WORLD RESOURCES INSTITUTE

WORKING PAPER

EXECUTIVE SUMMARY

THE ECONOMIC COSTS AND BENEFITS OF SECURING COMMUNITY FOREST TENURE: EVIDENCE FROM BRAZIL AND GUATEMALA

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For Indigenous Peoples and communities around the globe, forests provide food, shelter, income, and employment. Forests may also be historically, culturally, and spiritually significant to the people who have lived in and around them for generations. But, while Indigenous Peoples and communities occupy and use a significant portion of the world's forests, only a small fraction of community forestland is recognized by national law, and even less is protected and securely held. In 2013, Indigenous Peoples and communities held legal rights to only about 15.5 percent of the world's forests (RRI 2014).

Tenure security—defined as the certainty that a community's land rights will be recognized and protected if challenged—is linked to numerous benefits, both for communities and for society more broadly. Evidence is growing that tenure-secure community forests are associated with avoided deforestation and other ecosystem-service benefits. There are also economic and social benefits connected to communal management. Of course, securing community forest tenure also involves costs. A key question for policymakers and funding agencies is *how do these benefits and costs compare?*

The Economic Costs and Benefits of Securing Community Forest Tenure: Evidence from Brazil and Guatemala addresses this question through benefit-cost analyses of community forest tenure in Brazil's Indigenous Territories and Guatemala's Maya Biosphere Reserve. Although data limitations prevented a full accounting of all benefits and costs, the results of the analyses suggest that, in the study areas, the economic benefits of securing community forest tenure outweigh the costs.

Working Papers contain preliminary research, analysis, findings, and recommendations. They are circulated to stimulate timely discussion and critical feedback and to influence ongoing debate on emerging issues. Most working papers are eventually published in another form and their content may be revised.

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Research approach

To weigh the benefits and costs of securing community forest tenure, we focused our research on two tasks. First, we identified and described the benefits and costs associated with establishing and maintaining secure community tenure. Next, we conducted benefit-cost analyses that estimated the net economic benefits realizable from community forests, as well as the cost per tonne of carbon dioxide ($/tCO$_2$) mitigation realized through securing forest tenure that, in turn, avoids deforestation. The benefit-cost analyses focus on Indigenous Territories in the Brazilian Amazon and community concessions in the Guatemalan Maya Biosphere Reserve, although we also describe benefits and costs for a community forest-enterprise operation in Durango, Mexico in the Annex. We conducted our research over three months, relying primarily on literature

reviews and expert consultations. To our knowledge, this working paper is the first analysis to develop a benefit-cost analysis model comparing the economic benefits and costs of securing community forest tenure.

What are the benefits and costs associated with establishing and maintaining community forest tenure?

The benefits and costs associated with establishing and maintaining secure community forest tenure vary according to country contexts. Nevertheless, we identify three general categories of benefits and four general categories of costs, shown in Figure ES-1.

How do the economic benefits of securing community forest tenure compare to the costs?

Our benefit-cost analyses focused on the increased benefits and costs of a tenure-secure scenario compared to a tenure-insecure scenario in the two study areas.

Recent analyses for both areas (Blackman 2015; Nolte et al. 2013; Nepstad et al. 2006) show that deforestation rates are lower in tenure-secure community forests than in similar areas without tenure security. When trees are left standing, carbon is stored and communities are able to extract value from forest resources. For our analyses, we considered only the benefits associated with this avoided deforestation, including carbon mitigation (for both Brazil and Guatemala) and timber and non-timber production

Figure ES-1 | **Categories of Benefits and Costs Associated With Establishing and Maintaining Secure Community Forest Tenure**

BENEFITS

ECOSYSTEM-SERVICE BENEFITS

Forest ecosystems provide extractive benefits as well as non-extractive benefits. Extractive benefits include timber and non-timber forest products and recreation (e.g., hunting and fishing); non-extractive benefits include climate change mitigation, water regulation, habitat and biodiversity, protection of local and regional climate systems, and tourism.

COLLECTIVE ACTION & CONFLICT RESOLUTION

The clarification of land-use rights and roles can lead to behavioral changes by community members, which in turn can result in avoided transaction and conflict-resolution costs associated with insecure forest rights.

SOCIAL BENEFITS

These include benefits related to capacity-building efforts that strengthen local communities (e.g., job creation and community reinvestment in education and health programs).

COSTS

TENURE-SECURITY ESTABLISHMENT COSTS

Costs associated with establishing or changing the institutional and legislative framework to support community forest tenure. They include investment and transaction costs associated with legislative or regulatory changes.

COMMUNITY FOREST ESTABLISHMENT COSTS

Upfront or initial investment and transaction costs for identifying and securing lands as community forests, including identification, demarcation, registration, titling, and establishing forest-management plans.

COMMUNITY FOREST MANAGEMENT, OPERATING, & MONITORING COSTS

Annual or recurring costs associated with protecting community forest tenure; monitoring and enforcement activities on these lands to ensure rights are protected; transaction costs associated with handling disputes over community forests; production costs for timber and non-timber forest products; and recurring investments in programs or activities to support and strengthen community rights and livelihoods on these lands.

OPPORTUNITY COSTS

These include foregone income from alternative land uses.

(for Guatemala only). We estimated carbon-mitigation benefits using a social cost of carbon value of $41/tCO$_2$, based on guidance from the U.S. Interagency Working Group on the Social Cost of Carbon (2015). We compared benefits and costs of tenure security using the "net present value" for the study period: in other words, we calculated the present value of benefits minus present value costs over a 20-year period using a 2 percent and 6 percent discount rate. We also estimated the mitigation cost per tonne of CO_2.

Our analyses show that the estimated annual per hectare costs of securing community forest tenure are low compared to the benefits from carbon mitigation and timber and non-timber production. For Brazil, annual costs average $1.57 per hectare (ha) while carbon-mitigation benefits range from $230/ha to $38/ha per year over the analysis period. For Guatemala, annual costs are estimated at $16.85/ha while carbon-mitigation benefits range from $187/ha to $120/ha, and timber and non-timber production benefits are $12.51/ha and $0.91/ha.[1]

In Brazil, the net present values results (benefits minus costs) range from $1,454 to $1,743 per hectare and $162 billion to $194 billion for all Indigenous Territories in the Brazilian Amazon. We estimated the cost of carbon mitigation (per tonne of CO_2 emissions removed from the atmosphere) through a 20-year investment in forest-tenure security to be between $0.39 and $0.52/tCO$_2$ (Table ES-1). The cost-of-carbon-mitigation metric is useful for comparing climate-change mitigation measures in terms of cost-effectiveness.

Table ES-1 | **Brazil Benefit-Cost Analysis and Cost/tCO$_2$ Results**

DISCOUNT RATE	6%	2%
Total net present value (US$ 2015)	$161,681,533,000	$193,915,358,000
Net present value per hectare	$1,454	$1,743
Mitigation cost ($/tCO$_2$)	$0.39	$0.52

In Guatemala, the net present value per hectare ranges from $1,715 to $2,280 and from $605 million to $805 million dollars for all nine active community concessions. The carbon-mitigation cost per tonne of CO_2 emissions removed from the atmosphere through a 20-year tenure-security investment is estimated to range from $7.37 to $8.50 (Table ES-2).

Table ES-2 | **Guatemala Benefit-Cost Analysis and Cost/tCO$_2$ Results**

DISCOUNT RATE	6%	2%
Total net present value (US$ 2015)	$605,368,000	$804,649,000
Net present value per hectare	$1,715	$2,280
Mitigation cost ($/tCO$_2$)	$7.37	$8.50

Figure ES-2 compares 20-year present value benefits and costs (per hectare) for both countries using a 6 percent discount rate and demonstrates the large gap in values. The difference between the benefits and costs is $1,454 per hectare in Brazil and $1,715 per hectare in Guatemala.

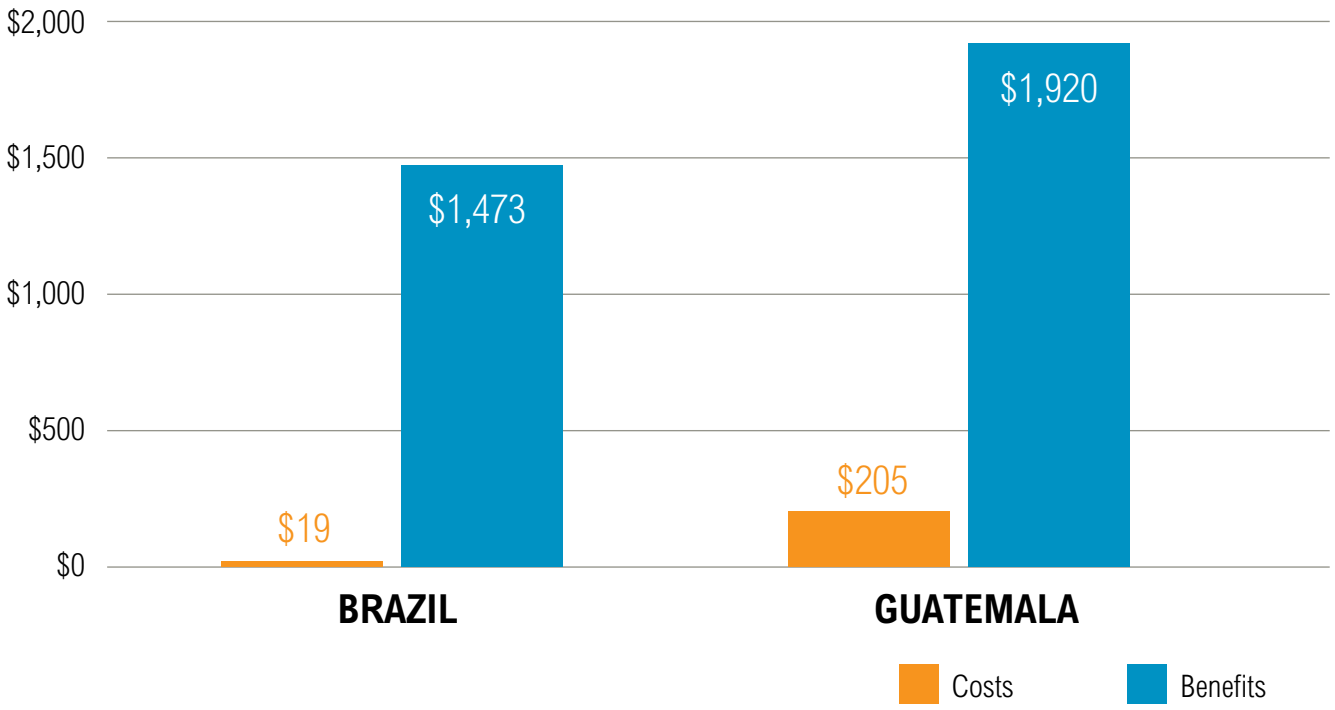
Because some degree of uncertainty is inherent in any benefit-cost analysis, we conducted a sensitivity analysis to examine how our analyses might be affected by changes in our assumptions. Specifically, we created lower-bound and upper-bound net present value estimates by varying the discount rate, the price of carbon, carbon-storage values, and other cost and benefit assumptions. Even when we used a much lower carbon value of $6/tCO$_2$ and upper-bound estimates for costs and lower-bound estimates for benefits, the benefits of securing community tenure continued to outweigh the costs. Sensitivity analysis results are available in the paper's Appendix.

Overall Findings

1. Our benefit-cost analyses of Brazil's Indigenous Territories and the community concessions in Guatemala's Maya Biosphere Reserve suggest that securing community forest tenure is a low-cost, high-benefit investment that benefits communities, countries, and global society. Even when we used a much lower value of carbon ($6/tCO$_2$), the economic benefits of tenure security outweighed the costs.

2. Community forests can generate a wide variety of economic benefits through ecosystem services and behavioral changes that support conflict resolution and social benefits. Economic valuation can enhance our understanding of the multiple benefits of community forests by demonstrating even higher net benefits. Economic valuations can also demonstrate the high value of tenure security in terms of improving forest-resource management and conservation, and help policymakers to better target policies and investments.

Figure ES-2 | **20-Year Present Value Comparison of Per Hectare Costs to Benefits for Brazil Indigenous Territories and Community Concessions in the Guatemalan Maya Biosphere Reserve (6 Percent Discount Rate)**



Note: Costs are likely underestimated due to data constraints on tenure-security establishment and opportunity costs. Likewise, benefits are also likely underestimated due to data constraints.

3. The results of the benefit-cost analyses suggest that investing in strong community forest-tenure security can be a cost-effective measure for climate-change mitigation when compared with other mitigation measures. However, while we consider the cost data representative of tenure establishment and maintenance costs for the study areas, complete data were not available. Accordingly, the mitigation-cost estimates should not be interpreted as the actual price that would need to be paid to avoid a hectare of deforestation in the study areas. Rather, they help to demonstrate the cost-effectiveness of community forests as a carbon-mitigation measure.

Addressing data-collection constraints could lay the groundwork for a deeper understanding of the net economic gains from community forests. Investing in improved efforts for monitoring and evaluation of community forests could be an important first step. Enhanced monitoring and evaluation could shed light on the benefits associated with improvements in forest cover and ecosystem health. It could also enrich our understanding of social investments and community conflicts—two categories of benefits and costs that are currently hard to gauge because of data limitations. Making stakeholder budgetary data more transparent would also contribute to more robust evidence regarding the costs of securing community forest tenure.

Extending the benefit-cost analysis approach to other community forests around the world could also advance understanding of the economic case for secure community forest tenure. WRI is currently collaborating with local experts to extend this work to other countries in South America, including Bolivia and Colombia. This will allow for extrapolating the results to the Amazon basin. Findings, conclusions, and policy recommendations will be captured in a WRI Research Report to be published in 2016.

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ENDNOTES

1. While we consider the cost data presented to be representative of tenure establishment and maintenance costs, the data are limited. For example, the Brazil analysis does not include tenure-establishment costs, so the costs presented will be an underestimate. For Guatemala, there are no detailed inventories of funding for the Maya Biosphere Reserve (and specifically, the community concessions), especially for years after 2005. Additionally, production expenses for timber and non-timber extraction were available only for three concessions and may overestimate these costs. As a result, the cost estimates are uncertain. The sensitivity analysis described in the paper's appendix was designed to address these uncertainties.

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ABOUT WRI

World Resources Institute is a global research organization that turns big ideas into action at the nexus of environment, economic opportunity and human well-being.

Our Challenge
Natural resources are at the foundation of economic opportunity and human well-being. But today, we are depleting Earth's resources at rates that are not sustainable, endangering economies and people's lives. People depend on clean water, fertile land, healthy forests, and a stable climate. Livable cities and clean energy are essential for a sustainable planet. We must address these urgent, global challenges this decade.

Our Vision
We envision an equitable and prosperous planet driven by the wise management of natural resources. We aspire to create a world where the actions of government, business, and communities combine to eliminate poverty and sustain the natural environment for all people.

Our Approach
COUNT IT
We start with data. We conduct independent research and draw on the latest technology to develop new insights and recommendations. Our rigorous analysis identifies risks, unveils opportunities, and informs smart strategies. We focus our efforts on influential and emerging economies where the future of sustainability will be determined.

CHANGE IT
We use our research to influence government policies, business strategies, and civil society action. We test projects with communities, companies, and government agencies to build a strong evidence base. Then, we work with partners to deliver change on the ground that alleviates poverty and strengthens society. We hold ourselves accountable to ensure our outcomes will be bold and enduring.

SCALE IT
We don't think small. Once tested, we work with partners to adopt and expand our efforts regionally and globally. We engage with decision-makers to carry out our ideas and elevate our impact. We measure success through government and business actions that improve people's lives and sustain a healthy environment.