochard 2016).

Government, non-government organizations (NGOs), and private sector actors have invested billions of dollars in forest conservation and management in the past quarter century. For instance, overseas development assistance in forestry and related activities doubled in the six-year period of 2002-04 to 2008-10, from approximately USD 560 million to USD 1.26 billion (Agrawal *et al.* 2013). The World Bank Group (WBG), which invested a total of USD 6.5 billion in forestry activities from 2002-2015 (World Bank 2016a), is the leading public funder of forestry and conservation in developing countries.³ As of 2015, the Bank had 106 active projects related to forest-based activities (World Bank Group 2016a).⁴ More typically, the WBG supports large-scale efforts to reduce poverty in developing countries. In 2016, for example, it committed nearly \$64.2 billion in loans, grants, equity investments and guarantees to its members and private businesses

(World Bank 2016e). The WBG's large forestry investments and mandate to reduce poverty make it an important institution for the future of forests and forest-dependent people.

In this article, we present a broad conceptual framework, building on an understanding of the economic behaviors of households, to address forest-poverty challenges. We conceptualize the multiple ways forests might contribute to poverty reduction to inform poverty-targeted interventions in forest landscapes. In section 2 below, we discuss why such a framework is needed, paying attention to how it fits in with existing analytical and practical approaches to addressing forest-poverty dynamics. Arguing that forests can contribute to poverty reduction if the benefits from timber, NTFPs and ecosystem services can be realized by the poor, we present an umbrella frame that covers five broad pathways to prosperity in forest landscapes. We discuss each pathway briefly. Section 3 examines the practical utility of the framework by applying it to the WBG's forest investments. We review the WBG's portfolio of investments to test the extent to which PRIME pathways and possible combinations of pathways are used in forestry projects to improve people's welfare. Through the portfolio review, we also identify a set of case studies to help us illustrate the applicability of the PRIME framework to different country contexts. We choose to examine the WBG's interventions because it is one of the largest global public investors in forestry and poverty reduction, yet macro analysis of its forestry investments infrequently make it into the peer-reviewed literature. In Section 4, we validate the usefulness of each component of the PRIME framework by examining available peer-reviewed literature and illustrate its applicability to different country contexts through the case studies. Section 5 discusses gender in forest landscapes as a cross-cutting issue that requires special attention. Section 6 draws lesson from the discussion and concludes with a presentation of key issues that need to be addressed for forest-poverty reduction to succeed.

2. Structuring Pathways to Prosperity in Remote Forest Landscapes

Many households living in forest areas rely on timber and NTFPs to meet a significant part of their nutritional, energy and housing needs (Wunder *et al.* 2014; Angelsen and Wunder 2003). Forest resources also serve as an input to agricultural and livestock production systems (Cavendish 2000) and smooth consumption by acting as an insurance-type mechanism (Pattanayak and Sills 2001). Furthermore, ecosystem services, such as storm-protection services of mangroves, can make poor communities less vulnerable to natural disasters (Das and Vincent 2009). While these safety net aspects of forests are important to ensure that poor households do not fall further into poverty, this article focuses on the kinds of policies and interventions that help people climb out of poverty (Barrett 2005). The critical question to address then becomes: what investments in people, resources and institutions can enhance the benefits obtained from forests so they can play an even bigger role in poverty reduction?

Rural households typically move out of poverty by pursuing one or more of three main strategies: agricultural entrepreneurship, off-farm jobs or migration (World Bank 2007; Barbier and Hochard 2016; Schneider and Gugerty 2011). Diversification of income sources is an important and almost universally used tactic by poor households to improve their well-being (Banerjee and Duflo 2007 and 2011; Krishna 2010; ILO 2014). Households diversify livelihood activities in response to their own assets and abilities and the risks and opportunities that they perceive (Barrett *et al.* 2011; ILO 2014).

Remote forest areas, however, offer limited prospects for households to improve returns to land or diversify economic activities. Households also face high costs of long-term migration. This combination of factors can contribute to households being stuck in poverty-environment traps (Barbier and Hochard 2016; Barbier 2016; Barret *et al.* 2011). Generations of households may be

stuck in poverty traps, if, because of their endowments or the conditions they face, they are simply unable to get over some wealth threshold beyond which there can be endogenous growth (Barrett 2005). Poverty-environment traps can occur when the characteristics of certain remote regions make household investments less productive relative to non-remote areas (Jalan and Ravillion 2002; Kray and McKenzie, 2014; Barbier and Hochard 2016).

Given the remoteness of forest landscapes and the possible presence of geographic-poverty traps, poverty reduction will require a combination of household specific and geographic interventions. Arguably, long-term poverty reduction in forest landscapes, as elsewhere, will require strengthening agency, i.e. empowering the poor to make decisions that affect their lives (World Bank 2001; Banerjee and Duflo 2011), improvements in education (Duflo 2001; Pritchett 2006) and health outcomes (Kremer and Miguel 2004; Dupas and Miguel 2016), considering the multi-dimensionality of poverty and higher and more diversified incomes (World Bank 2007, ILO 2014). It will also require resilient forest ecosystems that can endure shocks and offer a sustainable resource base (Miura *et al.* 2015, Das and Vincent, 2009).

As Figure 1 shows, these outcomes can be achieved partly through forest-specific interventions that bolster timber, non-timber and ecosystem service-related entrepreneurship. Other pathways include well-established rural poverty reduction strategies such as improved agricultural productivity, more off-farm (and off-forest) jobs and greater outmigration from forest landscapes (World Bank 2007; Schneider and Gugerty 2011). While we acknowledge the importance of these latter pathways, this paper emphasizes behavioral changes and welfare outcomes that result from forest-related interventions. Thus, we focus on strengthening skills and the capacity of individuals and households to participate in forest-based entrepreneurship, improvements in forest management practices and investments that may lower risks and increase

opportunities for forest-based entrepreneurship.

In this context, we offer a framework in Figure 1 for structuring and understanding which forest-related interventions, and bundles of interventions, can help achieve poverty reduction. Based on a review of the development economics, poverty, and forest literature, field experience, and discussions with experts, we identify five broad strategies to improve economic returns, reduce risks and create new opportunities in remote forest landscapes. This so-called PRIME framework stands for: a) improvements in productivity (P) of forest land and labor; b) strengthened community, household and women's rights (R) over forests and land; c) regional complementary investments (I) in institutions, infrastructure, and public services that facilitate forest resource use; d) increased access to markets (M) for timber or NTFPs; and e) mechanisms that enhance and enable the flow of benefits from forest ecosystem services (E) to the poor. Several of these strategies may have to occur simultaneously. Our focus is on forest-related strategies as other important poverty reduction efforts, such as agricultural development and broad job market support, are extensively discussed elsewhere (Banerjee and Duflo 2007; World Bank 2007; Schneider and Gugerty 2011) and beyond the scope of this paper.

< Insert Figure 1 >

Productivity. Growth in land and labor productivity is integral to rural development (Irz *et al.* 2001; de Janvry and Sadoulet 2010). Forestry has some challenges that go beyond what is faced in small-scale agriculture based economic development. Timber operations, for instance, require long-term investments and economies of scale to be financially viable and the returns to NTFP management can be uncertain. These factors can potentially be overcome by improving individual and community skills in harvesting, monitoring and regenerating forest products.⁵

Resource productivity can also be improved through better forest management and the infusion of capital, for instance, portable saw mills.

Rights. A second strategy is to increase the wealth and agency of the poor by strengthening their rights (R) over natural capital. Secure rights can reduce uncertainty over resource access and allow households to make longer-term investments (Meinzen-Dick 2009; FAO 2011). The importance of rights is clearly manifested in the growth of community-based forest management in the last decades (FAO 2016). Community forestry is being implemented through power-sharing agreements with the state, increased legal access and decentralization within national agencies (Chhatre and Agrawal 2009; Shyamsundar and Ghate 2014). Investing in resource rights has significant implications for many of the most marginalized people, including women and indigenous communities (Agrawal 2009; Colfer *et al.* 2015; World Bank 2016c).

Investments. Poverty reduction in forest landscapes will not be possible without regional complementary investments (I) in institutions that govern forest use as well as the infrastructure and public services that support them in remote areas. Policies and bureaucratic rules that are not supportive of forest enterprises can make it risky for households to engage in forest entrepreneurship (Pacheco 2012; Ros-Tonen and Kusters 2011). Moreover, poverty in remote rural areas is partly a result of limited access to public services and connectivity, which can inhibit both agency and the growth of markets (Kray and McKenzie 2014; Barbier and Hochard 2016). Geographic constraints will also limit the supply of ‘off-forest’ jobs. Without access to reasonable public goods, targeted programs that seek to reduce forest poverty, and institutions that facilitate forest enterprises, the poor in forest hinterlands will not be able use forests to increase or diversify their income (World Bank 2007).

Markets. Creating access to markets (M) is a well-established conduit for jobs and income generation in rural areas. Forest-dependent communities have long used forest resources for subsistence purposes and some have also connected to markets. For instance, markets for a small number of high-value NTFPs (e.g. Brazil or Shea nuts) have significantly benefited men and women in poor households (Colfer *et al.* 2015). And as for timber, gaining certification and access to export markets are important economic strategies. For this approach to benefit the poor, more needs to be done to strengthen small and medium enterprises (SMEs) by increasing their access to training, credit, technologies and marketing networks.

Ecosystem Services. A final opportunity is to strengthen the flow of benefits from forest ecosystem services (E) to the forest-dependent poor. Ecosystem services can enhance the productivity of land, improve environmental quality and reduce risks (Miura *et al.* 2015; Munang *et al.* 2013; Renaud *et al.* 2013). Over the last decade, there have been attempts to better manage ecosystem services by enhancing their value through policy instruments such as payments for ecosystem services (PES), carbon markets and investments in eco-tourism businesses (MEA 2005; Bulte *et al.* 2008; Alix-Garcia and Wolff 2014). The forest poor can benefit from the monetary income derived from maintaining and enhancing ecosystem services, in addition to any non-economic benefits and risk reductions.⁶ This may require strengthening capacity and creating new institutions to enable transactions.

In our proposed framework, **gender** is a cross-cutting issue that arises in each of the PRIME categories. There is increasing evidence demonstrating that projects and policies that recognize and address the critical role gender plays in accessing, using and managing forest and tree resources and their associated benefits are more effective than those that neglect it (Mai 2011).

3. The World Bank's Forestry Portfolio

In this section, we review the World Bank's forestry portfolio to test the practical utility of the PRIME framework. The review seeks to assess whether PRIME strategies are used in WBG forestry projects to improve people's welfare and to what extent several strategies are combined. The review uses the WBG's Forest Strategy in 2002 (World Bank 2004) as a starting point. This enables us to examine projects under one forest policy framework.

During the period 2002-2015, the WBG had forestry investments in 309 projects. Out of these, some 88 had finished a full project cycle, i.e. they were approved, fully implemented and brought to closure. The portfolio review focused on a subset of these completed projects. A project was included in our analysis if: a) it was approved in 2002 or later; b) it was completed and a results assessment was publicly available; c) at least 20 percent of the project was focused on the forestry sector, ensuring the project's relevance for the sector; and d) WBG funding for the forestry-related components amounted to at least US\$ 0.5 million, i.e. was large enough to include multiple action items. Thirty-eight projects met these criteria.

Data for the review comes from a database created in 2015-16 for the World Bank's latest Forest Action Plan. We supplemented this dataset with a detailed review of publicly available project documents prepared at the beginning and end of each project: The Project Appraisal Document and Implementation Completion Report.

To determine whether a project aligned with one or more PRIME strategy, a set of decision criteria, listed in Table 1, were applied to each project. For example, interventions that boosted productivity through enhancements to forestry land, machinery or labor were counted under "P", while interventions that strengthen rights over forest and/or land either through formal or informal mechanisms were included under "R" (mere inclusion of community members in the design,

implementation or monitoring of a project component was not sufficient). Project interventions were counted as regional complementary investments under “I”, if they supported people’s livelihoods in forest landscapes, e.g. through investments in telecommunication or transport services that improved access to forest product markets or institutional reforms that provided some form of livelihood support or social security or lowered the regulatory burden on small-scale forest enterprises. Interventions that focused on macro-level reforms, such as the development of a national forest sector strategy, were excluded as they may or may not focus on poverty reduction. Similarly, interventions were only included under “E” if ecosystem services specifically supported livelihoods and income generation, i.e. by creating additional jobs or commercial opportunities, but not if they had a purely conservation focus.

< Table 1 here >

Across the sample of 38 projects assessed, the average amount of WBG funding for each project was USD 37.9 million in grants and loans. As illustrated in Figure 2a, projects were implemented in East Asia and the Pacific (28%), Sub-Saharan Africa (22%), Latin America (20%) and Eastern Europe and Central Asia (17.5%).⁷ The main exception is South Asia. Despite its significant development needs, forest poverty and being home to a quarter of the global population, South Asia was associated with only one of the 38 projects. Also, as Figure 2b shows, the distribution of projects by the recipient country’s level of development was highly concentrated. Nearly 90% of the project recipients were “lower middle” and “upper middle” income countries based on the WBG’s income status criteria.⁸ Low income countries account for barely 1 in 10 projects.

<Figure 2a and b here >

Figure 3 identifies the percentage of projects that featured each PRIME theme. The most

common theme addressed was regional complementary investments (I), which featured in 71% of projects in the sample. This usually came in the form of support for forest department reform, participatory forest land use management and zoning, investment in village infrastructure and community building, monitoring and evaluation of both forest and livelihood outcomes etc. However, because it was not always possible to separate institutional support focused on improving livelihood outcomes from broader support for other forestry activities, 71% may be an overestimate. Notably, over a third of the projects had a focus on compensation for ecosystem services (E) and rights (R) together. That access to markets was less targeted is an interesting finding and suggests that current WBG forestry investments do not prioritize the role of timber and NTFP markets for the poor and may primarily support the production end of the value chain.

< Figure 3 here >

The results from the analyses also suggest that a typical project included at least two PRIME strategies, while about a third of the projects had three or more PRIME strategies (see Table 2). This supports the notion that PRIME themes are complementary, especially institutional strengthening with other interventions.

< Table 2 here >

To illustrate the applicability of the PRIME framework to different country contexts and examine how specific strategies are applied in practice, the next section explores six case studies of World Bank projects (see Table 3). The cases were qualitatively chosen based on the portfolio review and discussions with task teams to reflect the diversity of the WBG's portfolio and illustrate the use of at least one PRIME strategy. We examine examples of longer-term forestry and conservation investments to ensure availability of information on impacts. The cases include: Vietnam, an emerging economy; Albania, one of the poorest countries in Europe; Brazil a large

important country for forests; Mexico, which has a long history in decentralized forestry management; and China, known for its large-scale efforts to reduce poverty and transform rural landscapes.

< Table 3 here >

4. The PRIME Framework in Practice

The PRIME framework identifies five strategies to reduce poverty in forest landscapes. In this section, we examine evidence from the peer reviewed literature for each PRIME strategy and illustrate the framework's applicability in diverse contexts through WBG case studies. We also use the case studies to identify synergies across strategies.

1. Income generation by improving skills and productivity (P)

Improvements in forest and labor productivity can become a pathway out of poverty when either resource extraction is sufficiently profitable or the returns to labor are high enough that they contribute to wealth accumulation. Currently, 31% of the world's forests are designated as primarily production forests and an additional 28% are multiple-use (FAO 2015). Plantation forests are a small proportion of overall forest area (7%), but their share is growing, as are smallholder plantations (FAO 2006b). Increasing the returns to plantation and production forestry may require better management of natural forests for timber and NTFPs, use of best practices in plantations and agroforestry as well as fire, pest and disease control. Improving smallholders' skills in harvesting, management and product marketing will also be important.

Timber is commercially the most important product in most forests, generating a gross value added of USD 606 billion in 2011 (FAO 2014). However, some fundamental characteristics

of the sector create barriers to entry for the poor. Timber planting, harvesting and processing is a long-term capital and technology-intensive investment that requires secure tenure (Angelsen and Wunder 2003), exhibits economies of scale (Wunder 2001) and may require access to specialized markets (Angelsen and Wunder 2003; Belcher and Kusters 2004). It is, thus, no wonder that the poor are excluded, especially given the sector's high regulatory burden and complex political economy (Belcher 2004). Further, large-scale timber enterprises often do not provide formal employment to local community members and can even marginalize them (McKenney *et al.* 2004; Mayers 2006; Blaser and Zabel 2015).

Smallholder forestry could provide a pathway out of poverty, but poor households and communities often do not have the forestry skills to take on tree management (Rohadi *et al.* 2010) or the business management skills to negotiate good deals with logging companies (Pacheco 2012; Medina *et al.* 2009). Thus, in some cases, it is more profitable for communities to work for logging companies than to harvest on their own with the support of well-meaning NGOs and donors (Medina *et al.* 2009). In Brazil, where there are examples of profitable small-scale timber production, technical and credit support are critical elements of success (Humphries *et al.* 2012). In particular, technical support can be critical. A case in point is the cultivation of bamboo in Southern China, where household income could potentially double by improving productivity, reducing post-harvest losses and increasing market effectiveness (Hogarth *et al.* 2013; Hogarth and Belcher 2013). The paper by Sanchez-Badini *et al.* in this special issue discusses some of the factors that contribute to productivity gains.

Smallholder forest plantations are one way to improve forest land productivity and, thereby, enhance household income. To understand whether smallholder forest operations can be fruitful in this manner, we examine WBG forestry support to Vietnam, a country where around 25

million people live in and around forests (Auer 2012), which make up 48% of land area (FAO 2015).⁹ Vietnam has a flourishing timber-based processing industry, with demand outstripping timber supply (Putzel *et al.* 2012; Auer 2012).¹⁰ Some 60% of productive forests in Vietnam are under household management (FAO 2006b). These plantations supply wood to the export-oriented wood-chip industry, in addition to meeting some of the needs of the furniture industry. Vietnam's National Forest Development Strategy calls for a broad expansion of plantation forests and third-party certification by 2020.

In support of Vietnam's growing forestry sector, the WBG invested USD 78.5 million from 2005-2015 in the Vietnam Forest Sector Development Project (World Bank 2015a). Among other activities, the project supported policies to promote commercial tree growing, accelerated processes for issuing land use rights certificates, assisted in financial and technical forest-management aid to smallholders and helped improve the international competitiveness of the forest industry. Through these investments, some 40,000 poor and medium income households developed 76,571 ha of plantations. Nearly three-fourths of the plantations met international sustainable forestry certification standards. This success is attributable to the expansion of low interest credit to farmers, the availability of quality inputs from accredited nurseries, technical advice and extension services tied to the creation of 800 farm forest groups, land-use certificates that enabled farmers to invest over the long-run and continued robust market demand for timber.

Post-project surveys indicate that the financial rates of return to forest smallholders were on average 24% (average net present values of USD 3,000 per ha), mainly due to good timber yields, moderate costs and high stumpage prices (Frey *et al.* 2016). By increasing land and labor productivity through forest plantations and new skills, smallholder forestry in Vietnam appears to offer households a commercial opportunity to meet both short- and long-term economic needs

(Sandewall *et al.* 2015). These results were facilitated by multiple complementary actions. The government's commitment to giving farmers long-term rights to land, the growth in markets for wood products and a supportive regulatory environment enabled farmers to obtain credit and sell their products. Thus, plantation forestry investments in land and household skills (P) in Vietnam were aided by strategies to strengthen rights (R) and access to financial institutions (I) and markets (M).

2. *Wealth accumulation through rights and empowerment (R)*

Communities use private, public and communally-held forest lands to meet livelihood needs. Globally, 76% of global forests are controlled by governments,¹¹ with the other 24% managed by communities and the private sector (FAO 2015). Community control over forests has increased, from 21% in 2002 to 30% in 2013 – a trend that is largely driven by changes in Latin America and China (RRI 2014).¹² This is a positive trend given evidence that strengthened indigenous and local community rights over forests can contribute to reductions in forest deforestation and degradation (Blackman *et al.* 2017; Chhatre and Agrawal 2009; Robinson *et al.* 2014; Persha *et al.* 2011; Shyamsundar and Ghate 2014).

Security of tenure and rights over forest resources is important because it can promote investments, increase productivity and contribute to social standing (Meinzen-Dick 2009).¹³ However, does empowering the poor with better rights over forests reduce poverty? There is little quantitative evidence to provide a direct answer to this question; and, rights, by themselves, are inadequate if the poor face other significant barriers (Delville 2010).¹⁴ Nonetheless, secure rights and contracts are foundational for sound economic development (FAO 2011).¹⁵

While there are many ongoing attempts to strengthen local rights over forests, the effectiveness of such policies can be undermined by burdensome legal requirements, the heterogeneous needs of communities and the costs associated with co-management with the state (Cronkleton *et al.* 2012). Often, reform-based legal access to resources is correlated with factors such as education, location and income. Thus, tenure reform can hurt the less-educated poor, particularly if it fails to consider the customary, secondary and informal rights that the poor may have (Meinzen-Dick 2009).¹⁶ Further, where households sell forest products, the benefits from reforms depend on the capacity of communities to successfully engage with markets (Pacheco 2012). Based on a ten-country study, Larson and Dahal (2012) argue, for instance, that rights do not necessarily translate to livelihood improvements unless they are backed by other economic measures. One such measure may be secondary organizations or federations that can lobby for local communities (Paudel *et al.* 2012).

To understand the poverty implications of large-scale tenure reform, we examine forest decentralization in Albania, a small nation that remains one of Europe's poorest countries (World Bank 2015b; USAID 2016).¹⁷ Some 56% of Albania is forested or in pasture and 44% of rural Albanians rely on these lands for timber and NTFPs (Suli *et al.* 2013; Lako 2008). Albania's most significant forestry reform has been to accord resource rights and privileges to communities and family and individual users.¹⁸ In 1991, as part of Albania's transition away from communism, the government began to recreate historical communal forest and pasture lands by transferring forests to local government units.¹⁹

Forest-tenure reforms in Albania started with a pilot transfer of rights to 30 communes and then spread to cover some 345 communes (approximately one million Albanians) and 40% of forest and pasture lands (Lako 2008).²⁰ Accordingly, from 2005-2011, 281 communes in Albania

introduced participatory forest and pasture management plans in erosion-prone uplands and undertook a variety of other forestry activities (World Bank 2013).²¹ Post-project surveys indicate that households in communities where forestry and management plans were implemented realized an eight percent increase in average annual income, while households in communities where micro-catchment plans were implemented realized a 28% increase. Increases in income came from improved agricultural, forest and pasture productivity. Public benefits were also realized through erosion reduction and carbon sequestration (World Bank 2013). While it is useful to note such positive outcomes, these results cannot be fully attributed to project inputs or to the strengthening of local rights over forests given the absence of counterfactual information (Ferraro 2009; Baylis *et al.* 2016).²²

Albania's decentralization effort in the forest sector took time, but is noteworthy because of its national scope. Here, the poverty reduction efforts combined decentralized forestry rights (R), with institutional reforms (I) of government and non-government agencies to facilitate the transfer of rights and technical assistance to improve skills and productivity (P) (World Bank 2013; Suli *et al.* 2013; Lako 2008). Again, the Albanian example points to the importance of multiple, synergistic strategies.

3. Investing in regional institutions, infrastructure and public services (I)

A sizable literature points to how improvements in public services and the performance of public institutions can enhance the productivity of traditional rural economic activities, increase access to new markets, and empower the poor (Barrett *et al.* 2011; Barbier *et al.* 2016). There is strong evidence of the positive impacts of roads, electricity, health care and other services on poverty reduction (Deininger and Okidi 2003; Chomitz 2007; Khandker *et al.* 2013; van de Walle

et al. 2015). In addition, reforms that provide clarity over laws, lessen regulatory and financial constraints and provide social support can help reduce barriers for market exchange and empower households to take reasonable risks. This is particularly important for market-based transactions in remote forest landscapes (Pacheco *et al.* 2016; Mirjam and Kusters 2011).

Although the usefulness of the “I” in PRIME for poverty reduction in forest landscapes is generally clear, forest safeguard issues are a consideration. A principal worry with investments such as roads, for instance, is that they can contribute to deforestation by increasing access to logging, bringing in secondary settlements or attracting migrants (Angelsen 2010; Chomitz 2007). Furthermore, the responsibility for economic development in forest landscapes often falls outside the mandate of forestry agencies, making it difficult to develop appropriate policies.

To deepen our understanding of how poverty might be reduced through public support in forest landscapes, we apply the PRIME framework to assess Bolsa Verde, a Brazilian program that is specifically trying to surmount the locational challenges of poverty reduction in remote areas. Bolsa Verde is a social protection program that is being implemented in many extractive reserves and sustainable use forests in Brazil (AFC and ILO 2016; Schwarzer *et al.* 2016). It seeks to expand Brazil’s well-established social security support to communities who have previously not benefited from it. While less than 16% of Brazil's population is rural, about half of the rural population lives in extreme poverty (2010 Census, cited in Viana 2015), often residing in environmentally sensitive areas. To address the needs of such households, the Ministry of Environment collaborated with the Ministry of Social Development to create Bolsa Verde as part of the ‘Brazil Without Extreme Poverty’ plan.²³ The WBG acted as a catalyst by supporting initial enrollment into Bolsa Verde through its Amazon Region Protected Area operation.²⁴

Bolsa Verde expands the institutional framework developed under Bolsa Família, Brazil's large poverty reduction program that seeks to lift about one quarter of its population out of poverty through a combination of cash transfers and increased access to social and health services (Helmann 2015). Unlike a PES scheme, Bolsa Verde provides social security support to help households who live under extreme poverty in targeted forest landscapes such as territories occupied by traditional communities. This institutional reform seeks to support the subsistence needs of the forest-dependent poor and lower risks, which may enable some households to take on new productive activities or seek new jobs.

Under the Bolsa Verde program, households who are already registered under Bolsa Família receive a quarterly stipend of USD 139 per family (Schwarzer *et al.* 2016). Through an international collaboration with the British Embassy, households are also expected to receive training and technical support on production processes and marketing. While recipient households continue to extract forest resources for subsistence or artisanal purposes, they agree to various conditions tied to the specific regulations associated with the forest area in which they live (Viana 2015).²⁵ In terms of monitoring, a geo-referenced information system is being developed that will match information on payments and periodic monitoring of a sample of beneficiaries with remotely sensed data on the vegetation changes (Schwarzer *et al.* 2016).

Bolsa Verde represents a relatively new type of poverty reduction strategy that could potentially be replicated in other forest landscapes. As the program becomes fully operational, it will need to be tracked to understand whether and to what extent geographically targeted investments (“I”) through social security payments can contribute to positive welfare and forestry outcomes.

4. *Improving Market Access (M)*

Recent trends have opened new opportunities in timber and non-timber markets for poor households. Greater devolution of forest management to local communities have enhanced their access to resources. In addition, technological changes in the plywood and paper industry and the introduction of portable sawmills have made small-scale producers and plantations more competitive (Angelsen and Wunder 2003; Scherr *et al.* 2004). SMEs focusing on carpentry, woodworking, and weaving, etc. also provide important off-farm and peri-urban employment (FAO 1987; Arnold *et al.* 1994). However, these new technologies and market opportunities may further increase pressure on forests by increasing demand for ‘any tree of any size’ (Angelsen and Wunder 2003; Belcher and Kusters 2004).²⁶

One possibility for achieving both poverty reduction and sustainability is to access the growing market for certified timber through, for example, the Forest Stewardship Council (FSC) (Rametsteiner and Simula 2003; Romero *et al.* 2013). The area under international forest certification has risen from 14 million ha in 2000 to 438 million ha in 2014 (FAO 2015). However, participation in certification schemes can be cumbersome for forest-dependent SMEs (Molnar 2004), unless they band together under community forestry enterprises (CFEs) and receive external support (FSC 2004; Antinori and Bray 2005). CFEs can help address many certification challenges related to the scale, quality and sustainability of timber management and associated transaction costs (Molnar 2004; Wiersum *et al.* 2011; Burivalova *et al.* 2016).

Production and marketing of NTFPs such as medicinal plants, bush meat, nuts, and honey, play a key role in supporting the incomes of many poor households (Neuman and Hirsch 2000; Angelsen *et al.* 2014). However, commercially successful NTFPs are relatively rare because they require a high value-weight ratio, low product adulteration and a stable resource base and market

(Angelsen and Wunder 2003; Belcher *et al.* 2005).²⁷ Moreover, poor households often obtain a small share of the final benefits due to high regulatory burden, weak bargaining power (Sunderland and Ndoye 2004) and exploitative market chains (Rasul *et al.* 2008; Shackleton and Gumbo 2010).²⁸ One strategy to expand market access for NTFPs would be to register them under Geographical Indication, an intellectual property recognized by the World Trade Organization (Egelyng *et al.* 2016).²⁹ Such ‘origin’ markets, like certification schemes, will need support to be successful.

Lastly, wood-based fuels offer another opportunity to increase market access for the poor, as they play a critical role in meeting their energy needs (FAO 2014) and require few skills or technology to enter the market (Angelsen and Wunder 2003). The employment potential through small-scale wood collection, charcoal production, transportation, and last-mile retail is substantial (World Bank 2011), with the charcoal sector in Sub-Saharan Africa alone employing around seven million people. While these typically informal markets can be legalized and made more pro-poor,³⁰ such formalization may become a threat to forests (Makonda and Gillah 2007; FAO 2010, Zulu *et al.* 2013). Thus, sourcing fuelwood and charcoal as a by-product of land clearing or through tree planting on farms may be critical (Angelsen and Wunder 2003).

In all the markets discussed above, the poor clearly face challenges both in entering the market and extracting sufficient rent from the sale of forest products. A strategy to surpass some of these barriers is for smallholders to organize themselves into self-governing forest producer organizations (FAO and Agricord 2012 and 2016; Macqueen 2013). These offer members political and economic services, including lobbying for policy changes, economies of scale, information on prices and quality requirements, capacity building, and better linkages to government institutions, the private sector, financial institutions and development agencies (Hajjar and Kozak 2017).

Mexico provides examples of how communities can mobilize to sustainably manage their own forest resources.³¹ Most of the forest land in Mexico, which makes up 34% of the total land area, is owned and managed by indigenous communities (*comunidades*) or groups of formerly landless rural people (*ejidos*) (Antinori and Rauser 2010). The WBG has invested USD 835 million in forestry and climate change programs in Mexico since the late 1990s.³² This funding has provided technical assistance and capacity building to targeted CFEs and enabled Mexico's National Forestry Commission to run a nationwide CFE program. These investments have contributed to increased participation of communities in CFEs (the latest project increased the number of participating *comunidades* and *ejidos* by more than 55%), improved forest management, stronger associations and improvements in community access to credit, certification schemes and markets (World Bank 2016d).

A recent review of these WBG initiatives has shown that most CFEs, particularly those focused on forest management and sawmills, were profitable (Cubbage *et al.* 2015)³³ and some 9,000 jobs were created during the 2011-2014 period. The benefits went beyond the creation of income and jobs as communities also received a user fee from CFEs,³⁴ which was typically invested in local public goods, and in some instances dividends (Antinori and Rauser 2010). While the financial viability of these CFEs is encouraging, they benefitted from prevailing high timber prices. Thus, continued success will likely depend on their ability to curtail production costs by reducing wastage and increasing efficiency throughout the value chain. This will require targeted technical and financial assistance (Cubbage *et al.* 2015), i.e. investments in productivity (P) and in regional infrastructure, institutions and public services (I), highlighting again the important synergies across the PRIME strategies.

5. *Ecosystem services for poverty reduction (E)*

Forests provide critical ecosystem services, including water regulation and filtration, carbon sequestration, erosion control, pollination, biodiversity and storm protection (Canadell and Raupach 2008; MEA 2005; Cohn *et al.* in this issue). Many approaches aimed at conserving ecosystem services have implications poverty reduction. A well-known market-driven approach to increase economic benefits from ecosystem services is nature-based tourism, which has emerged as a driver of growth in many developing economies (Hall 2007; Narain and Orfei 2012). There is now better evidence to suggest that protected area systems can contribute to poverty reduction (Andam *et al.* 2010). Regulating services from forests are also clearly important for maintaining not only livelihoods but also productivity in agriculture, agroforestry, hydropower and other sectors (Ricketts *et al.* 2004; Cohn *et al.* in this issue). An increasingly common strategy for managing ecosystem services is to construct markets that protect ecosystems while providing payments to local communities (Bulte *et al.* 2008; Alix-Garcia and Wolff 2014).

One such market is PES, which is now viewed not only as an instrument to manage natural areas but also to reduce rural poverty (Landell-Mills and Porras 2002; Pagiola *et al.* 2005). Scholars, however, caution that it takes careful design to achieve one, let alone two goals, with this one policy instrument (Alix-Garcia and Wolff 2014; Milder *et al.* 2010; Wunder *et al.* 2008; Pagiola *et al.* 2005). PES programs may choose to meet forest protection goals cost-effectively by targeting a few sellers of ecosystem services, a strategy that will likely favor payments to larger landowners. In addition, areas that deliver important ecosystem services may not overlap with where the poor live (Ferraro 2008; Fisher 2012; Robalino *et al.* 2014). A case in point is China's Grain for Green program, which increased soil organic carbon (Song *et al.* 2014), but with moderate impacts on poverty, possibly because the selection criteria prioritized off-site soil erosion

rather than poverty reduction (Uchida *et al.* 2007). In addition to such design issues, PES participation and the benefits accruing to the poor depend on household characteristics and the opportunity and transaction costs that households face (Pagiola *et al.* 2005; Bulte *et al.* 2008; Wunder 2008).³⁵

Mexico's PES program is among the largest national ecosystem payment programs in the world. Between 2003 and 2011, with WBG support, Mexico's National Forestry Commission, allocated USD 489 million for PES activities, supporting conservation in 3.4 million ha (5.2%) of forests and targeting some 5,967 *ejidos*, communities and smallholders (CONAFOR 2011; Shapiro-Garza 2013). PES activities in Mexico began as straightforward, market-based payment programs. However, through interactions with social movements and national and local politics, they were 'hybridized' in implementation and developed a strong poverty reduction focus (Shapiro-Garza 2013).

Mexico's Payments of Ecosystem Services-Hydrological (PSAH) program pays landowners to maintain forest cover for five-year periods. Payments are made for communally and privately held forests, with the payment varying, depending on the relative deforestation risk faced by a parcel of land.³⁶ PSAH payments, on average, amount to USD 3,050 per year per household (12% of household income) for private owners and USD 130 per year per capita in common property areas (about one month of work at minimum wages) (Alix-Garcia *et al.* 2015). Households associated with community forests tend to be poorer and more dependent on agriculture, making PES an important source of income.

A recent study of the environmental and socioeconomic impacts of the PSAH program shows that it reduced land cover loss from deforestation or degradation by 40-51% compared to rates in the absence of the program (Alix-Garcia *et al.* 2015).³⁷ However, the program only slightly

reduced poverty at the local level. The authors argue that this is because: a) there is generally a trade-off between conservation in forest-rich areas and poverty, with a stronger overlap between deforestation risk and poverty in community forestry areas relative to private forests; and b) the participation costs of actively managing natural forests (fire and pest management and patrols) are high enough to make payments less profitable at the household level.

How PES can meet both environmental and poverty reduction goals is an important issue, particularly in the context of global-scale carbon payments that REDD+ seeks to make. WBG experience suggests that it is crucial to design inclusive systems that are mindful of unexpected consequences for the poor. As discussed, PES is more likely to be a pathway out of poverty when forests associated with high deforestation risks are owned or managed by the poor. This may require creative strategies to strengthen rights (R). Improving productivity (P) and reducing the regulatory burden (I) can further help reduce transaction and post-implementation costs, thereby improving poverty outcomes.

5. Paying attention to gender

Any implementation of PRIME strategies will need to account for differences and marginalization across social groups and within households in forest landscapes (Aguilar *et al.* 2011). Attention to gender issues is particularly important, as there are major differences in how, why and where men and women access, use, manage and benefit from forests.³⁸ Globally, women contribute as much to households' forest income as do men,³⁹ but their roles in collecting forest products vary significantly across regions (Sunderland *et al.* 2014). In Africa, for example, women are the main collectors of subsistence-oriented forest products; whereas in Latin America, men

dominate firewood collection. Men are also more involved in hunting, wood harvesting, and minerals extraction across regions.

Persistent gender gaps in access to services, markets and value-addition activities, land and tree tenure, as well as voice and agency result in forestry programs that often marginalize women (Colfer *et al.* 2016).⁴⁰ Thus, gender-sensitive designs and institutional arrangements can ensure more equitable and effective development outcomes. For instance, Agrawal (2009) shows that enhancing women's presence in community forestry institutions improved resource conservation and regeneration in Nepal and India. Interventions targeted solely at women may not be sufficient, however. In East Africa and Latin America, forest-user groups that were predominantly female were found to perform less well than mixed or male-dominated groups, suggesting additional efforts aimed at addressing gender bias in technology access and dissemination, women's labor constraints and limitations in women's sanctioning authority were needed (Mwangi *et al.* 2011).

In fact, there are many constraints to achieving gender-sensitive outcomes in forest and agroforestry efforts (Kiptot 2015; Colfer *et al.* 2015). Common challenges include gendered norms and cultural prejudices that reinforce forestry as a male profession, women's limited representation in decision-making, limited technical capacity and budgets to implement gender-focused activities as well as a lack of evidence-based research and gender-disaggregated data, (Buchy 2012). Successful forestry-related strategies addressing these challenges have included participatory consultations to discuss gender gaps in forest policies and practices (Aguilar *et al.* 2011), creating forest-gender working groups and learning networks (Gurung *et al.* 2011; WOCAN 2016; Agarwal 2015), re-engineering forest management structures and setting up gender-sensitive monitoring and evaluation systems (Buchy 2012; WOCAN 2016) and benefit-sharing mechanisms (Shames *et al.* 2012).

While the WBG has a strong commitment to gender issues, forestry operations are often focused on environmental or household-level outcomes, making it difficult to tease out differences in impacts on women and men. An exception is China's recent land tenure reform, which granted new land tenure rights to over 90 million farming households, covering around 184 million ha of forest land between 2008 and 2014 (World Bank 2016c). A gender analysis of the reform showed that 89% of female household heads were satisfied with the forest policy reforms, and 60% of the sampled villages cited positive attitudes about women's role in the reform (World Bank 2016c). This was attributed to increases in: job opportunities and employment for women, the number of women starting up small and micro-forestry enterprises, forest-related income for female-headed households, access by women to forestry technologies and women's participation in village activities. However, the assessment also identified two important limitations, namely that forest tenure certificates only recognize the head of household (in 95% of cases a man's name) and that women lose their share of forest land after they get married, divorced or are widowed.

This example suggests that addressing gender gaps can help ensure that the PRIME framework achieves its full poverty reduction potential by, for example, providing women with new forestry skills (P), more secure tenure (R), and access to new jobs and markets (M). While the discussion here has focused on gender, similar differentiated approaches are needed to target the challenges faced by indigenous peoples or ethnic minorities who have traditionally been largely excluded from forest-related dialogues and interventions.

6. Conclusions

The PRIME framework highlights five complementary strategies for reducing poverty among those living in and around forests. By emphasizing interventions that both enhance forest

resource-based livelihoods and reduce geographic limitations, it seeks to identify a comprehensive approach to poverty reduction. A large and complex literature on poverty, poverty-environment traps and forestry interventions is molded into a simple framework that can be readily applied and adjusted to different country contexts.

Effective poverty reduction in forest landscapes is likely to be conditional on multiple PRIME strategies being implemented simultaneously. Capacity development is integral to improving productivity, stronger and equitable forest and land rights strengthen agency, and inclusive institutions and services are needed for forest landscapes to provide pathways out of poverty. Gender-responsive interventions and institutional arrangements are equally critical, as women are key players necessary for achieving sustainable forest management. Our case studies illustrate how poverty-related outcomes are facilitated by synergies among different PRIME strategies. For instance, the government granting long-term forest tenure to households, providing training to improve people's forest management skills and increasing access to credit and other regional complementary investments were essential to success in Vietnam and Albania.

Even if all five PRIME pathways are not present, an incremental approach can be useful. However, there may be some path-dependencies. Without secure rights over resource extraction, for instance, interventions that support the supply of forest products to markets may fail. In the case of Mexico, strengthening CFEs and introducing PES was possible because the forestry institutions in the country were decentralized. Similarly, land tenure reform in China enabled households to take advantage of new employment and market opportunities, but had different impacts on women and men, stressing the need to carefully analyze not only the differences across but also within households.

Over time, poverty reduction in forest areas will likely be no different than what is seen in agricultural areas: ‘off-forest’ jobs and migration (Hecht *et al.* 2016) will play a significant role in changing the relationship between forests and people. We see this trend in forest villages in middle-income countries such as Turkey and Albania (World Bank 2016b; IOM 2016). This implies that communities need to be supported to seek off-forest jobs, while simultaneously strengthening their ability to benefit from forest resources in a sustainable manner. The PRIME framework, we hope, is useful precisely because it stresses both direct forest-income generation strategies and complementary regional investments that will support the poor in finding new opportunities.

Conceptualizing the multiple ways forests may contribute to poverty reduction has potentially high pay-offs in terms of identifying concrete actions to pursue. The PRIME framework can help multiple stakeholders – whether a researcher, investor, policymaker or practitioner – to better recognize and articulate which poverty strategy needs to be highlighted in different forest landscapes. The framework is intentionally broad in scope, with the idea that it can be made much more specific when applied to a country or region. In each case, the framework can be used for developing a theory of change as well as determining the sequence of interventions based on local contexts, scale of the intervention and available forest resources.

While PRIME offers a comprehensive view on poverty reduction, it would be important to carefully evaluate the forest-related outcomes of any specific intervention. There may be trade-offs between the socioeconomic and environmental effects of poverty-reducing interventions. Thus, stringent social and environmental safeguards may be needed to ensure that potential negative impacts on forests are effectively addressed. Within each country context, it may be

useful to match specific PRIME strategies with a parallel set of forest safeguards and to track both poverty and forest indicators over time.

The dearth of strong evidence on the poverty impacts of specific forest-related interventions would caution us to use PRIME as a conceptual approach for thinking through pathways and for analyzing complex interventions, rather than as a tool to measure the relative contribution of each type of investment to reduce poverty. Its practical utility is currently being further tested at the WBG, where project leaders have been asked by the Program on Forests (PROFOR) to consider this framework, including guidance on incorporating gender, at the earliest stages of project and program design. However, any individual intervention within a specific country context will need to be rigorously evaluated to ascertain welfare outcomes.

In terms of future research directions, the framework and our application of it in this analysis demonstrate a need for better program evaluation of different forestry-interventions (for instance, Bolsa Verde) and standard instruments to measure forest use and benefits and costs. Both these actions will strengthen the evidence on different PRIME strategies and synergies between them. Here, FAO, CIFOR, IFRI and the WBG recently launched a standard survey instrument, called the Forestry Living Standards Measurement Survey (FAO *et al.* 2016). Combining such field-based surveys with participatory gender-disaggregated approaches and, ideally, satellite (forest/tree cover) data, offer exciting opportunities for measuring and monitoring forest sustainability and poverty simultaneously. It is only when more countries implement such approaches that we will begin to see more convincing evidence on the complex role and contributions forest landscapes can play for the diverse communities and people that depend on them.

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Endnotes:

¹ Hosonuma *et al.* (2012), based on data from 46 countries, estimate that commercial agriculture accounts for 40% of deforestation and local/subsistence agriculture accounts for 33% of deforestation; timber extraction and logging account for some 52% and fuelwood collection and charcoal production (mainly small-scale activities, particularly in Africa) account for 31% of forest degradation.

² The term forest-dependent poor is commonly used to refer to households who ‘gain some form of benefits’ from forests (Newton *et al.* 2016). However, as Newton *et al.* (2016) argue, there are many definitions of ‘forest-dependent households’, making it difficult to compare such communities across studies or to get an understanding of the overall numbers of such populations.

³ Establishing the exact share of the WBG’s engagement is not easy since the WBG uses multiple instruments. IDA funds are related to other official development assistance from bilateral and multilateral sources, however, IBRD and IFC financing can be akin to non-concessional public and commercial financing.

⁴ The WBG’s investments are dwarfed by international private financial flows into forestry, which, however, mostly go to forests in North America rather than natural forests in developing countries. Private flows to forestry are estimated at USD 15 billion per year (Asen *et al.* 2012). Because of its mandate to fund forestry initiatives related to climate change, the WBG’s contributions to sustainable forest management may grow.

⁵ One concern with improving labor productivity is that it may result in higher benefits that accrue to a smaller number of more productive people.

⁶ Regulatory ecosystem services (e.g. soil retention, water regulation) underpin provisioning services (food, water, energy) from both forests and adjacent ecosystems

⁷ Far fewer projects were implemented in the Middle East and North Africa (5%) and South Asia (3%).

⁸ The income groups are determined by the Gross National Income per capita. Current thresholds in US\$ are:

Low income (L)	<= 1,005
Lower middle income (LM)	1,006-3,955
Upper middle income (UM)	3,956-12,235
High income (H)	> 12,235

⁹ Between 1990 and 2010, plantation forests in Vietnam increased by some 270%, with plantation forests covering some 25% of forested lands (FAO and JRC 2012). However, primary forests in Vietnam have decreased (FAO and JRC 2012, Auer 2012).

¹⁰ By 2008, the processing sector was already one of Vietnam's top five export sectors (Putzel *et al.* 2012).

¹¹ This share increases considerably for Western and Central Africa (99%), Western and Central Asia (98%), and South and Southeast Asia (90%).

¹² Forest land brought under community ownership during 2008-2013 is less than 20% of what was secured in the previous six years. In addition, much of the handover to communities has happened in Latin America and China. In peninsular and archipelagic South East Asia and the Congo-Basin, for instance, states retain legal control over 98, 75 and 99% of forests. Further, implementation of tenure reforms are weak and do not provide strong security of tenure (Rights and Resources Initiative 2014).

¹³ The nature of rights (private, formal or informal) often matters less than the scope of the bundle of rights, (use, management, exclusion and alienation) (Meinzen-Dick 2009). Informal rights can also induce investments, if social institutions offer security and private rights do not ensure investments (Delville 2010, FAO 2011).

¹⁴ A large global household survey (Jagger *et al.* 2014) finds that average forest incomes are lower in community-managed forests relative to state-managed forests. Such evidence does not, however, undermine the hypothesis that rights over forest resources can benefit communities; rather it reinforces a common understanding that communities are often handed over the least productive forests.

¹⁵ Notably, for poverty reduction, rights may go beyond rights to forest products and include rights to lease land for gas pipelines, for example, or the right to mine underground resources, although these are the least likely rights to be handed over to communities.

¹⁶ Initial evidence from Zambia, for instance, points to the possibility of elite capture in REDD+ projects, with tenure

¹⁸ These local units are supported through 258 Community Forest and Pasture Users' Associations, which are managed under eight Regional and one National Communal Forest and Pastures Federation.

¹⁹ In the early part of the last century, Albania's first Forest Law (1923) established communal, village and private ownership of forest lands. However, this ended post-World War II, with communism's insistence on agricultural cooperatives.

²⁰ Recent re-structuring has made the new National Agency for Protected Areas being responsible for 16% of the territory (the protected areas), while municipalities will manage 80%.

²¹ The WBG completed the Albania Forestry Project (1996-2004) and the Natural Resources Development Project (NRDP, 2005-2011) and has a third operation on-going that focuses on environmental services.

²² Economic growth in Albania lifted a significant number of people out of poverty during the 2000s (World Bank 2015).

²³ It provides 0.4% of Brazil's GDP as conditional transfers to the poor (Soares 2015). While controversial, there is evidence to show that Bolsa Família has reduced poverty, made a significant dent in inequality and increased the participation of girls in schooling (Tepperman 2015, Soares 2013, de Brauwa 2015).

²⁴ Upon completion of its third phase in 2018, Amazon Region Protected Area will cover nearly 70 million ha of rainforest (World Bank website, accessed 05/12/2016)

²⁵ Ministry of the Environment issues the Terms of Adherence to the Programme or "TAP" to each household based on where they live and the requirements of those areas (Viana 2015).

²⁶ Alongside improving access to markets, it will be critical to safeguard natural forests and promote other sources of timber, for example through smallholder forest plantations (Angelsen and Wunder 2003) and outgrower schemes with the private sector (Mayers 2000, Desmond and Race 2001).

²⁷ Shea butter is Burkina Faso's third most important national export and a key source of income to poor, often landless women (Schreckenber 2004). It contributes up to 40-60% to their income (Tincani 2013) and employs around four

²⁸ In the few instances when a product can break the deadlock, more powerful external stakeholders tend to enter, driving out the poor who lack the required skills, resources, connections as well as market information to compete successfully (Angelsen and Wunder 2003, Belcher and Kusters 2004).

²⁹ One such example is Oku honey from Cameroon, which is produced by groups of small-scale honey producers and marketed through cooperatives (Chabrol *et al.* 2015). After PGI registration in 2013, its price increased from 1,500 to 4,000 FCFA (USD 2.8-7.5) for a liter of processed honey and several new SMEs were created (WIPO 2014).

³⁰ For example, in Mali, woodcutters benefitted when rural wood markets were formalized with harvesting quotas, identification of points of sale and oversight by a management agency (Gautier *et al.* 2005).

³¹ Over 60% of Mexico's rural population is poor.

³² This support included the Community Forestry Projects (PROCYMAF I from 1997-2003 and II 2003-2008), the Environmental Services Project (2006-2011) and the Mexico Forests and Climate Change Project (2012-2017).

³³ Profitability for the forest management component, for example, ranged from a maximum of USD 1,228/ha to a minimum of USD 0/ha (average profit = USD 180/ha), with only one CFE having a negative profit. (Cubbage *et al.* 2015)

³⁴ Payments to communities accounted for 13% of forest management costs on average.

³⁵ Wunder (2008) states that participation in PES programs is determined by owning enough “environmentally strategic land”; trusting the purchaser; having sufficient capacity to meet program monitoring/production requirements; and that payments exceed opportunity costs.

³⁶ For example, yearly payments correspond to approximately USD 36 per ha for cloud forest and USD 27 per ha for other forest types (Alix-Garcia *et al.* 2015).

³⁷ Environmental impacts for the 2004-2009 program cohorts used land cover data from 2000-2012 and national program data. Socioeconomic impacts at the household level used survey data from 2007-2011 for a nationally-representative subsample of the 2008 cohort and at the locality level using changes in the poverty index from 2000-

³⁹ This differs across regions. The share of overall income from processed forest products (e.g. furniture) is higher for men (61%) than women (25%) across the three regions (Sunderland *et al.* 2014). Women also collect more forest products than men from common property resources in Latin America and Asia, but not in Africa (Sunderland *et al.* 2014, Jagger *et al.* 2014).

⁴⁰ And in some areas, men's migration from rural areas has left women to assume the spectrum of agricultural and forest management roles, often without the resources or agency to do so successfully.

Tables:

Table 1: Criteria for applying PRIME criteria to WB Forestry portfolio

Theme	Description of included interventions
Productivity	<p>Decision criteria:</p> <ul style="list-style-type: none"> • Include if the intervention boosts productivity through enhancements to forestry land, machinery or labor. • Exclude if the intervention focuses on enhancing agricultural or other non-forest sector productivity. <p>Examples:</p> <ul style="list-style-type: none"> • Training individuals or communities in forest management (e.g. planting, harvesting, monitoring), management of non-timber forest products and/or agroforestry production • Providing machinery and/or technology to enhance productivity, such as portable saw mills, seedlings, or fertilizer
Rights	<p>Decision criteria:</p> <ul style="list-style-type: none"> • Include if the intervention strengthens formal or informal rights (including decision-making processes) over forests/land. • Exclude if the intervention only includes participatory component in project design, implementation and/or monitoring. <p>Examples:</p> <ul style="list-style-type: none"> • Granting individuals and/or communities forest and tree ownership and/or use rights • Strengthening community-based forest user groups
Regional complementary Investments	<p>Decision criteria:</p> <ul style="list-style-type: none"> • Include if the intervention provides complementary investments in institutions, infrastructure and public services at the regional level that support the forestry sector. • Exclude if the intervention supports broad-based institutional reform, such as the development of a national forest sector strategy or land use plan <p>Examples:</p> <ul style="list-style-type: none"> • Institutional reforms to reduce bureaucratic/legal hindrances and streamlining of regulatory processes for small-scale forest enterprises or creating institutional mechanisms to enhance forest economic activities • Introducing safety net programs tied to remote forest landscapes • Improving rural connectivity, including transport and IT infrastructure to enhance forest livelihoods. • Increasing access to credit to support forest management, agroforestry or the production of NTFPs • Increasing capacity of forest agency staff to support livelihood programs
Market access	<p>Decision criteria:</p> <ul style="list-style-type: none"> • Include if the intervention enhances market access through marketing and logistics support or value addition • Exclude if the intervention improves infrastructure access to markets, such as through roads, as this is included in “I” <p>Examples:</p> <ul style="list-style-type: none"> • Introducing certification schemes for timber or origin products for NTFPs • Formalizing markets for sustainable charcoal and fuelwood production • Developing new/additional forest products and /or adding value to existing products • Creation of producer networks and cooperatives.
Ecosystem services	<p>Decision criteria:</p> <ul style="list-style-type: none"> • Include if the intervention enhances the returns from ecosystem services in an equitable manner, including monetary, such as REDD or other carbon sequestration payments, as well as non-monetary income from ecosystem asset or services • Exclude if the intervention is not livelihoods-oriented, i.e. if it has a conservation focus <p>Examples:</p>

- Introducing payment for ecosystem services, such as REDD+
- Developing nature tourism initiatives that benefit local poor
- Training on managing forest ecosystem services and ecotourism

Table 2: PRIME themes featuring in projects

No. of PRIME themes per project	Share of projects
0	13.20%
1	7.90%
2	44.70%
3	13.20%
4	18.40%
5	2.60%

Table 3: Forest and Poverty Indicators in case study countries

Indicator	Albania	Brazil	China	Mexico	Vietnam	Source
1 Forest Area (% of land area) (2015)	28	59	22	34	48	FAO (2015)
2 Deforestation rate (annual % change 2010-2015)	-0.1	-0.2	0.8	-0.1	0.9	FAO (2015)
3 Rural Population (% of total)	0.43	0.14	0.44	0.21	0.66	World Bank Indicators 2015
4 Rural Population Growth (average, 2010-2015)	-11.7%	-4.4%	-10.4%	0.2%	0.6%	Estimated from World Bank Indicators 2015
5 Rural Population/Forest Area (ha) 2015	1.60	0.06	2.92	0.40	4.12	Estimated from World Bank Indicators 2015
6 GDP Per Capita (constant 2010 USD)	4,541	11,159	6,416	9,517	1,685	World Bank Indicators 2015
7 Rural Poverty Headcount ratio (% of rural population)	15.3	Approximately 50% of rural population considered extreme poor	7.2	62.4	18.6	World Bank Indicators: Albania'12; China '14; Mexico'14; Vietnam'14. Brazil data: 2010 Census cited in Viana 2015.

8	Indigenous Peoples and Local Community Forests (% Change 2002-2013) [1]	No data	68%	16%	4%	3%	Rights and Resources Land Tenure Tool, accessed on December 4, 2016 from http://rightsandresources.org/en/resources/tenure-data/tenure-data-tool .
9	Indigenous Peoples and Local Community Forests as % of Total Forest Land (2013) [1]	National reforms now cover 345 communes, approximately 1 million people and 40% of forest and pasture lands.[2]	37%	61%	70%	2%	Albania: Lako 2008; Brazil, China, Mexico, and Vietnam data from Rights and Resources 2014.
10	World Bank Forestry Portfolio, FY02-15 (Total projects/Total USD Targeting Forestry-Related Activities)	8 projects/ USD 38.8 million	19 projects/ USD 1,651 million	12 projects/ USD 840 million	17 projects/ USD 3,244 million	7 projects/ USD 259 million	World Bank (2016a)

Notes:

[1] Indigenous Peoples and Local Community Forests includes land both owned by and designated for Indigenous Peoples and Communities.

[2] Communal ownership is defined as an administrative unit comprised of a number of villages. In Albania, state forests have been transferred to communes, a Local Government Unit (LGU), which then make agreements with the villages or individual users. The process is described as not simply a transfer of use, but a transfer of management responsibility from the State government to LGUs. The transfer can be a transfer in ownership or in use, depending on LGU requests. (Lako 2008)

Figures:

Figure 1: Theory of change of poverty reduction in forest landscapes

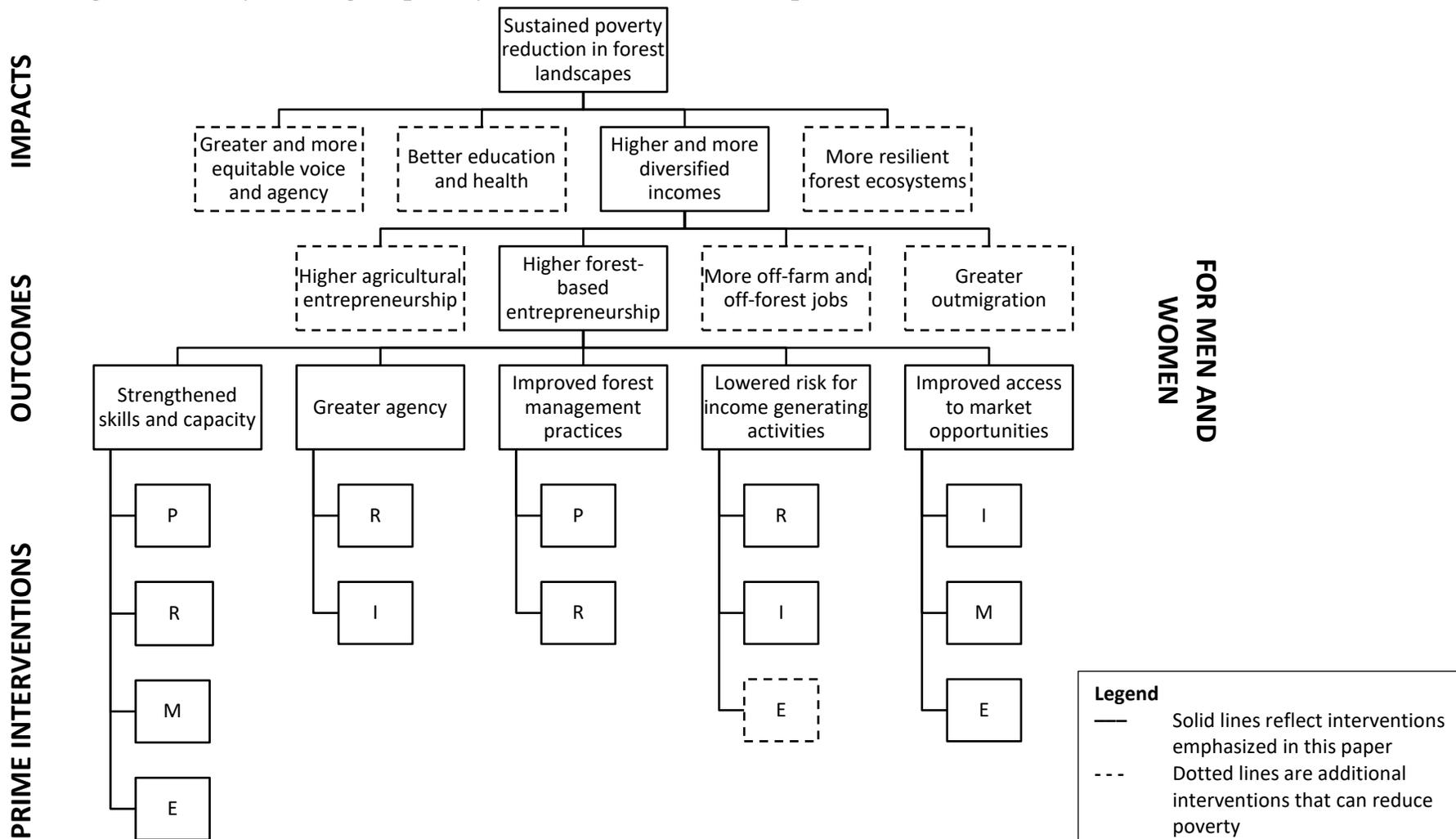
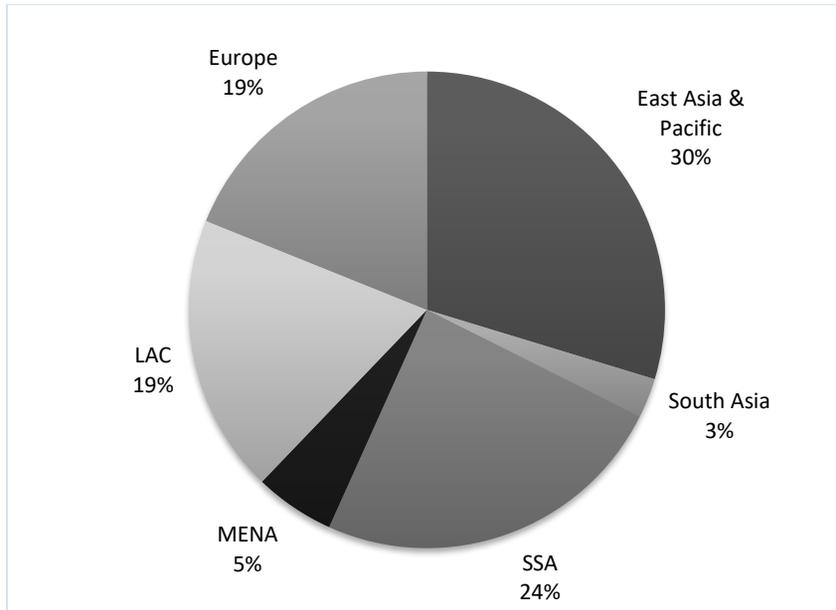


Figure 2: Distribution of countries in the WBG forestry Portfolio

Panel A: By region



Panel B: By income group

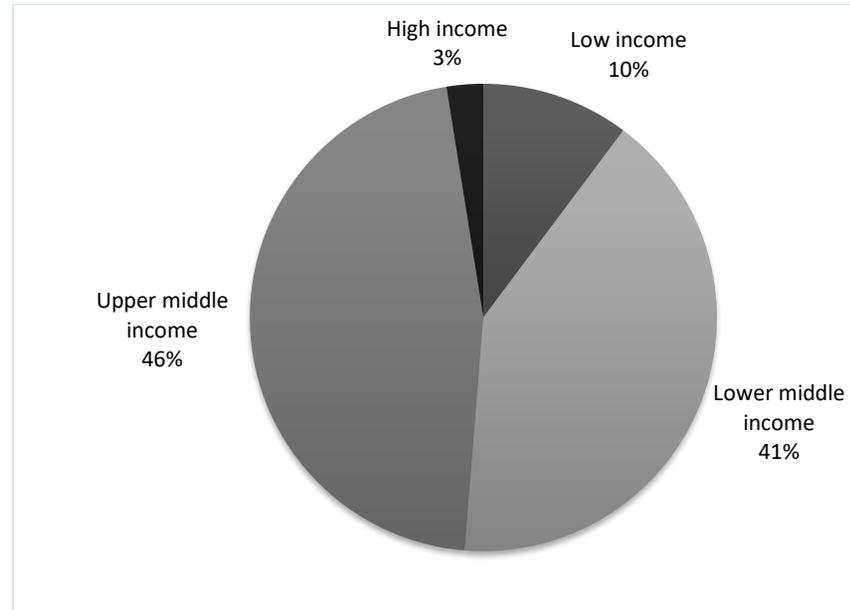


Figure 3: Projects with different thematic coverage

