Toward a Global Baseline of Carbon Storage in Collective Lands

AN UPDATED ANALYSIS OF INDIGENOUS PEOPLES' AND LOCAL COMMUNITIES' CONTRIBUTIONS TO CLIMATE CHANGE MITIGATION

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Across the tropics, forestlands that are legally owned or traditionally held by Indigenous Peoples and local communities (hereafter "collective forestlands") contain at least 54,546 million metric tons of carbon (MtC). Globally, this represents at least 24 percent of the total carbon stored aboveground in the world's tropical forests, an amount equivalent to more than 250 times the carbon dioxide emissions from global air travel in 2015.[1] While considerable, the true amount of carbon sequestered in collective lands across the tropics and beyond is potentially much greater, given that we do not have data for all of the territories customarily inhabited and claimed by Indigenous Peoples and local communities, which far exceeds what is legally recognized. Building on the results of previous studies of tropical forest carbon stored in legally owned and claimed indigenous territories in 19 countries, this study expands the analysis to 18 new countries. This brings the total to 37 countries covering tropical America, Africa, and Asia that were analyzed for carbon storage in collective forestlands.

As countries begin turning climate commitments into action, the results of this study reinforce the urgent need to make collective tenure security a critical part of national emission reduction strategies. Empowering forest peoples to continue their historical role as stewards of the environment is not only essential for stabilizing Earth's climate, it is also necessary to achieve global goals of sustainable development, food security, and poverty alleviation.

Findings and Recommendations

Indigenous Peoples and local communities manage at least 24 percent (54,546 MtC) of the total carbon stored aboveground in the world's tropical forests, a sum greater than 250 times the amount of carbon dioxide emitted by global air travel in 2015.

At least one tenth of the total carbon found in tropical forests is located in collective forestlands lacking formal recognition, placing some 22,322 MtC at risk from external deforestation and/or degradation pressures.

Study results are a mere fraction of the forest carbon managed by Indigenous Peoples and local communities. Indigenous Peoples and local communities legally own just 10 percent of the lands they customarily claim. Though considerable, the gap between recognized and unrecognized areas points to significant opportunities to scale-up the protection of customary rights.

To dramatically and efficiently increase the sustainable use and protection of tropical forests and the carbon they sequester, tropical country governments and the international community should:

- Support the efforts of forest peoples' organizations to document and secure their collective forest rights by scaling up dedicated funding streams and technical assistance;
- Make Indigenous Peoples and local communities part of the climate solution by incorporating community-based actions in Nationally Determined Contributions; and
- Develop/adopt institutional safeguards that significantly increase the voice and contributions of forest peoples in the design and implementation of national REDD+ strategies and other priority actions to conserve/enhance forest carbon stocks and non-carbon benefits.

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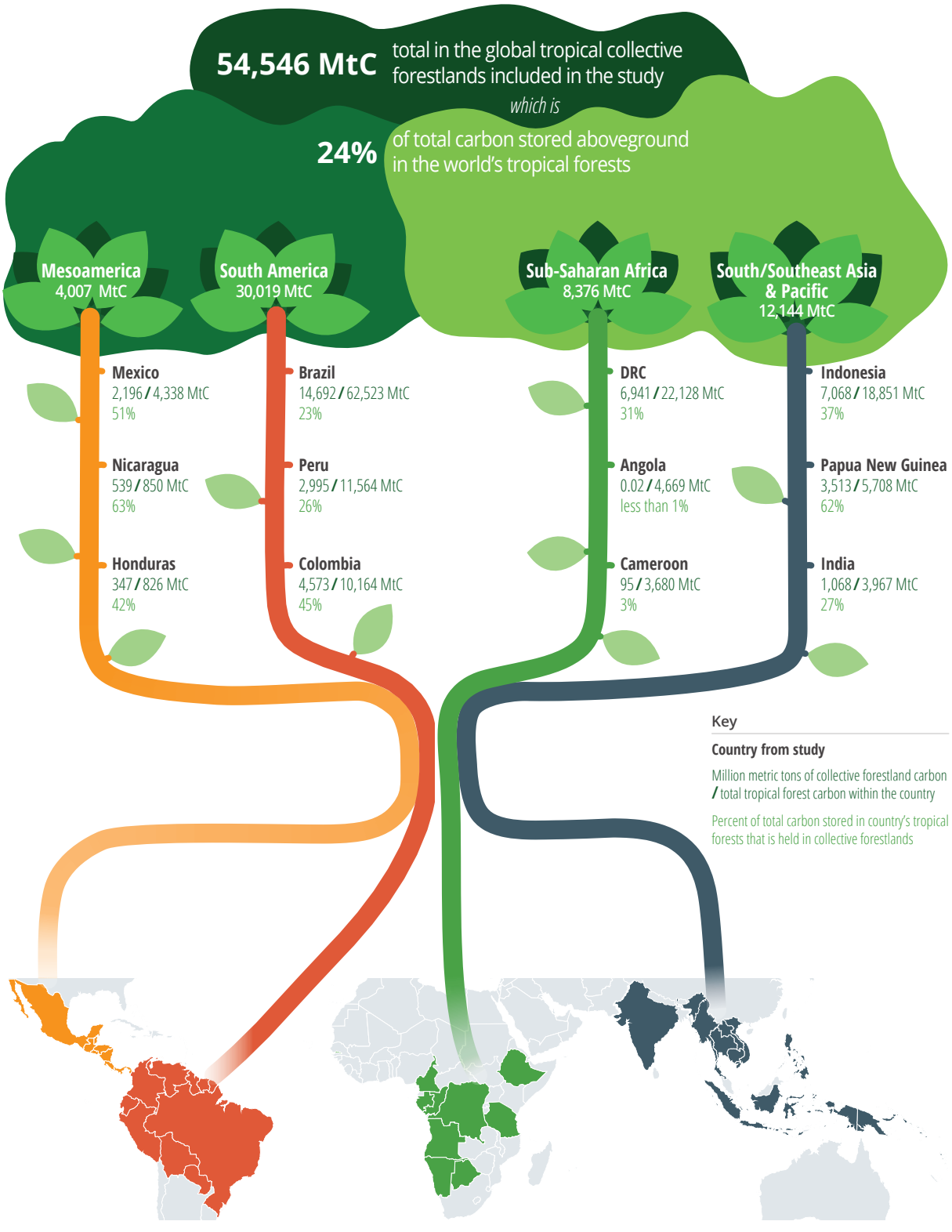
Figure 1

This figure shows the total amount of aboveground carbon held in collective forestlands across the regions studied. The countries with the highest concentration of forest carbon per region are highlighted, and the proportion of carbon managed by Indigenous Peoples and local communities is presented as a percentage of the total carbon stored aboveground in each of these countries.



A new collaboration for a global baseline

This study furthers the groundbreaking work initiated in 2014 by a dedicated group of scientific, policy, and indigenous organizations to quantify the carbon sequestered in collective forestlands across the tropics. Led by Woods Hole Research Center (WHRC), the Environmental Defense Fund (EDF), Red Amazónica de Información Socioambiental Georreferenciada (RAISG), and Coordinadora de las Organizaciones Indígenas de la Cuenca Amazónica (COICA), the first study assessed forest carbon storage in some 3,000 indigenous territories (both formally recognized and customarily claimed) and protected natural areas across nine Amazon Basin countries. Study findings showed that these lands collectively stored more carbon aboveground than the Democratic Republic of the Congo (DRC) and Indonesia combined.[2] In 2015, ahead of COP 21, WHRC and EDF collaborated with Alianza Mesoamericana de Pueblos y Bosques (AMPB), Réseau des Populations Autochtones et Locales pour la Gestion des Ecosystèmes Forestiers d'Afrique Centrale (REPALEAC), and Aliansi Masyarakat Adat Nusantara (AMAN) to add data on Mesoamerica, DRC, and Indonesia, respectively. The study revealed that indigenous territories across Amazonia, Mesoamerica, DRC, and Indonesia accounted for no less than 20 percent of the aboveground carbon stored in the planet's tropical forests.[3]

The current iteration combines the carbon mapping expertise of WHRC with new tenure data from RRI and WRI. It expands the scope of previous analyses by including area data for forests claimed or formally held by local communities and focuses attention on collective forestlands alone, by removing data points for protected areas that are not claimed by indigenous or local communities.

RRI is home to a global forest tenure database that currently includes 52 countries containing nearly 90 percent of the world's forests.[4] WRI holds public data on many indigenous and community lands and is an active member of the operations team of LandMark: The Global Platform of Indigenous and Community Lands, which provides georeferenced information on collective lands worldwide.[5] Together with new tenure data from the Philippines,[6] this report marks the continuing efforts of a growing body of international organizations, indigenous groups, and forest peoples' initiatives to recognize the invaluable contributions of Indigenous Peoples and local communities to the conservation and protection of global forests, the carbon they sequester, and the wealth of other social, economic, and environmental benefits they provide.

Building on the growing demand for more in-depth reporting on forest peoples' contributions to climate change mitigation and other development priorities, this report also marks the launch of a longer-term initiative to quantify carbon stocks in collective lands worldwide. Through open collaboration and engagement of all constituencies dedicated to the advancement of community forest rights, the initiative aims to continuously improve our understanding of the extent and depth of forest peoples' role in sequestering carbon by expanding data points for traditionally-held but not formally recognized collective forestlands, and extending coverage to forest biomes outside the tropics—including those in the temperate and boreal zones. Establishing this global baseline will allow for continuous tracking of Indigenous Peoples' and local communities' contributions to the protection of forest carbon stocks, further strengthening the rationale for securing collective land and forest rights.

Results: How much carbon do collective forestlands sequester?

This research reveals that the magnitude of Indigenous Peoples' and local communities' contributions to climate change mitigation is even greater than previously realized. Figure 2 lists the amount of carbon stored in collective forestlands by country and whether the populations that steward these lands have formally recognized ownership or usage rights. Figure 3 shows regional and global totals for carbon storage in the examined countries for both tenure categories, as well as percentages of the total carbon stored in the planet's tropical forests that are sequestered in collective forestlands. As significant as these figures are, they are conservative due to limited data, particularly on unrecognized collective forestlands.

At least a quarter of the carbon stored in the world's tropical forests is in collectively-managed territories. Tenure data from the 37 countries examined reveals that formally recognized and unrecognized collective forestlands contain at least 54,546 MtC of the almost 230,000 MtC found in all tropical forests.[7] This is equivalent to almost four times the world's greenhouse gas emissions in 2014.[8] Relative to results from the 2015 study, this represents a 19 percent increase in the known amount of carbon stored in collective forestlands.[9]

One tenth of the total carbon contained in tropical forests is in collective forestlands lacking formal recognition. Based on available data, forestlands claimed by Indigenous Peoples and local communities but not legally recognized by national governments hold at least 22,322 MtC, or 10 percent of

Figure 2

Aboveground carbon storage in tropical forests owned or claimed by Indigenous Peoples and local communities, by country and tenure category

Country[10]	Formally owned or designated collective forestlands (MtC)[11]	Claimed but not formally recognized collective forestlands (MtC)	Total collective forestlands (MtC)
Brazil	14,692		14,692
Indonesia		7,068	7,068
DRC		6,941	6,941
Colombia	4,573		4,573
Venezuela		3,526	3,526
Papua New Guinea	3,513		3,513
Peru	2,192	803	2,995
Mexico	2,196		2,196
Bolivia	1,553	362	1,915
India	48	1,020	1,068
Ecuador	227	820	1,047
Suriname		765	765
Tanzania	726		726
Nicaragua	496	43	539
Guatemala		508	508
Philippines	431		431
Guyana	351		351
Honduras	116	231	347
Botswana	195	148	343
Panama	275		275
Namibia	222		222
French Guiana	101		101
Cameroon	95		95
Belize		59	59
Costa Rica	55		55
Paraguay	54		54
Rep. of the Congo	44		44
El Salvador		28	28
Thailand	27		27
Vietnam	19		19
Cambodia	13		13
Ethiopia	4		4
Myanmar	3		3
Laos	2		2
Gambia	0.72		0.72
Gabon	0.40		0.40
Angola	0.02		0.02
TOTALS	**32,224**	**22,322**	**54,546**

Key: Mesoamerica, South America, Sub-Saharan Africa, South/Southeast Asia and Pacific

Figure 3

Regional and global totals for carbon storage (in MtC) in collective forestlands

	Formally owned or designated collective forestlands (MtC)	Claimed but not formally recognized collective forestlands (MtC)	Total collective forestlands (MtC)
Mesoamerica	3,138	869	4,007
South America	23,743	6,276	30,019
Sub-Saharan Africa	1,287	7,089	8,376
South/Southeast Asia & Pacific	4,056	8,088	12,144
Total MtC stored in tropical collective forestlands of examined countries in all four regions	32,224	22,322	54,546
Percent of total carbon stored in tropical forests (~230,000 MtC) that is held in collective forestlands	14 %	10 %	24 %

the planet's total aboveground tropical forest carbon. Insecure collective land rights render these forestlands particularly susceptible to deforestation and/or degradation pressures from external drivers, increasing the risk of substantial emissions if left unsecured.

Results of this study represent a mere fraction of what is managed by Indigenous Peoples and local communities. The contribution of forest peoples globally is greater than what can be assessed using confirmed data sources. According to RRI's "Who Owns the World's Land?", Indigenous Peoples and local communities customarily claim at least 50 percent of the world's lands, but legally own just 10 percent and exercise some formal rights to use or manage an additional 8 percent. The gap between known and unknown collective forestlands is therefore substantial. This new collaboration will continue to improve and expand on these estimates as new data becomes available.

Keeping carbon sequestered: Securing collective land rights for climate and beyond

In spite of clear linkages between community forest rights, forest conservation, and climate change mitigation,[12] progress toward collective tenure security has declined in recent years, with fewer countries recognizing increasingly weaker rights since 2008.[13] The 2015 Paris Agreement has since marked a critical turning point in the global response to climate change, but failed to adequately consider the contributions of forest peoples, limiting reference to the rights of Indigenous Peoples and local communities to the preamble.[14] Likewise, few countries took the opportunity to make community rights part of their national climate change mitigation plans, as noted in a study of Intended Nationally Determined Contributions (INDCs), which found that only 21 of the 188 countries that presented submissions in advance of COP 21 made clear commitments to support community-based tenure or natural resource management strategies.[15] While investments in climate finance mechanisms like the Forest Carbon Partnership Facility's Carbon Fund and the Green Climate Fund are increasing, commitments to indigenous and community rights remain weak, as demonstrated in a recent analysis of submissions to the Carbon Fund pipeline.[16]

Securing the land and resource rights of Indigenous Peoples' and local communities' is a fundamental pre-condition to the realization of a wide range of non-carbon benefits that have a direct bearing on the sustainable use and conservation of forests, and the protection and enhancement of forest carbon stocks.[17]

Securing land rights makes economic sense. Research shows that securing collective land and forest rights represents a low-cost, high-benefit investment. As demonstrated in a recent study of three countries in the Amazon basin, the annual per-hectare costs to governments (in USD) of securing and managing indigenous forestlands amount to $5.35 in Bolivia, $5.58 in Brazil, and $1.35 in Colombia, whereas the 20-year, per-hectare total net benefit of ecosystem services (including carbon sequestration) was calculated to be between $4,888 and $10,784 in Bolivia, $4,636 and $10,402 in Brazil, and $4,610 and $10,344 in Colombia. When multiplied by the total land area that could potentially be titled, the cost of securing forest

tenure for 20 years was at most 1 percent of the benefits derived, making tenure security a far more cost-effective means of achieving climate mitigation targets than other carbon capture and storage measures.[18]

Securing land rights reduces poverty and inequality. Collective lands play an important role in the well-being of up to 2.5 billion people worldwide, providing a crucial source of food, fuel, and income for communities that hold, use, and depend on these lands for their livelihoods.[19] Insecure land and resource rights affect their ability to carry out traditional activities, including commercial forestry and agriculture.[20] As documented in a global study of 108 countries, strong property rights are linked to higher per capita incomes and greater socio-economic stability.[21] Tenure security can also alleviate the disproportionate burden of poverty that women face, creating healthier outcomes for rural families. When women have secure resource rights, they tend to have greater influence on household decisions and are more likely than men to contribute to household welfare.[22]

Securing land rights can reduce conflict. The lack of clear and enforceable resource rights is a major driver of conflict. In addition to the destruction of natural forests and related biodiversity, rising demand for land and resources is associated with increasing social tensions, land-use conflicts, and illegal land acquisitions and transfers.[23] In 2015 alone, at least 185 environmental and land defenders were killed, with activists from indigenous populations making up nearly 40 percent of the victims.[24] Secure land rights are essential for achieving social, political, and economic stability, both for communities and for local and international companies intent on reducing their operational, financial, and reputational risks.[25]

Securing land rights preserves cultural and linguistic diversity. Biodiversity conservation is heavily tied to the maintenance of cultural diversity, and the preservation of culture, knowledge, and language is fundamentally linked to the protection of Indigenous Peoples' and local communities' land and resource rights.[26] As the principal custodians of Earth's remaining tropical forest areas, these populations are essential for the protection of biodiversity-rich forests and the many services that these systems provide.[27] In turn, the preservation of cultural and linguistic diversity is essential to maintaining the values, knowledge, and traditions of locally-adapted resource governance institutions. Such knowledge is vital to developing more sustainable and resilient social-ecological systems grounded in the need to conserve and enhance greenhouse gas sinks and reservoirs.

Marrakech Onward

In 2015, the indigenous organizations that contributed to the analysis of carbon sequestered in their territories proposed five policy interventions to ensure the continued and long-term conservation of tropical forests in their territories (see Box 1). Unfortunately, progress on these has been limited, despite large and growing demand from Indigenous Peoples, local communities, governments, development organizations, and private investors to clarify and secure tenure rights in the developing world.

Without secure land and forest tenure and the protection of customary rights, international efforts to achieve the Sustainable Development Goals and keep the global rise in temperature below the two-degree threshold will remain a struggle.

Box 1

RECOMMENDATIONS FROM "TROPICAL FOREST CARBON IN INDIGENOUS TERRITORIES: A GLOBAL ANALYSIS (2015)"

1. Title all currently unrecognized indigenous territories;
2. End the persecution of indigenous leaders;
3. Recognize Indigenous Peoples' contributions to climate change mitigation and adaptation in the context of Intended Nationally Determined Contributions (INDCs);
4. Implement the use of Free, Prior, and Informed Consent (FPIC); and
5. Provide direct access to climate financing for Indigenous Peoples' organizations.

To overcome the numerous barriers that forest communities face to conserve their forests, the international community and country governments in particular must urgently respond to the demands of the Indigenous Peoples who endorsed this initiative. Priority actions to achieve these ends include:

- Support civil society organizations and Indigenous Peoples' organizations in their efforts to document and secure collective forest rights by dramatically scaling up dedicated funding streams and technical assistance to forest peoples' initiatives;

- Make Indigenous Peoples and local communities part of the climate solution by encouraging governments to recognize and support community-based actions within the framework of their Nationally Determined Contributions; and
- Develop and adopt institutional safeguards at national and international levels that significantly increase the voice and contributions of Indigenous Peoples and local communities in the design and implementation of national REDD+ strategies and other priority actions to conserve and enhance forest carbon stocks and other non-carbon benefits.

Data and Methodology

The analysis quantified aboveground carbon storage in the collective forestlands of the 37 countries listed in Figure 2 using available spatial and non-spatial data sources. Geographic Information System (GIS)-compatible polygons (i.e., ESRI Shapefile or Google Earth KML file format) delineating the boundaries of collective forestlands were used for 23 countries. Georeferenced community boundaries were combined with carbon density[28] data via a GIS (ArcGIS 10.2), and analyzed using a raster-based approach. Political-administrative layers were used to quantify the amount and distribution of carbon contained within national-level collective forestlands. Countries analyzed spatially include Belize, Bolivia, Botswana, Brazil, Colombia, Costa Rica, DRC, Ecuador, El Salvador, French Guiana, Honduras, Guatemala, Guyana, Indonesia, Mexico, Namibia, Nicaragua, Panama, Paraguay, Peru, the Philippines, Suriname, and Venezuela. Data for these countries is considered current and inclusive of documented collective forestlands for formally and non-formally recognized areas. Nevertheless, significant gaps in data and coverage remain, suggesting opportunities for future iterations of this analysis as additional information become available.

The authors relied on area-based statistics of collective forestlands for the 15 countries lacking spatially-explicit data. Data for Indonesia was obtained from AMAN, while data for the remaining 14 countries was derived from RRI's forest tenure database. Aboveground carbon storage was quantified by multiplying known areas of collective forestlands by average carbon density values for woody vegetation in the selected jurisdictions. In the case of Indonesia, an average value of 124 Mg/hectare was identified in consultation with AMAN technical staff for intact Indonesian tropical forests based on carbon density data; for all other countries, carbon density values were derived from national averages. This method was used for Angola, Cambodia, Cameroon, Ethiopia, Gabon, Gambia, India, Laos, Myanmar, Papua New Guinea, the Republic of the Congo, Tanzania, Thailand, and Vietnam. RRI tracks statutory forest tenure, and so the data for these countries represents forest areas that are formally recognized as owned by or designated for Indigenous Peoples and local communities. Additional data was obtained for collective forestlands in India without formal recognition. With the exceptions of India and Indonesia, the use of this method was not applied for other areas lacking formal recognition. Hence, results for these countries provide only a minimum baseline estimate of the carbon held in collective forestlands. Actual contributions of Indigenous Peoples and local communities are likely to be much higher, and the preliminary results of this assessment will be revised as spatial data and information on customarily held and claimed areas becomes available.

Aboveground carbon density values were produced by WHRC using field measurements together with information from Earth observation satellites.[29] The result was a continuous map-based estimate of the amount and distribution of carbon stored aboveground in the live woody biomass of vegetation across tropical America, Africa, and Asia for the period 2007-2008 at a resolution of ca. 500 meters.[30]

Endnotes

[1] One ton of carbon equals 3.67 tons of carbon dioxide. This conversion was used to calculate this equivalency based on a statistic of global air travel in 2015 producing 781 million tons of carbon dioxide. This figure is available at http://www.atag.org/facts-and-figures.html.

[2] Walker et al. 2014. Forest carbon in Amazonia: the unrecognized contribution of indigenous territories and protected natural areas. Carbon Management 5 (5-6).

[3] Woods Hole Research Center and Environmental Defense Fund. 2015. Tropical Forest Carbon in Indigenous Territories: A Global Analysis. Report prepared for UNFCCC COP 21. Available at http://www.edf.org/sites/default/files/tropical-forest-carbon-in-indigenous-territories-a-global-analysis.pdf.

[4] RRI's forest tenure database can be accessed at http://rightsandresources.org/en/resources/tenure-data.

[5] LandMark can be accessed at http://www.landmarkmap.org.

[6] Philippine Association for Intercultural Development provided data on formally recognized indigenous lands (Certificate of Ancestral Domain Titles) for the Philippines, allowing the archipelago to be one of the new countries examined.

[7] Baccini et al. 2012. Estimated carbon dioxide emissions from tropical deforestation improved by carbon-density maps. Nature Climate Change, 2(3), pp.182-185.

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[9] Woods Hole Research Center and Environmental Defense Fund. 2015.

[10] Sources for data -- Brazil: RAISG/FUNAI; Bolivia: RAISG/INRA; Botswana: Department of Surveys and Mapping, Government of Botswana; Colombia: RAISG/INCODER; DRC: Moabi; Ecuador: RAISG/Ecociencia; Indonesia: AMAN; Mexico: Registro Agrario Nacional; Namibia: Directorate of Survey and Mapping, Namibia Ministry of Land Reform; Paraguay: Instituto Paraguayo del Indígena; Philippines: PAFID. Angola, Cambodia, Cameroon, Ethiopia, Gabon, Gambia, India, Laos, Myanmar, Papua New Guinea, Republic of the Congo, Tanzania, Thailand, and Vietnam all from RRI. See What Future for Reform? Progress and Slowdown in Forest Tenure Reform since 2002 (RRI, 2014) for specific sources and notes for each country. Notably, data for formally recognized collective forests in India differs from that published in What Future for Reform? (see forthcoming research). Data for forest area without formal recognition in India from Potential for Recognition of Community Forest Resource Rights under India's Forest Rights Act (RRI, 2015). Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama all from AMPB. French Guiana, Guyana, Peru, Suriname, and Venezuela all from RAISG.

[11] These areas may be formally documented or undergoing the process of obtaining formal documentation. In some countries, national law recognizes indigenous and community land without formal documentation, although some Indigenous Peoples and communities obtain formal documentation to double-lock their land rights.

[12] Stevens, C., Winterbottom, R., Springer, J. and Reytar, K. 2014. Securing Rights, Combating Climate Change: How Strengthening Community Forest Rights Mitigates Climate Change. World Resources Institute: Washington, DC.

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[25] TMP Systems and Rights and Resources Initiative. 2016. IAN: Managing Tenure Risk. RRI: Washington, DC. Available at http://rightsandresources.org/wp-content/uploads/RRI_IAN_Managing-Tenure-Risk.pdf.

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[28] Baccini et al. 2012.

[29] The data set was generated using field measurements co-located with satellite-based Light Detection And Ranging (LiDAR) observations from the NASA Geoscience Laser Altimeter System (GLAS) together with a cloud-free temporal mosaic generated from NASA Moderate Resolution Imaging Spectrometer (MODIS) and Nadir Adjusted Reflectance (NBAR) data.

[30] For further information on the biomass data set, the reader is directed to Baccini et al. (2012).

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The Rights and Resources Initiative

The Rights and Resources Initiative (RRI) is a global coalition consisting of 15 Partners, 5 Affiliated Networks, 14 International Fellows, and more than 150 collaborating international, regional, and community organizations dedicated to advancing the forest land and resource rights of Indigenous Peoples and local communities. RRI leverages the capacity and expertise of coalition members to promote secure local land and resource rights and catalyze progressive policy and market reforms. For more information, please visit www.rightsandresources.org.

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2715 M Street NW
Suite 300
Washington, DC 20007

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