The state of Indigenous Peoples' and Local Communities' lands and territories

A technical review of the state of Indigenous Peoples' and Local Communities' lands, their contributions to global biodiversity conservation and ecosystem services, the pressures they face, and recommendations for actions

DEDICATION

This report is dedicated to Ghanimat Azhdari[1], a young and passionate leader from the Qashqai tribal confederacy in Iran. Ghanimat was a specialist in Geographic Information Systems (GIS) and community mapping, working tirelessly to support the participatory documentation of territories of life with the national federations and unions of nomadic tribes in Iran (UNINOMAD and UNICAMEL). She was contributing her deep knowledge and skills to the development of this report when she died suddenly on 8 January 2020. Ghanimat played important roles in the Centre for Sustainable Development and Environment (CENESTA), the ICCA Consortium and LandMark. and was pursuing her PhD at the University of Guelph at the time of her passing. She is dearly missed. Her legacy will continue through the work of the many people whose lives she touched during her short time on Earth.

We also acknowledge the traditional owners and custodians of the lands and waters that form the basis of this report, and those whose traditional territories the geographically dispersed authors have occupied while writing this report.

CITATION

Recommended citation: WWF[1], UNEP-WCMC[2], SGP/ICCA-GSI[3], LM[4], TNC[5], CI[6], WCS[7], EP[8], ILC-S[9], CM[10], IUCN[11] The State of Indigenous Peoples' and Local Communities' Lands and Territories: A technical review of the state of Indigenous Peoples' and Local Communities' lands, their contributions to global biodiversity conservation and ecosystem services, the pressures they face, and recommendations for actions Gland, Switzerland (2021)

[1] World Wide Fund for Nature
[2] UN Environment Programme World Conservation Monitoring Centre
[3] GEF Small Grants Programme, ICCA-Global Support Initiative
[4] LandMark Global Platform of Indigenous and Community Lands
[5] The Nature Conservancy
[6] Conservation International,
[7] Wildlife Conservation Society
[8] UNDP Equator Prize
[9] International Land Coalition Secretariat
[10] Conservation Matters LLC
[11] International Union for Conservation of Nature

CONTRIBUTIONS

This report is the product of an inclusive co-creation process that started with the following collaborating organizations and programmes bringing together ideas and research questions as well as data, analyses and expertise. Together they provided strategic guidance on the analysis, interpretation of results, and drafting of the report (listed in alphabetical order):

- Asociación Latinoamericana para el Desarrollo Alternativo (ALDEA)
- La Coordinadora de las Organizaciones Indígenas de la Cuenca Amazónica (COICA)
- Conservation Matters LLC
- Conservation International (CI)
- International Land Coalition Secretariat (ILC Secretariat)
- International Union for Conservation of Nature (IUCN)
- GEF Small Grants Programme, ICCA-Global Support Initiative (ICCA GSI)
- LandMark (Global Platform for Indigenous and Community Lands)
- RECONCILE/ILC Rangelands Initiative-African Component
- The Nature Conservancy (TNC)
- United Nations Development Programme (UNDP) Equator Prize
- United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC)
- Wildlife Conservation Society (WCS)
- World Resources Institute (WRI)
- World Wide Fund for Nature (WWF)

Main writers

- Colleen Corrigan, Conservation Matters LLC
- Heather C. Bingham, UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC)
- Joost Van Montfort, WWF International

Scientific technical team and data providers

- Ward Anseeuw, International Land Coalition Secretariat/Landmark
- Scott Atkinson, UNDP
- Heather C. Bingham, UN Environment Programme World Conservation Monitoring Centre
- Pam Collins, Conservation International
- Colleen Corrigan, Conservation Matters LLC
- Brandie Fariss, The Nature Conservancy
- Joe Gosling, UN Environment Programme World Conservation Monitoring Centre
- Pablo Izquierdo, WWF-Norway
- Nina Kantcheva, UNDP
- Peter Ken Otieno, RECONCILE/ Rangelands Initiative-African Component
- Christina Kennedy, The Nature Conservancy
- Paola Maldonado Tobar, Asociación Latinoamericana para Desarrollo Alternativo, ALDEA
- Jim Oakleaf, The Nature Conservancy
- David Patterson, WWF-UK
- Sushma Shrestha, Conservation International
- Jessica Stewart, UN Environment Programme World Conservation Monitoring Centre
- Katie Reytar, World Resources Institute

Steering and review group

- Andrea Burgess, TNC
- Jamison Ervin, UNDP
- José Gregorio Díaz Mirabal, Coordinadora de las Organizaciones Indígenas de la Cuenca Amazónica (COICA)
- Alain Frechette, Rights and Resources Initiative
- Delfin Jr. Ganapin, WWF International
- Terence Hay-Edie, UNDP-implemented GEF Small Grants Programme (SGP)
- Holly Jonas, ICCA Consortium
- Naomi Kingston, UN Environment Programme World Conservation Monitoring Centre
- Michael Looker, The Nature Conservancy
- Judy Oglethorpe, WWF-US
- Pablo Pacheco, WWF-US
- Michael Painter, Wildlife Conservation Society
- Zack Romo, Coordinadora de las Organizaciones Indígenas de la Cuenca Amazónica (COICA)
- David Rubio, International Land Coalition Secretariat/Landmark
- Jenny Springer, IUCN
- John Tayleur, UN Environment Programme World Conservation Monitoring Centre
- Dave de Vera, Philippine Association for Intercultural Development (PAFID)
- Peter Veit, World Resources Institute
- Kristen Walker-Painemilla, Conservation International

The following IPLC representatives and experts reviewed this report:

- Dominique Bikaba, Strong Roots, DRC
- Joji Carino, Forest Peoples Programme
- Minnie Degawan, Kankanaey/ Igorot/Conservation International
- Maurizio F. Ferrari, Forest Peoples Programme
- Cindy Julianty, Working Group ICCAs, Indonesia
- Kasmita Widodo, Working Group ICCAs, Indonesia
- Edward Loure, Ujamaa Community Resource Team (UCRT), Tanzania
- Roberto Múkaro Borrero, Tribal Link Foundation
- Lucy Mulenkei, Indigenous Women Biodiversity Network, International Forum on Biodiversity and International Forum of Indigenous Women
- Hindou Oumarou Ibrahim, IPACC
- PACOS Trust, Malaysia
- Giovanni Reyes, Sagada-born Kankanaey-Igorot, Philippine ICCA Consortium
- Makko Sinandai, Ujamaa Community Resource Team (UCRT), Tanzania
- Yolanda Teran, Indigenous Women Network on Biodiversity from Latin America and the Caribbean, RMIB-LAC

Other contributions:

- Report design: Ralph Design Ltd
- Infographic design: Ines Hirata

A modified version of the IPLC lands dataset developed for this report is available, subject to specific terms of use, from UNEP-WCMC. Please contact protectedareas@unep-wcmc.org.

Disclaimer: All photos in this report have been selected from WWF and UNDP Equator Prize databases and, where relevant, a model release was obtained to ensure consent of individuals. Please see page 61 for photo credits.

1 Ghanimat's memorial page: www.iccaconsortium.org/index.php/2020/01/08/a-tribute-to-ghanimat-azhdari/

LIST OF ACRONYMS AND ABBREVIATIONS

CBD	Convention on Biological Diversity
DPI	Development Potential Index
FPIC	Free, prior and informed consent
GBF	Post 2020 Global Biodiversity Framework
GEF	Global Environment Facility
GHM	Global Human Modification
IBA	Important Bird and Biodiversity Area
ICCAs	Territories and areas conserved by Indigenous Peoples and Local Communities; also referred to as Territories of Life
IPLCs	Indigenous Peoples and Local Communities
IPLC PA	Protected area under the governance of Indigenous Peoples and/or Local Communities
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Area
Non-IPLC PA	Protected area under the governance of any actor (e.g. state or private) other than Indigenous Peoples and/or Local Communities. Shared governance arrangements are included in this category.
OECM	Other Effective Area-based Conservation Measures
PA	Protected area
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
WD-OECM	World Database on Other Effective Area-Based Conservation Measures
WDPA	World Database on Protected Areas

A COLLABORATION

This report is the result of a unique and broad collaboration of key organizations and individuals from different backgrounds but with a shared goal: to better understand, highlight and support Indigenous Peoples and Local Communities (IPLCs) and their critical role in conservation and sustainability. Initial discussions arose during a January 2019 Bali workshop co-designed by WWF's Governance Practice and the ICCA Consortium. Additional workshops were hosted by UNEP-WCMC and WWF in Cambridge, UK (March 2019) and by WRI in Washington DC (July 2019). These workshops paved the way for technical meetings and the building of a broader strategic collaboration. Participating organizations in this report include global conservation NGOs, human rights-based NGOs, global alliances, UN entities, IPLC experts, individuals and others as representatives of organizations led by IPLCs. All these stakeholders came to the table with complementary skills, expertise and resources, and a willingness to share information and ideas for their shared purpose. A transparent consultative process was used to ensure a useful report for IPLCs and the organizations aiming to support them. The intention is to align with and not contradict messages or information raised by IPLCs themselves, and to pave the way for a broader set of actions, further collaborations and future research.

Data sources and associated caveats are described in this report so that IPLCs, civil society organizations, donors, government agencies and others can make use of the outputs for their own needs and/or collaborations. Filling the gaps identified in this technical report will require significant investment of time and resources. It will also require inputs from a wide range of partners and organizations, particularly IPLCs who are the rights-holders and custodians of their lands, territories, waters and resources. Only a truly global, transparent and committed collaboration of diverse organizations will allow for the comprehensive and accurate understanding of IPLCs' contributions to nature conservation, the pressures they confront, and opportunities to support their self-determined priorities and pathways.

The authors and contributors to this report defer to IPLCs on how the results presented here should be translated into specific action by relevant stakeholders. Although broad recommendations have been developed in consultation with IPLC representatives, any specific policies drawing on the report's findings should be subject to further consultation with IPLCs and aligned with their data as well as their indigenous and local knowledge systems. The recommendations made in this report include: (1) IPLCs' rights to lands, waters and resources should be recognized and formalized, and (2) they should receive appropriate recognition, safeguards and support for their contributions to conservation. The forms of recognition and support that are appropriate for a given situation should always be defined by IPLCs themselves.

Supported by:
Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
based on a decision of the German Bundestag

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Executive summary of key findings

At a time of unprecedented threats to the global environment, local leadership in governing and managing natural resources is increasingly becoming a critical solution for both people and nature. One key challenge is to identify the most appropriate pathways for enabling the resilience and security of local environmental custodians around the world. In response, a number of conservation organizations and contributors have worked collaboratively over the course of many months to develop a transparent analytical process, in consultation and dialogue with Indigenous Peoples and Local Communities (IPLC) representatives and experts, to reach a set of technical findings on spatially-relevant conservation values of IPLC lands, and related recommendations for organizations that work with IPLCs, or whose actions may affect them.

This global analysis on IPLC lands[2] provides a science-based assessment that can be used to guide the development of policies, research and other actions supporting IPLCs and their customs and practices that have, or have the potential for, effective conservation outcomes across the globe. While based on best available data, the results are likely an underestimate of the true extent of IPLC lands.[3] Being focused on conservation, the results also cannot reflect the other diverse values of IPLC lands, such as cultural and spiritual values that are often interrelated and embedded in the social, political, economic and geographic contexts. Despite these limitations, the following key findings provide evidence for moving forward on a shared agenda of respecting, recognizing and building support for those who play a key role in protecting nature, and whose role and well-being is critical to achieve the world's Sustainable Development Goals.

The report demonstrates that:

1. Indigenous Peoples and Local Communities (IPLCs)[4] are vital custodians of the world's remaining natural landscapes. As such, achieving the ambitious goals and targets in the post-2020 global biodiversity framework will not be possible without the lands and territories recognised, sustained, protected and restored by IPLCs. IPLCs warrant appropriate recognition of their rights and governance authority as well as support to equitably and effectively participate in these global efforts. This technical report finds at least 32%, or 43.5 million km^2, of global land and associated inland waters is owned or governed by IPLCs, either through legal or customarily-held means.[5] This is an increase on previous estimates derived from similar methodologies (see IPBES, 2019), largely owing to the addition of Local Communities' lands. This finding is significant when compared to the fact that only 15.4% of the world's land is within protected areas (UNEP-WCMC and IUCN, 2021), though there is some overlap between the two land uses. IPLCs should be acknowledged as critical rights-holders and decision-makers in the conservation and sustainable use of natural resources. Their historical and current contributions to conservation, as well as their rights and governance authority, should be recognized and supported, especially in the context of the post-2020 global biodiversity framework and its implementation.

Achieving the ambitious goals and targets in the post-2020 global biodiversity framework will not be possible without the lands and territories recognised, sustained, protected and restored by IPLCs.

2. The majority of IPLC lands are in good ecological condition. Sixty-five percent of IPLC lands have zero to low levels of human modification, meaning they are natural to semi-natural lands that are no more than 10% modified by intensive human impacts. It is likely that these intact ecosystems are also playing a significant role in climate change mitigation (Martin and Watson, 2016). A further 27% of IPLC lands are subject to moderate forms of human modification. In total, 91% of IPLC lands are in good or moderate ecological condition, providing further evidence that IPLC custodianship is consistent with the conservation of biodiversity.

2 In this report, we define Indigenous Peoples' and Local Communities' lands as those lands that are owned or governed by IPLCs, with or without legal recognition. This covers lands occupied or held by IPLCs, but not lands where IPLCs use resources if they are not also responsible for making decisions about management.

3 The data and results presented are not intended to contrast or contest other data or results used by IPLCs, which are often based on different methodologies.

4 See Kothari et al. (2012), especially Annex 5, for a more complete elaboration of the history and definition of 'Indigenous Peoples and Local Communities' and other relevant terms. See also Supplementary Information from Garnett et al. (2018). IUCN defines Indigenous Peoples and Local Community Conserved Territories and Areas (ICCAs) as 'natural and/or modified ecosystems, containing significant biodiversity values, ecological benefits and cultural values, voluntarily conserved by indigenous peoples and local communities, through customary laws or other effective means'.

5 As argued, this is likely an underestimate. A recent RRI study that includes an estimate of the unrecognized land area of Indigenous Peoples, local communities, and Afro-descendants concludes that the total extent of IPLC areas is close to 50%. See: http://67.222.18.91/~rrnew/publication/estimate-of-the-area-of-land-and-territories-of-iplcad/

3. IPLC lands in good ecological condition are globally significant. Of all global lands in good ecological condition, at least 42% are within IPLC lands. When overlaps with protected areas under the governance of any actor other than IPLCs[6] are excluded, IPLC lands in good ecological condition cover 17.5% of the world's terrestrial surface. Many of these areas are potentially important biocultural landscapes that achieve conservation and climate-resilient outcomes while also advancing Indigenous Peoples' rights, and preserving cultural, spiritual and other values. The finding that IPLC lands in good ecological condition are globally significant suggests the future of global conservation efforts requires strong support for and alliance with the custodians of these particularly important areas.

4. IPLC lands and associated waters comprise and protect a large portion of areas particularly important for biodiversity. This study finds that at least 36% of the global area covered by Key Biodiversity Areas (KBAs) is contained within IPLC lands, and over half of that area is not protected by other means. Moreover, the global KBA database is still developing and is not yet complete. Once full identification of KBAs has been conducted, the area where KBAs and IPLC lands overlap is likely to increase. This result highlights the importance of IPLCs for areas critical for biodiversity.

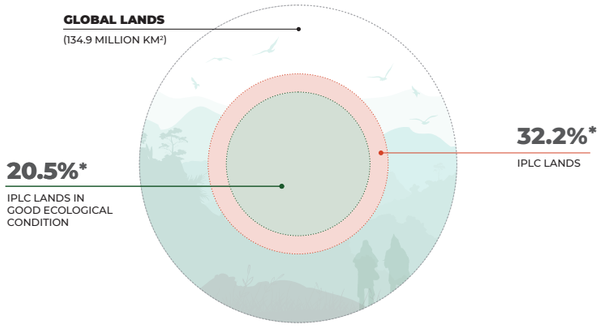
5. Ecologically representative conservation relies on IPLC custodians and thus can only be achieved through appropriate recognition of, and support for, IPLC land and resource rights. IPLC lands are found in at least 75% of the world's 847 terrestrial ecoregions, and those IPLC lands assessed in this report include the entirety of 14 ecoregions. In the case of some ecoregions, IPLC governance provides the only source of protection. As such, the health and integrity of these ecoregions relies fully on a continued presence, active governance, and custodianship by IPLCs.

6. Supporting IPLCs as custodians of nature provides widespread benefits and services for all of humanity. Nearly one-quarter of IPLC lands have high levels of ecosystem service provisioning at the global level, a calculation based on the combination of 15 services including fresh water and carbon sequestration. In short, IPLC lands and the practices of their custodians provide environmental benefits, such as climate resilience, that extend beyond the borders of those lands. The widespread recognition and documentation of IPLCs' historical role in maintaining these landscapes for the benefit of all is relatively new.

7. Over a quarter of IPLC lands could face high development pressure in the future. These are areas where local conditions make future commodity-driven development (such as from energy production, mining, industrial agriculture, or urbanization) more likely, with potential negative impacts for IPLCs and the ecological condition of their lands. Currently, 80% of IPLC land facing potentially high development pressure is still in good or moderate ecological condition. As a result, these areas are important for investments that sustain their custodians and their rights and reduce threats that are damaging to the environment or IPLCs.

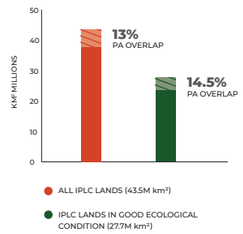
8. Global results cannot be translated into national-level policy without in-depth assessments involving nationally-appropriate datasets and, crucially, the full participation of IPLCs. The examples of Ecuador and the Philippines, presented in this report, show that the specific conservation values of IPLC lands vary between countries. In both countries, IPLC lands contribute significantly, but differently, to ecological representation and coverage of areas of importance for biodiversity. IPLC lands in both countries are likely to face increasing pressures in the future, but the response to these pressures will vary depending on national contexts and the expressed needs of IPLCs.

INDIGENOUS PEOPLES' AND LOCAL COMMUNITIES' (IPLC) LANDS: THE GLOBAL PICTURE

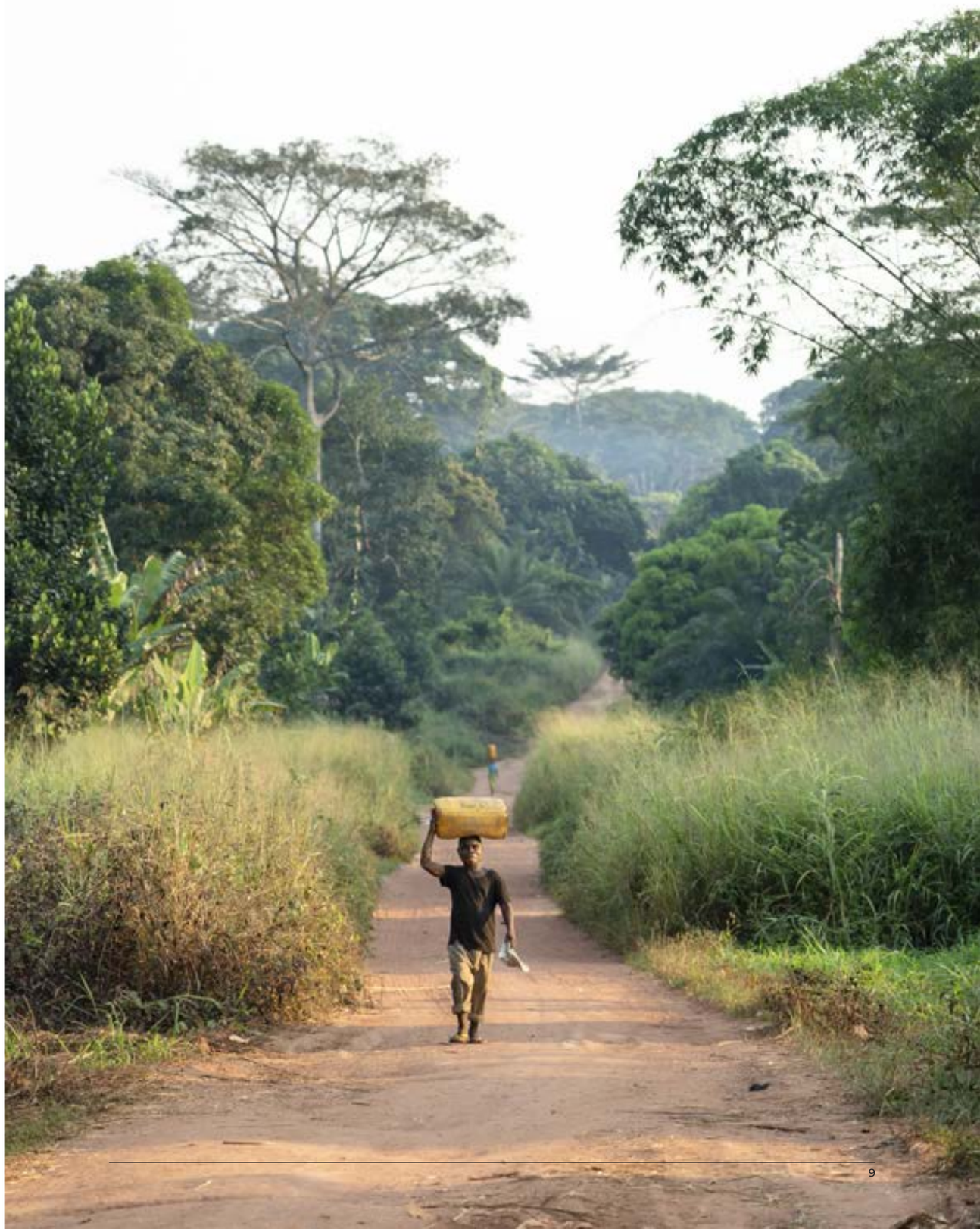


* These percentages are of the world's total land surface excluding Antarctica

OVERLAP BETWEEN IPLC LANDS AND PROTECTED AREAS



6 These areas are referred to as 'non-IPLC protected areas' in the data analysis of this report. The term 'non-IPLC protected area' describes any protected area that is not governed by Indigenous Peoples and Local Communities (IPLCs). Shared governance arrangements are included in this category.



1. Background

Many IPLCs have longstanding and deeply rooted relationships with their territories and areas and the nature contained therein. Although Indigenous Peoples (IP) have unique characteristics[7] and different internationally-accepted rights when compared to Local Communities (LC), both groups often have an intimate connection to their communally-held lands and waters. This connection has resulted in sophisticated place-based knowledge being developed and accumulated through generations (Gadgil *et al.,* 1993; Aikenhead & Ogawa, 2007). In many cases, it results in systems of practices, knowledge, innovations and values that support the conservation of biodiversity, with associated spiritual, social and cultural values (Berkes *et al.,* 2000; Borrini-Feyerabend *et al.,* 2014; Sheil *et al.,* 2015).

The environmental importance and impact of IPLC governance and management, such as their role in governing critical habitats serving as ecological corridors (IUCN, 2016), has widespread evidence at multiple scales. Indigenous Peoples' and/or Local Communities' custodianship is associated with areas of high conservation value and diverse biomes, including intact forests (Fa *et al.,* 2020), areas of low human impact (Garnett *et al.,* 2018), and healthy marine areas (Govan, 2018), as well as areas important for species (O'Bryan *et al.,* 2019; Nuttall, 2021). Many habitats under IPLC governance have co-evolved and rely on continued management protocols, such as controlled burning (Mistry *et al.,* 2016), to maintain them.

While IPLC lands are diverse and often managed for values other than nature conservation per se, they have been found to overlap with many of the world's remaining high biodiversity areas (WRI, 2005; Sobrevila, 2008; Dinerstein *et al.,* 2020) and can contain higher species diversity than state protected areas (Schuster *et al.,* 2019). Furthermore, decades of research on common resource use has highlighted the importance and impact of community governance. As such, IPLCs have a key role in nature conservation, but they often lack support or legal recognition of their authority in this role, and their future ability to sustainably manage and conserve biodiversity is therefore at risk.

Multiple studies have attempted to quantify the extent of Indigenous Peoples' and/or Local Communities' lands and thus advance understanding of their conservation values (e.g. RRI, 2015; Garnett *et al.,* 2018; Wily, 2011). A range of methods have been used, not always based on spatially-explicit data, and the resulting estimates can vary significantly as a result. Estimates are also affected by the scope of studies, with some focusing only on Indigenous Peoples' lands or Local Communities' lands, and others focusing on both. Still other studies are limited by analysis involving a small number of countries from which results are difficult to extrapolate. Regardless of the different methodological approaches, it is known that IPLCs hold much more land than that which is legally recognized (e.g. see RRI, 2020), and their lands cover a significant proportion of the Earth. This technical report complements previous studies by drawing together the best available spatially explicit data on IPLC lands. Further details and comparisons are shared in various sections of the report. Although Indigenous Peoples have rightly received considerable attention for their leadership in conservation, many Local Communities share similar bonds with their territories and areas, and the natural resources within them. As such, this report focuses on the lands of both Indigenous Peoples and Local Communities.

Many policies and laws at national and global levels still fail to provide appropriate and explicit recognition and support to IPLCs.

While there is increasing awareness of the vital role IPLCs play in the achievement of global conservation goals, many policies and laws at national and global levels still fail to provide appropriate and explicit recognition and support to IPLCs, or they limit the formalization of rights to lands and resources. With the rapid evolution of multiple threats to IPLCs and their lands, and inherently the nature they protect, it is time for a change.

7 This report does not distinguish between Indigenous Peoples and Local Communities, but it is acknowledged that distinctions exist between the two groups (see Notes on approach and interpretation of results). See Annex 5 in Kothari et al. (2012) for a complete definition of Indigenous Peoples and Local Communities and other relevant terms. By including Local Communities, this report follows other recent studies; for example, a recent RRI study of the customary land rights of Indigenous Peoples, Local Communities and Afro-descendants across a sample of 43 countries covering half of the global land mass (outside Antarctica) found that IPLCs hold historical or customary rights to at least 50% of the total land area in these countries. Of this IPLC land, 26% is legally recognized and another 23% has yet to be lawfully secured (RRI, 2020).

Purpose of this report

This technical report quantifies the global extent of IPLC lands and associated inland waters, and their contributions to biodiversity conservation and critical ecosystem services. It comes at a time of urgency for this kind of collaboration and analysis, given the global context of unprecedented biodiversity loss and its impact on climate change, the rapid spread of infectious diseases, unsustainable development, the increasing threat of fire, and the destruction of livelihoods by a range of direct and indirect drivers. It is anticipated that the report will inform policy decisions at the global level, and increase cooperation among organizations seeking to support IPLCs in sustaining their cultures, languages, livelihoods and the environments that they conserve.

Beyond biodiversity, urgent action is needed regarding the loss of IPLCs and their cultures and practices. While some protective laws do exist, they are often not implemented, though mechanisms to support IPLCs are advancing in some regions.[8] Many members of IPLCs are giving their lives in protecting critical areas of the globe; in 2019 alone, more than 200 people were killed while defending the environment and their rights to it, 40% of whom were Indigenous People (Global Witness, 2020).

To demonstrate the significant conservation values of IPLC lands, this report describes the extent of overlap between IPLC lands and associated waters with areas of importance for biodiversity, a diversity of ecoregions, globally important ecosystem services, and areas in good ecological condition. The report discusses the pressures faced by IPLCs, which potentially limit their future ability to conserve nature and its associated cultural and spiritual values. Although IPLCs are custodians of many coastal and marine areas, this report is limited to the terrestrial realm due to a lack of available international coastal and marine data for IPLC-governed areas.

This report tests the following assumptions:

1. IPLCs are effective custodians of biodiversity and ecosystem services.
2. IPLC lands are facing pressures at broad scales.
3. IPLC lands and territories merit urgent action and significant investments through appropriate recognition, as well as (but not limited to) political, legal and financial support.
4. Ambitious and transformative targets in the post-2020 global biodiversity framework can only be met through recognition and implementation of rights and governance systems for IPLCs over their lands and territories.

This report builds on and advances previous research and reports in three core ways:

1. It expands the scope of data to include both Indigenous Peoples' and Local Communities' lands and extends the area analysed from 87 (Garnett *et al.*, 2018) to 132 countries and territories.
2. It provides an updated analysis of the ecological condition of IPLC lands, covering a broader range of sectors than are assessed in other studies, using human modification as a proxy for ecological condition.[9]
3. It examines potential future development pressures on IPLC lands.

8 See the Escazu Agreement for example at www.cepal.org/en/escazuagreement, the Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean.

9 Based on the Global Human Modification dataset by Kennedy et al. (2018); see Annex 1 for full description.

2. Introduction

Despite the positive relationships between IPLCs and biodiversity, there is increasing pressure on both from threats such as unsustainable development and climate change. Two critical knowledge gaps have affected policymakers' ability to understand the scale of the problem and take appropriate action: (1) the lack of an accurate and globally comprehensive assessment of the extent and characteristics of IPLC lands, and (2) an incomplete understanding of the implications of tenure insecurity on ecological outcomes and processes. This report aims to advance, in particular, the first knowledge gap. Below is an outline of the current state of knowledge, and an identification of some key gaps and limitations in current science.

What is the current state of knowledge?

There is robust evidence at varying scales highlighting the positive conservation impacts of IPLCs. Even more important, there are a vast array of dedicated institutions and initiatives led at the local level by IPLCs that play a crucial role in linking local and traditional knowledge with other scales. The integration of such national and local knowledge in global efforts, with IPLC consent and full and effective participation wherever possible, would further our understanding of IPLCs' lands and territories, waters, and resources.

Awareness of IPLCs is expanding. Across the conservation sector and beyond, many are just beginning to recognize IPLCs' historical and ancestral role in maintaining landscapes and seascapes for the benefit of all. There has been positive and significant development, however, in the past decade to widen awareness of the diversity of stakeholders involved in the management and governance of protected and conserved areas. Global accounting processes – such as through the World Database on Protected Areas, World Database on Other Effective Area-based Conservation Measures, and ICCA Registry[10] – are expanding opportunities for documenting and recording IPLC governance of the environment.

Evidence of IPLC contributions to global biodiversity conservation and ecological representation is widely documented in the literature, but not yet globally comprehensive. The documentation tends to focus on specific geographies or an aggregation of multiple national studies. For example, three national case studies, where IPLC lands were found to cover more than 50% of the global extent of 10 ecoregions (Corrigan *et al.,* 2018), suggest that a more comprehensive analysis could reveal a much larger impact from IPLCs on global ecoregion coverage. Other research, based on 58 countries covering nearly 92% of the world's forests, shows that as of 2017, communities legally own at least 12.2% (4.47 million km^2) of forest lands, and they hold legally designated rights to over 2.2% (800,000 km^2) of the global forest area (RRI, 2018).

IPLC lands are also critical for climate change mitigation and adaptation. At least a quarter of carbon stored above ground in global tropical forests is contained in the collective lands of IPLCs (RRI, WRI and Woods Hole, 2018), and Indigenous lands overlap extensively with a recently-defined 'Global Safety Net' needed to reverse biodiversity loss and stabilize the Earth's climate (Dinerstein *et al.,* 2020)). Furthermore, evidence shows that tenure security reduces deforestation and emissions (Ding *et al.,* 2016; Blackman and Veit, 2018; Walker *et al.,* 2020).

Threats to IPLCs are numerous. The security of IPLCs is continuously at risk for many reasons, including direct threats such as lack of tenure rights or development encroachment, or indirect threats such as misunderstanding and misrepresentation of IPLCs. For example, the ability of IPLCs to sustainably manage and conserve biodiversity is threatened by mounting pressures from "resource extraction, commodity production, mining and transport and energy infrastructure" (IPBES, 2019). There are also demonstrated and often significant geographic overlaps between IPLC lands and protected areas (Jonas *et al.,* 2014), often with negative consequences for IPLCs,[11] for example in circumstances when violent displacement occurs (Tauli-Corpuz *et al.,* 2018).

IPLCs are widespread in coastal areas. Many large coastal areas are under the custodianship of IPLCs and are increasingly formally recognized, such as in Madagascar (Rocliffe *et al.,* 2014). In the South Pacific alone, 12,000 km^2 of the coastal area (1,000 km^2 of which comprises no-take zones) is owned or governed by 500 communities from 15 countries in the form of locally owned and governed marine areas (Govan, 2009). In Australia, Indigenous Peoples continue to establish marine Indigenous Protected Areas (IPAs) (Rist *et al.,* 2019). Many IPLCs govern and claim coastal and marine areas as part of their territories, though legal ownership rights are less frequently granted than in terrestrial areas.

10 The global ICCA Registry, www.iccaregisty.org, is a platform to help document IPLC territories and areas through different means such as maps, case studies, and photographs; it is not a globally comprehensive spatial database but instead has developed slowly to respond to the site-specific needs of those who use and rely upon it, as well as to ensure adherence to free, prior and informed consent (FPIC) principles.

11 See *Notes on approach and interpretation of results* in Introduction for further details.

Where is there limited knowledge?

Georeferenced data is limited. Current knowledge is shaped by studies that are limited in georeferenced data. At present, no global datasets exist that comprehensively map the extent of lands under the custodianship of IPLCs. Global reports can underrepresent Indigenous lands, such as in the case of Canada where many studies only reflect state-recognized data, leaving unaccounted the extensive portions of land areas with relevant Indigenous responsibilities and rights (Artelle *et al.,* 2019). Despite a growing awareness of the role of IPLC governance in the conservation of coastal and marine areas as noted above, there is a severe lack of IPLC data for the marine realm. As such, the ability to aggregate and include marine spatial data in global analyses has been limited.

Methodologies need greater transparency and coordination. Some studies aiming to assess the global characteristics of IPLC lands have not been consistent in documenting their source data or analytical approach, and some have not referenced important caveats. This can lead to the proliferation of statistics with unclear underpinnings, and confusion over how the results of different studies relate to each other. Extrapolation methods to estimate global figures from a limited number of countries need to be applied carefully and with full transparency so they can be compared to others or replicated and advanced. Proxy options often have provided only limited understanding; for example, some studies – including the Garnett *et al.* 2018 study on which this technical report relies – have used census data to estimate Indigenous Peoples' land boundaries, or used ethnicity or language spoken because more specific spatial data were not available. Data on Indigenous Peoples in particular may be missed from official data sources, including censuses, meaning that such methods may provide incomplete or inaccurate results.[12] Global policy processes and knowledge systems require reliable, robust and consistent data on which to base decisions; this necessitates coordination and collaboration among a range of science, government and civil society entities including IPLCs, women and youth.

Limitations in the security of tenure rights can make mapping difficult. The lack of consistent, global data is complicated by issues of tenure insecurity, boundary disputes, potential violations and infringement of rights, lack of recognition of IPLCs as such, and the conflict of Indigenous Peoples' and other Local Communities' identities in some nations. These factors can mean that it is challenging to create maps that are agreed upon by all relevant stakeholders. Participatory mapping is critical to ensuring that lands under IPLC governance can be documented regardless of their legal status.

Global analysis is challenging due to barriers to documenting IPLC lands. The ancestral ownership of lands, territories, waters and resources has intrinsic links with oral history, Indigenous types of land tenure and ownership, Indigenous mapping and Indigenous naming, traditional knowledge, customary laws and collective memory. These factors combined can create barriers to documenting IPLC lands. Where these areas are documented, the localized system of knowledge management can also make it difficult to monitor them in a globally consistent way. This very characteristic of diversity makes assessing their impact at the global level a challenge.

The number and diversity of IPLCs is unknown. The sheer number of IPLCs that exist across the world, with diverse languages and customs, can be difficult to align with contemporary scientific timeframes or methodologies. The scale of working from local to global is complex, leaving many IPLCs without input to the boundaries used in global analyses. A long-term goal, to which this report is an early contribution, would be a process of extensive input from IPLCs on the characteristics of their own lands and waters. Critical to this are participatory mapping processes, which have already resulted in robust GIS data and are expanding opportunities that can both empower IPLCs – including women, youth and elders – and inform science at multiple levels.

12 E.g. see www.un.org/development/desa/indigenouspeoples/mandated-areas1/data-and-indicators.html

Notes on approach and interpretation of results

The analysis and results presented here do not distinguish between Indigenous Peoples and Local Communities. It is, however, acknowledged that important distinctions exist. Indigenous Peoples have certain characteristics that Local Communities may lack, including some of great significance to biodiversity conservation, such as a strong cultural and/or spiritual bond with their ancestral territories and natural resources. Indigenous Peoples also have distinct rights under international law, as captured by the United Nations Declaration on the Rights of Indigenous Peoples (UN General Assembly, 2007). The rights of Local Communities are not clearly defined in international law, though there is growing jurisprudence around non-Indigenous communities whose cultures and ways of life have close relationships with their lands and territories. These relationships may be similar to those of Indigenous Peoples but they should not be equated or conflated. The rights of peasants are more clearly defined by the UN[13] than the rights of Local Communities.

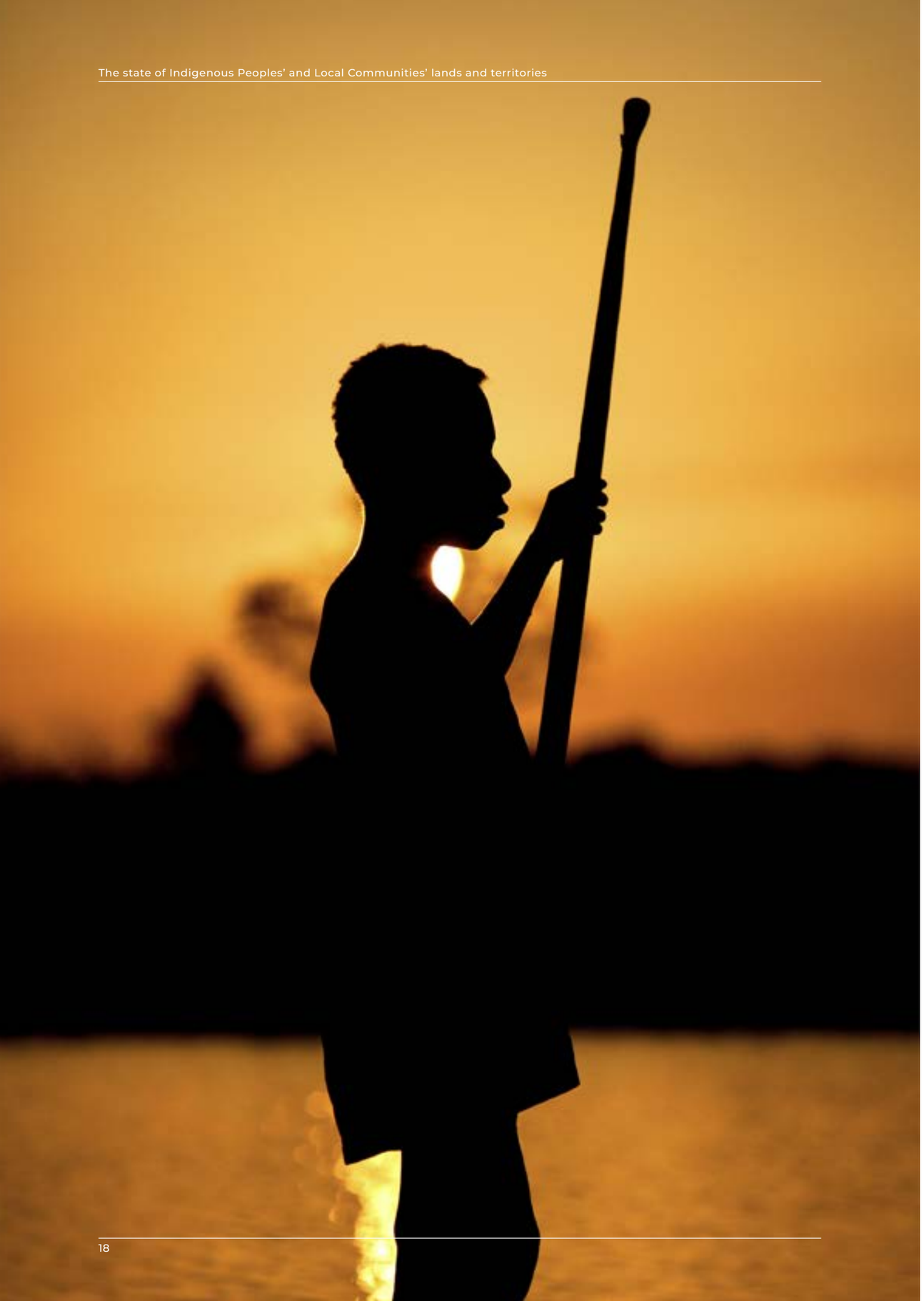
Government policy may further complicate the distinction between Indigenous Peoples and Local Communities, notably in countries where self-declared Indigenous Peoples are not recognized as such. Indigenous Peoples and Local Communities may also find themselves in conflict with each other, such as in cases where Local Communities have encroached upon the lands of Indigenous Peoples as a result of complex socioeconomic drivers. Like Indigenous Peoples, Local Communities are not homogenous. Local Communities in the context of this report are those with communal ownership and/or governance over lands, whether legal or de facto and have customary access and strong social and cultural links to their lands and territories. Whether Indigenous Peoples or Local Communities are the primary custodians of communal lands varies between countries. This report acknowledges these complex issues and directs readers to other sources[14] for further information.

IPLCs have diverse priorities for the management of their lands; these are often holistic in nature and can include various values and uses (such as traditional, cultural and spiritual values; or economic development), often alongside the conservation of biodiversity. While this report focuses on the conservation values of IPLC lands, it should be remembered that these values are often deeply interconnected with other values and principles held by IPLCs.

This report frequently refers to 'appropriate recognition and support'. The word 'appropriate' denotes that any recognition or support provided should be determined and requested by IPLCs themselves – in relation to their respective lands, territories, waters, and ways of life. The support should not undermine the systems of governance and practices that sustain IPLCs and their livelihoods, lands and waters. Securing consultation and free, prior and informed consent is often a first step, and a legal

13 International Declaration on the Rights of Peasants (UNDROP)

14 See pages 21-25 of Volume II for more details at https://naturaljustice.org/the-living-convention/ or Jonas (2020).



requirement in many cases, to ensure the right to IPLC self-determination. Forms of appropriate recognition and support will therefore vary widely, according to each IPLC's reality and needs, and the authors of this report do not recommend any single solution.

The report touches on the complex relationship between IPLC lands and protected areas. In many cases, IPLCs manage their lands in ways that are consistent with the definition of a protected area[15] (Borrini-Feyerabend *et al.,* 2013). However, the status of these lands as protected areas is often not formalized, usually due to one or more of the following: (1) this type of recognition is not desired by the custodian IPLCs, (2) there is a lack of recognition by external actors, or (3) there is a lack of adequate regulatory and/or intercultural frameworks to support recognition, which also leads to limited enforcement. In many cases, protected areas under the governance of actors who are not IPLCs (such as government, private and some types of shared governance, referred to in this analysis as "non-IPLC"[16]) have been designated over IPLC lands. This has often occurred because IPLCs have kept these lands intact, increasing their suitability as candidates for formal protection (Stevens *et al.,* 2016). The designation of such protected areas has sometimes been conducted in a way that is disempowering and damaging to IPLCs, including by violating their rights and removing them from their lands (Stevens *et al.,* 2016). In other cases, the designation of a protected area over IPLC lands may have little influence over their customary ownership and governance, meaning that IPLCs remain the de facto, but unrecognized, custodians. It is important to note that national contexts are highly diverse and thus the relationship between IPLCs and protected areas varies widely across the globe.

The conservation values of IPLC lands are often deeply interconnected with other values and principles held by communities.

In exploring the conservation values of IPLC lands, we have accounted for the potential effect of non-IPLC protected areas by dividing the base layer (see section 4.1) into areas covered by, and not covered by, non-IPLC protected areas. This approach was taken to account for potential confounding effects of overlapping protected areas, and the results presented here have been divided in this way where noteworthy. The considerations listed above must be noted when interpreting the results.

The IPLC land boundaries compiled for this analysis differ in their level of accuracy and may be disputed. Since the data compiled for this report are from diverse sources, it is unclear which boundaries were digitized with the free, prior and informed consent of their custodian IPLCs. For these reasons, and following Garnett *et al.* (2018), all maps presented in this report that feature IPLC land boundaries have been generalized to one-degree resolution, obscuring specific boundaries. This generalization only relates to the presentation of maps; the analytical results presented are derived from the base layer at its original resolution.

Garnett *et al.* (2018) recommend that their dataset not be used for national-scale analyses, suggesting that users instead refer to the source data that informed the dataset. In the case of the national analyses presented here (Ecuador and the Philippines), this guidance was followed and did not necessitate any changes to the base layer.

Finally, it is central to this report's aim that IPLCs have the opportunity to work with conservation organizations where it may benefit IPLCs, but this does not require that they accept any particular way of framing global conservation issues and/or criteria for making land use decisions. The structure and design of this analysis and the messaging of the report have been developed with engagement from IPLCs and organizations working with them, but the report may not reflect the views of all IPLCs.

15 A protected area is a clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values (IUCN, 2008).

16 Protected areas can be governed and managed by a range of actors, including Indigenous Peoples and Local Communities. In this report, we use the term 'non-IPLC protected areas' to refer to protected areas under the governance of any actor other than Indigenous Peoples and Local Communities, i.e. protected areas under the governance of government authorities, private organizations or private individuals. Due to data limitations, we also include all shared governance protected areas in this category, though in reality IPLCs are often participants in shared governance.

3. Legal and policy context

Box 3.1. Legal context of Indigenous Peoples' rights

The rights of Indigenous Peoples have, over the past decades, become an important component of international law and policy, as a result of a movement driven by Indigenous Peoples, civil society, international mechanisms and States at the domestic, regional and international levels. The International Labour Organization (ILO) Convention No. 169 and its predecessor, the ILO Convention concerning the Protection and Integration of Indigenous and Other Tribal and Semi-Tribal Populations in Independent Countries, 1957 (No. 107), are the only conventions specifically dealing with Indigenous Peoples' rights. Convention No. 169 is fundamentally concerned with non-discrimination.[17] While ultimately not as comprehensive as the United Nations Declaration on the Rights of Indigenous Peoples, it covers Indigenous Peoples' rights to development, customary laws, lands, territories and resources, employment, education and health. Moreover, it signalled, at the time of its adoption in 1989, a greater international responsiveness to Indigenous Peoples' demands for greater control over their way of life and institutions. Additional international legal instruments that promote the protection of Indigenous Peoples' rights include the UN International Covenant on Civil and Political Rights and the UN International Covenant on Economic, Social and Cultural Rights. The International Convention on the Elimination of All Forms of Racial Discrimination calls on States, inter alia, to recognize and protect the rights of Indigenous Peoples to own, develop, control and use their communal lands, territories and resources and, where they have been deprived of their lands and territories traditionally owned or otherwise inhabited or used without their free and informed consent, to take steps to return those lands and territories.

International activity on Indigenous Peoples' issues has been expanding also in regional human rights bodies, such as the African and inter-American human rights systems, and into international law and policy areas as diverse as the environment (including climate change), intellectual property and trade. For many Indigenous Peoples, their relationship to their lands, territories and resources is a defining feature. The Inter-American Court of Human Rights has stressed: The close ties of indigenous people with the land must be recognized and understood as the fundamental basis of their cultures, their spiritual life, their integrity, and their economic survival. For indigenous communities, relations to the land are not merely a matter of possession and production but a material and spiritual element which they must fully enjoy, even to preserve their cultural legacy and transmit it to future generations.[18]

As the values of IPLC lands and waters have become more widely communicated and understood over the past several decades, conservation and sustainable development policies have increasingly recognized and accounted for IPLC contributions to global biodiversity and healthy ecosystems. Some countries rely on IPLC contributions to meet conservation targets and Sustainable Development Goals. For example, Indigenous Protected Areas make up 44% of Australia's declared National Reserve System (DAWE, 2020). Many national governments have legislation that recognizes some IPLCs. Courts, too, have been instrumental in the application of the rights of Indigenous Peoples articulated at the international level in domestic cases.[19] More broadly, and often with the involvement of national human rights institutions, governmental policy affecting Indigenous Peoples increasingly takes into account their rights under international human rights law.

However, there are numerous examples where lack of security over land and resources has harmed IPLCs (Notess, 2018). Threats from unsustainable development pressures or resource competition have exacerbated these challenges. The struggles of IPLC leaders to defend their territories and areas against these threats have resulted in violence, hardship and death for many environmental defenders and entire families (Global Witness, 2020). This has led to a renewed sense of urgency for an adequate and appropriate response.

The 196 Parties to the UN Convention on Biological Diversity (CBD) are currently negotiating a new global biodiversity framework that will replace the set of goals and targets that expired in 2020. This post-2020 framework is expected to be adopted at the CBD's 15th Conference of Parties. The influence of this framework, which will guide the development and implementation of national and other

17 For more information, see ILO, Indigenous and Tribal Peoples' Rights in Practice: A Guide to ILO Convention No. 169 (Geneva, 2009), https://www.ilo.org/global/publications/ilo-bookstore/order-online/books/WCMS_171810/lang--en/index.htm (accessed 20 April 2021).

18 Case of the Mayagna (Sumo) Awas Tingni Community v. Nicaragua, Judgement of 31 August 2001, Series C, No. 79, para. 149.

19 See, for example, Aurelio Cal et al. v. Attorney General of Belize (Supreme Court of Belize, 2007).

policies and actions related to biodiversity conservation and sustainable management, will extend to multiple conventions on biodiversity and climate change, such as the Convention on Migratory Species and the United Nations Framework Convention on Climate Change. The process will entail establishing new goals and targets with associated indicators that can be used to monitor progress toward achieving the framework over the next 10 years and beyond. The previous Aichi Biodiversity Targets, determined in 2010, have largely been unmet; or have been difficult to track, such as in the case of Aichi Target 18 related to traditional knowledge and Indigenous Peoples. The post-2020 framework aims to align with other UN conventions and integrate measures related to both biodiversity and climate change. This connection is critical because climate change is exacerbating the decline of species, habitats and ecological processes that underpin biological diversity. Conservation in the future needs to take account of changing conditions for both nature and people. Equally, the role of biodiversity in maintaining an environment and climate favourable to human life is increasingly being recognized.

State designation of protected areas has been the cornerstone of conservation policy for more than 100 years despite widespread human rights violations, including violent eviction of IPLCs from their territories and lands (Tauli-Corpuz *et al.*, 2020). It appears likely there will be a continued focus on expanding protected and conserved areas in the coming decade (e.g., increased spatial targets for protected and conserved areas are included in the draft post-2020 framework), and the diversity of governance approaches in protected and conserved areas is increasing. Many institutions have made commitments to, and investments in, the important work of partnering with IPLCs,[20] including women, children and youth, and elders, embracing more inclusive, community-based or community-led governance practices based on IPLCs' experience and systems of knowledge. While IUCN recognizes protected areas under the governance of IPLCs (designated through either legal or other means), such protected areas are generally under-recognized by governments and under-reported to the World Database on Protected Areas (WDPA) (Bingham *et al.*, 2019).

Although some IPLCs may not have conservation as a primary objective for their lands, as is required to meet IUCN's definition of a protected area, they may still provide conservation outcomes while pursuing other objectives. As a result, there are linkages between some IPLC lands and a relatively recent concept in international conservation policy: other effective area-based conservation measures (OECMs). In 2010, the international community adopted the term OECM to describe other forms of area-based conservation (beyond protected areas) that could contribute to Aichi Biodiversity Target 11. A subsequent and formal definition of the OECM term was agreed in 2018 (CBD, 2018) noting their achievement of long-term positive conservation outcomes, although this is not usually their primary objective (IUCN-WCPA Task Force on OECMs, 2019). The OECM concept has potential relevance to those IPLC lands where conservation is an outcome but not necessarily the primary intention (such as where the preservation of spiritual or cultural values is the primary aim). As a result, OECMs represent an opportunity to improve recognition of the conservation values of IPLC lands. Conversely, they could also result in similar problems to those associated with protected areas, such as loss of access to lands and resources, if the OECM concept is applied in ways that do not fully align with CBD and IUCN guidance.

The diversity of governance approaches in protected and conserved areas is increasing.

If requested by custodian IPLCs, governments can support them by recognizing their lands as OECMs or protected areas, rather than seeking to implement overlapping governance arrangements. In all cases, recognition of IPLC lands as OECMs or protected areas should only be done at the behest of IPLCs in accordance with their self-determined governance systems and with appropriate recognition of rights such as free and prior informed consent. Tables 1 and 2 provide an overview of the definitions of the types of area-based conservation and governance approaches that are referenced in this report.

20 For example, in June 2018, the GEF Assembly adopted the programme for its 7th replenishment (GEF-7) for the period of 2018-2022. Biodiversity is one of five focal areas in GEF-7 and 'inclusive conservation' is one of its programme areas. Similarly, the EU Commission, in its 2030 Biodiversity Strategy and its NaturAfrica initiative, vows to protect nature in Africa while promoting the role of non-state actors and Indigenous groups in this process. Also, larger conservation organizations such as WWF, CI and TNC have commitments to recognizing and respecting the role, rights and governance of IPLCs over their lands and territories.

Table 1. *Definitions of area-based conservation and land/sea governance approaches referred to in this report.*

IPLC lands	Abbreviation for lands of Indigenous Peoples and Local Communities. Refers to lands owned or governed by IPLCs, regardless of legal status. The Convention on Biological Diversity led to the common usage of the abbreviation 'IPLC' in the context of conservation policy. IPLCs who own or govern lands are referred to as 'custodians' throughout this report.
ICCAs	Abbreviation for territories and areas conserved by Indigenous Peoples and Local Communities (see Kothari *et al.* (2012) for more detail), also called territories of life.
Protected area	A protected area is *'a clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values'*
OECMs	Acronym for other effective area-based conservation measures. This term was adopted in 2010 in the context of the Convention on Biological Diversity's Aichi Target 11 to describe measures beyond protected areas that effectively conserve biodiversity. A definition of OECMs was adopted in 2018 by Parties to the CBD: *'a geographically defined area other than a Protected Area, which is governed and managed in ways that achieve positive and sustained long-term outcomes for the in situ conservation of biodiversity, with associated ecosystem functions and services and where applicable, cultural, spiritual, socio-economic, and other locally relevant values'* (CBD, 2018).
IPLC protected area	A protected area that is under the governance (care and decision-making authority) of Indigenous Peoples or Local Communities.
Non-IPLC protected area	A protected area that is under the governance (care and decision-making authority) of governments, private organizations, individuals, or a combination of these. We use this term to distinguish these types of protected areas from those protected areas that are exclusively governed by IPLCs.

Table 2. *Variations in defining features found in different types of conservation and land/sea management and governance mechanisms included in this report.*[21]

	IPLC lands	ICCAs	Protected areas	Non-IPLC protected areas	OECMs
Governance type	IPLCs or shared (see footnote)	IPLCs or shared (see footnote)	Any	Government authorities; private organizations or individuals; shared	Any
Primary management objective	Any	Any	Conservation (inclusive of sustainable use)	Conservation (inclusive of sustainable use)	Any
Conservation outcomes	Sometimes	Always (though potentially not in the case of ICCAs that have been disrupted or are still forming)	Expected	Expected	Always
Legal recognition	Sometimes	Sometimes	Sometimes	Sometimes	Sometimes

21 Data from the WDPA does not distinguish the type of entities involved in shared governance. Thus, for the purposes of this report, IPLC lands with shared governance arrangements in the WDPA are not included in the base layer.

4. Methods

Generating the IPLC lands base layer

To estimate the global extent of IPLC lands for this analysis, we combined several datasets (Table 3) into a single dataset we refer to as the 'base layer'. These datasets were sourced from previous and ongoing efforts that have greatly contributed to the global understanding of the extent of IPLCs' lands and territories. Datasets include lands that are acknowledged or formally recognized by governments, and lands that lack formal recognition but are subject to customary tenure, land claims, and/or de facto governance by IPLCs. To the best of our knowledge, the datasets do not include lands where IPLCs use resources if the IPLCs are not also responsible for making the decisions about management. The individual efforts summarized in Table 3 complement each other and provide a broader picture of the extent of IPLC lands when combined. The result is a global base layer of IPLC lands covering 132 countries and territories. This base layer is not complete and does not include all countries; however, by combining these datasets, this report provides the most globally comprehensive review of IPLC lands, based on spatially explicit data, to date.

This report provides the most globally comprehensive review of IPLC lands, based on spatially explicit data, to date.

Table 3. *Datasets used to compile the IPLC lands base layer.*

Dataset name and version	Description and citation	Component of dataset used in this study	Number of countries/ territories in the dataset
Indigenous Peoples' lands dataset, 2018	An academic research paper compiling various data sources to map the extent of lands where Indigenous Peoples "manage or have tenure rights". It does not include lands of non-Indigenous Local Communities. Garnett et al. (2018)	All	87
LandMark	IPLC lands categorized by legal recognition status (either acknowledged or not acknowledged by government) as well as lands known to be owned or governed by IPLCs but where their legal recognition status is unknown (i.e. indicative maps of IPLC lands). Dataset hosted by the World Resources Institute. LandMark (2020)	Polygons only	45
World Database on Protected Areas (WDPA), February 2020	The most comprehensive global database of marine and terrestrial protected areas. Managed by UNEP-WCMC. The subset of the WDPA relating to protected areas under the governance of IPLCs was used. Certain records were excluded following the usual method for deriving coverage statistics from the WDPA: www.protectedplanet.net/en/resources/calculating-protected-area-coverage UNEP-WCMC and IUCN (2020a)	Polygons only	28
World database on Other Effective area-based Conservation Measures (WD-OECM), February 2020	A newly developed, currently limited, database of marine and terrestrial OECMs. Managed by UNEP-WCMC. The subset of the WD-OECM relating to OECMs under the governance of Local Communities was used (no OECMs under the governance of Indigenous Peoples have yet been recorded in the database). UNEP-WCMC and IUCN (2020b)	Polygons only	1
Indigenous and Local Communities (IPLC) governance of lands and waters dataset, February 2020	Data on the formally recognized lands owned, governed, and or managed by Indigenous Peoples and Local Communities (IPLC). Aggregated and compiled by Conservation International. Conservation International (2020).	Polygons only	20

For details of how these datasets were combined to create the base layer, see Annex 3.

IPLC land boundaries have been obscured in the maps presented here (see notes on approach and interpretation of results in the Introduction of this report). To achieve this, datasets where IPLC land boundaries were discernible were intersected with a 1-degree grid. For each grid cell, results are displayed as presence/absence of IPLC lands. Grid cells show the presence of IPLC lands if they are more than 0% covered, meaning that a grid cell with 1% coverage is not distinguishable from a grid cell with 100% coverage. The maps will therefore present an overestimate of IPLC lands for some geographies.

Preparing the overlays

Table 4. Datasets used alongside the base layer in the analysis (detailed descriptions in Annex 1 and 2).

Dataset name and version	Description and citation	Purpose of analysis	Scale of use
Key Biodiversity Areas (KBAs), September 2019	Areas identified as globally important for biodiversity from the World Database of Key Biodiversity Areas BirdLife International (2019)	To identify the extent to which IPLC lands overlap with areas identified as important for biodiversity	Global analysis and national case studies
Ecosystem services	An aggregated map of 15 provisioning, regulating, and cultural ecosystem services, mapped by finding the top 30% of highest-performing pixels from the aggregate relative realized output of Costing Nature, v3. www.policysupport.org/costingnature. See also Mulligan (2019)	To identify the extent to which IPLC lands overlap with areas of global importance for supporting human well-being via ecosystem services	Global analysis
Terrestrial Ecoregions, 2017	A biogeographic categorization of the Earth's terrestrial biodiversity. Ecoregions are ecosystems of regional extent. Dinerstein et al. (2017)	To identify the extent to which IPLC lands might contribute to representative coverage of geographically distinct species assemblages and ecosystems	Global analysis and Philippines case study
Global Human Modification (GHM), 2018	A cumulative measure of human modification of terrestrial lands across the globe at a 1km resolution circa ~2016. Kennedy et al. (2018)	To identify the extent to which IPLC lands are modified by human impacts, as a proxy for ecological condition	Global analysis and national case studies
Cumulative Development Potential Index (DPI), 2020	A map of future development pressures derived from 14 Global Development Potential Indices (DPIs) for energy, mining, agriculture, and urban sectors. The DPIs identify lands with favourable economic and physical conditions for individual sector expansion. Oakleaf et al. (2020)	To identify the extent of IPLC lands potentially susceptible to high development pressure by commodity sectors in the future	Global analysis and national case studies
Nationally defined biogeographic regions (Ecuador)	Biogeographic units of Ecuador Ministerio del Ambiente de Ecuador (2020)	To identify the extent to which IPLC lands might contribute to representative coverage of geographically distinct species assemblages and ecosystems	Ecuador case study
Oil and Gas Concessions, 2020	Active oil and gas concessions Data from DrillingInfo, an offering of Enverus (2020)	To assess the extent of current sector-specific pressures in IPLC lands	National case studies
Mining Concessions, 2020	Active mining concessions Data from SNL Metals and Mining, an offering of S&P Global Market Intelligence (2020)	To assess the extent of current sector-specific pressures in IPLC lands	National case studies
Power Plants, 2020	Active power plants S&P Global Market Intelligence, a division of S&P Global. World Electric Power Plants Database. Accessed through S&P PLATTS portal. www.platts.com	To assess the extent of current sector-specific pressures in IPLC lands	National case studies

Table 4 summarizes the datasets used in the analysis alongside the base layer. For further details of the datasets used in the global and national analyses, please see Annexes 1 and 2 respectively. For a detailed methodology, please see Annex 3.

The analysis is restricted to terrestrial and freshwater realms since only limited data were available on coastal and marine areas under IPLC ownership or governance. Datasets with marine components were clipped to the terrestrial component of the country/territory boundary dataset. All areas were calculated on flattened (dissolved) data in the Mollweide projection. Analyses were carried out in ArcGIS Pro unless otherwise specified.

Intersect and clip tools were used to calculate the area of overlap between the base layer and a range of other datasets. This approach was taken with the following datasets (described in detail in Annex 1):

The LandMark dataset is the only component of the base layer that contains information on the legal status of lands. For this reason, the LandMark dataset was used in place of the full base layer for the analysis of legal recognition in Ecuador and the Philippines.

Data caveats

As mentioned earlier, there are inherent limitations associated with mapping and analysis of IPLC lands at the global scale. The caveats associated with each of the datasets used in the analysis are elaborated here. It is important to note that individual data layers used to create the base layer came with their own limitations in terms of methods and criteria used, which were mitigated where possible.

Base layer

The base layer on IPLC lands is incomplete, meaning that areas outside the base layer should not be assumed to lack IPLC governance or ownership (whether legal or customary); for example, Mongolia is minimally covered in the base layer but is estimated by LandMark to be over 80% covered by IPLC lands (WRI, 2020). Due to the lack of mapped boundaries for these lands, they could not be included in the base layer for this report. Similarly, in Canada, the extent of state-recognized Indigenous lands is orders of magnitude smaller than the extent of Indigenous territories described by Native Land,[22] and the idea of hard boundaries marking exclusive ownership or use rights is problematic in many settings (e.g. Artell *et al.*, 2019). This has far-reaching consequences for mapping efforts, including this report, in which Canada is one of multiple countries where the extent of IPLC lands is known to be underestimated at the global level despite concerted efforts to map these lands within the country.

In the case of the WDPA and WD-OECM, sites with shared governance were not included in the base layer. Although many shared governance arrangements involve IPLCs, it is not possible to identify these based on the level of detail in the WDPA and WD-OECM. Since this report excludes protected areas and OECMs where IPLCs participate in governance but are not the sole governance authority, it is likely to underestimate the extent of IPLC lands.

While the extent of IPLC lands may be underestimated for certain areas as noted above, it is likely to be overestimated for others, potentially including some areas where Garnett *et al.* (2018) modelled extent based on census data. In many cases the authority of data sources is contested, and in others there is an absolute lack of data, causing any statement about the extent of IPLC lands to be contentious. In Central Africa, for example, historical patterns of settlement and land use have been fundamentally altered by colonial allocation of IPLC lands to colonists, the relocation of IPLCs to build and maintain roads, and to grow and sell crops to generate income that could be taxed, as well as by more recent population displacement caused by civil strife and violence. As a result, the relationships between where people live, the areas they depend on for their livelihoods, and where they have formal or customary rights are complex and poorly documented (e.g. Olivero *et al.*, 2016). The development of an accurate global map of IPLC lands is an ongoing, international effort. The base layer used here should therefore be considered part of a collective work in progress.

The development of an accurate global map of IPLC lands is an ongoing, international effort.

Due to these caveats, the global base layer cannot be assumed fully accurate at global or national level. Likewise, the other global datasets used in this analysis cannot necessarily produce reliable national-level results, nor can the results of the overlays be assumed to be correct at sub-global level. As already noted, analyses at country level are better carried out using nationally defined and nationally appropriate, finer-scale datasets. For these reasons, this report includes case studies for two countries known to have accessible and reliable data on IPLC lands. Nevertheless, the national data in this report may be missing IPLC lands that lack legal recognition, resulting in maps that are likely under-representative.

22 Native Land is a web-based resource documenting native territories and languages in Canada. https://native-land.ca.

Other datasets used in the analysis (see Annex I and II for further details)

Key Biodiversity Areas (KBAs)
This dataset consists of areas identified as globally important for biodiversity. Data on KBAs are held in the World Database of Key Biodiversity Areas (WDKBA), which is managed by BirdLife International on behalf of the KBA Partnership. The dataset is updated twice per year. Most KBAs are Important Bird and Biodiversity Areas (IBAs), which means that although IBAs are also important for other species, the dataset is currently biased taxonomically towards birds. There is a significant effort underway by the KBA Partnership to identify KBAs across multiple taxa and across the full range of KBA criteria, and once this is completed, the coverage of KBAs is likely to be much higher than at present. Therefore, it is important to note that not all areas across the globe meeting the KBA standard have been identified to date. Furthermore, many areas that do not meet the KBA standard are also important for biodiversity and ecosystem services.

Terrestrial ecoregions
This dataset is a biogeographic regionalization of the Earth's terrestrial biodiversity. It has been refined with a major review in 2017 and is considered accurate, with well-established classifications. The dataset is likely to require revision in the future based on more accurate information and climate change impacts. This dataset does not include freshwater biota.

Global Human Modification (GHM)
The Global Human Modification (GHM) dataset creates maps of current land condition (circa 2016) based on spatial extent and magnitude of impacts from human settlement, agriculture, transportation, mining, energy production, and electrical infrastructure globally (excluding Antarctica) (Kennedy *et al.,* 2019). GHM ranges from 0 (no modification) to 1 (fully modified) and reflects the proportion of a landscape modified by mapped cumulative human impacts. While the GHM captures many significant human stressors, it does not capture them all, including timber production or selective logging, pastureland, recreational use, hunting, spread of invasive species, or climate change. The GHM focuses on mapping human activities known to negatively impact terrestrial natural systems and does not capture some human activities, especially in the context of lands customarily governed by IPLCs, that may modify the environment for the better through the building of landesque capital that can protect biodiversity and provide critical environmental services (IPBES, 2019).

Cumulative Development Potential Index (DPI)
Development Potential Indices (DPIs) (Oakleaf et al., 2019) are used to depict potential future expansion pressure by renewable energy, oil and gas, mining, agriculture and urban sectors. High development pressure areas identify lands that are highly suitable for expansion by commodity-based sectors due to the presence of large quantities of unexploited resources and infrastructure that supports extraction and transport of those resources. The DPIs can map development potential based only on resource potential and technical feasibility, and do not capture other feasibility aspects, such as land tenure or politics, nor do they account for estimated production demands due to uncertainties or lack of data on per-sector regional projections. For these reasons, lands classified as high development potential by the DPIs do not map the exact location of development siting or the potential conversion of this land; rather, they depict the 'readiness' and 'likelihood' of development that may occur within the area.

Nationally defined biogeographic regions (Ecuador)
The biogeographical regions dataset (Unidad biogeográfica) is produced by the Ministerio del Ambiente del Ecuador (Ecuadorian Ministry of the Environment). It represents the biogeography of continental Ecuador (i.e. it does not include the Galapagos archipelago), as defined by the government of Ecuador, and may therefore not be comparable to or in agreement with other global-level datasets.

Oil and gas concessions
This dataset consists of polygons defining state-licensed oil and gas concessions for 170 countries. Data were sourced from DrillingInfo, an offering of Enverus (2020). Data are updated quarterly with the most recent dataset assessed. Oil and gas concessions change location infrequently with an average lifespan of 3-4 years.

Mining concessions
The database for mining claims provides the delineation and location of mining claims in 88 countries. Data were sourced from SNL Metals & Mining, an offering of S&P Global Market Intelligence (2020). Data are updated quarterly with the most recent dataset assessed.

Power plants
The S&P Global Market Intelligence World Electric Power Plants Database (WEPP) is a worldwide inventory of electric power generating units. It contains design data for power plants of all sizes and technologies operated by regulated utilities, private power companies, and industrial auto producers. This data product has been prepared by S&P Global Market Intelligence, a division of S&P Global Inc.

Ecosystem services
The global ecosystem services map represents an aggregation of 15 distinct services, each of which is the result of an individual model run based on various input datasets. These datasets span a range of temporal and spatial resolutions and degrees of precision and accuracy, and the aggregation represents a simple linear unweighted sum of a normal transform of each of the layers. The final result is useful for illustrating broad spatial and temporal trends, but for local contexts it is recommended to use finer-resolution input data where available, and to consider weighting the different services appropriately for given needs/circumstances. A detailed methodology with discussion of limitations can be found at www.policysupport.org/costingnature. Only the top 30% of highest-performing pixels at the global scale by count were used in this report's analysis.

5. Global analysis

This section provides the results of a series of analytical overlays that establish the conservation values of IPLC lands. First, the global extent of mapped IPLC lands is calculated, then their relationship with sites critical for global biodiversity conservation is assessed alongside areas important for ecosystem services and diverse ecoregions. The next steps entail a review of the current ecological condition of IPLC lands and identification of areas that could be particularly susceptible to future pressures from commodity-driven development.

…a series of analytical overlays establish the conservation values of IPLC lands.

Coverage of IPLC lands

Context

At least 32% (43.5 million km^2) of the world's land is owned or governed by IPLCs. While this report's technical analysis combines data from several sources and is the most complete global base layer at this time, the true coverage of IPLC lands is likely to be higher than 32% due to the lack of data from some geographies (see data caveats). These findings should therefore not be interpreted as contradictory to other estimates of the extent of IPLC lands cited elsewhere (e.g. up to 50%, Child & Cooney, 2019). Instead, they simply represent the area that can currently be mapped.

At least 32% (43.5 million km^2) of the world's land is owned or governed by IPLCs.

Figure 1. *Distribution of IPLC lands globally, shown as presence or absence of IPLC lands per 1-degree grid cell to obscure specific IPLC land boundaries.[23] Grid cells that are not covered do not necessarily lack IPLC lands in reality (please see the important caveats listed above).*

What did we find?

The area covered by IPLC lands globally is at least 43,500,554 km^2 across a minimum of 132 countries and territories (Figure 1). Of the IPLC lands identified in this report, 13% overlap with non-IPLC protected areas. The remaining 87% are outside non-IPLC protected areas governed by the state or other entities (see Tables 1 and 2 for further detail).

What does this mean?

As custodians of at least 32% of the land across all regions of the world, IPLCs are key actors in global environmental governance. Although there is some overlap of IPLC lands with non-IPLC protected areas, it is only 13% of the total extent of IPLC lands. As a result, the conservation values and ecological condition of IPLC lands – described in the following sections – cannot be attributed to any large extent to the presence of overlapping protected areas.

23 See Notes on approach and interpretation of results in the Introduction

IPLC lands and Key Biodiversity Areas

Context

The Key Biodiversity Areas (KBA) standard for identifying areas of importance for biodiversity has been adopted globally, and KBA data is used as an indicator to assess progress towards international targets. It is used here to evaluate the relationship between IPLC lands and critical areas of biodiversity. A recent study has found that 39% of the world's KBAs have no protected area coverage, and 42% are only partially covered (UNEP-WCMC, IUCN and NGS, 2020). This indicates a large gap in the protection of some of the more critical sites for biodiversity across the globe. While KBAs often inform the delineation of protected areas, it is recognized that formal protected areas may not always be the most appropriate approach to their management (IUCN 2016a); as such, a diversity of governance mechanisms is needed.

What did we find?

IPLC lands cover at least 36% of the global extent of KBAs mapped to date (Figure 2), and over half of this area is outside non-IPLC protected areas.

What does this mean?

IPLCs are custodians of over a third of the world's most important places for biodiversity. Given that many KBAs lack other forms of protection, it is clear that IPLCs play an important role in conserving some of the most critical areas for biodiversity.

IPLCs are custodians of over a third of the world's most important places for biodiversity.

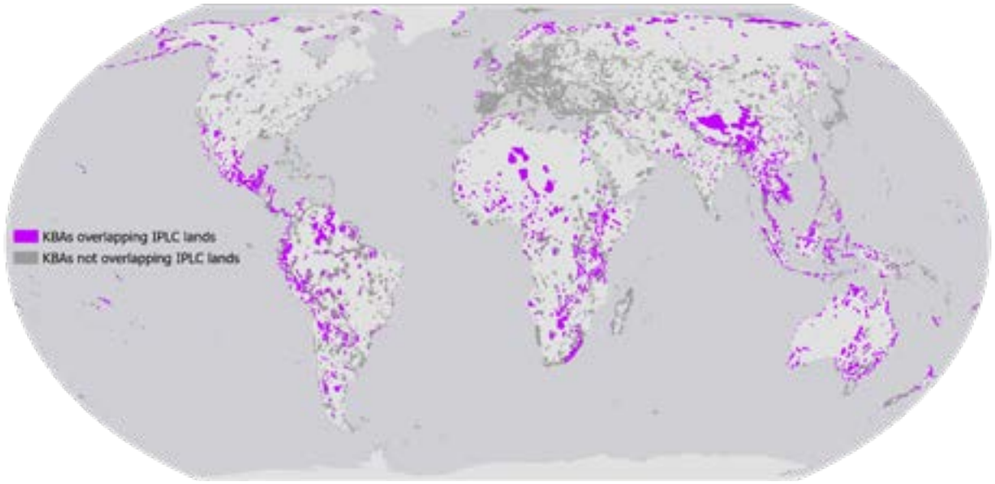


Figure 2. *Key Biodiversity Areas overlapping IPLC lands. Precise boundaries are shown in this map because IPLC land boundaries are not discernable.[24] Please note the important caveats listed above.*

In addition to KBAs, other areas are important for biodiversity and ecosystem services. For example, new studies are highlighting areas critical for biodiversity that is irreplaceable (see Last Chance Ecosystems,[25] for example). Other analyses show areas of high agricultural diversity that are crucial for biodiversity and yet are not considered KBAs (Dainese *et al.*, 2019; Lichtenberg *et al.*, 2017). As a result, IPLC lands outside KBAs should not necessarily be considered of lesser conservation importance.

24 See Notes on approach and interpretation of results in the Introduction.

25 www.nature.org/en-us/newsroom/last-chance-ecosystems/

Ecosystem services and IPLC lands

Context

Several ecosystem services have been mapped spatially at the global level to help show the relationship between areas where nature provides critical and basic services, such as fresh drinking water and timber for use in construction, and where those services are used by humanity. Other services are less direct but equally important, such as the storage and sequestration of carbon. This overlay assesses the presence of critical ecosystem services in IPLC lands.

What did we find?

Figure 3 shows the relationship between IPLC lands and globally important places for 15 provisioning, regulating, and cultural ecosystem services.[26] The area of overlap between the highest-performing areas for realized ecosystem service provision and IPLC lands is approximately 9.1 million km^2 (21% of the high-performing ecosystem services area and 24% of the IPLC lands area).[27]

What does this mean?

IPLCs maintain ecosystem services of importance to people living far beyond the borders of their lands. With nearly one-quarter of IPLC lands covering the areas of Earth with the greatest provisioning capacity of 15 combined ecosystem services, the health and vitality of custodian IPLCs has an influence on all others who benefit from the services of these lands, such as fresh water, nature-based tourism, and fisheries. Strengthening IPLC governance of their lands may lead to a co-benefit of enhanced ecosystem service provisioning.

IPLCs maintain ecosystem services that are of global importance.

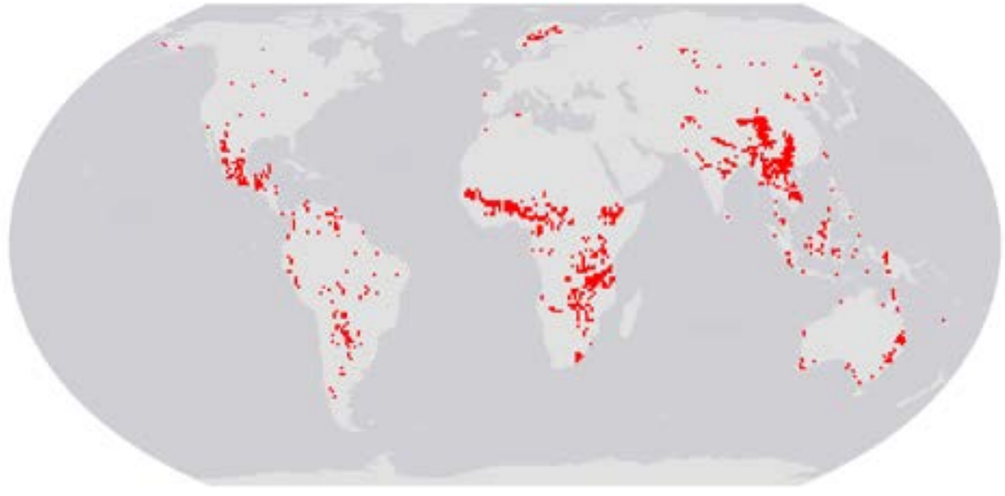


Figure 3. *Globally important places for 15 provisioning, regulating, and cultural ecosystem services (see footnote[26]) overlapping with IPLC lands. Results are shown as presence or absence of overlap per 1-degree grid cell to obscure specific IPLC land boundaries.[28] Grid cells that are not covered do not necessarily lack IPLC lands in reality (please see the important caveats listed above).*

26 The 15 services are as follows: carbon storage and sequestration, nature-based tourism, culture-based tourism, water provisioning, hazard mitigation, commercial timber, domestic timber, commercial fisheries, artisanal fisheries, fuelwood, grazing, non-wood forest products, wildlife services, wildlife dis-services, environmental aesthetic quality. More details on all of these can be found at the link to the model documentation website below.

27 Map and area analyses exclude Greenland and Antarctica.

28 See Notes on approach and interpretation of results in the Introduction.

IPLC lands, terrestrial ecoregions and biomes

Context

Ecological representation is an important consideration in global conservation, as reflected in previous international goals such as Aichi Biodiversity Target 11 and in the draft post-2020 global biodiversity framework. It can be measured by assessing the relative coverage (e.g. by protected areas) of ecoregions and biomes (Dinerstein *et al.*, 2017). The world's protected area network is currently not ecologically representative, with 66% of terrestrial ecoregions not yet meeting the CBD's 17% coverage target (UNEP-WCMC, IUCN and NGS, 2020).

IPLCs are the custodians of a diverse cross-section of the world's terrestrial ecosystems.

What did we find?

IPLC lands overlap significantly with many of the world's terrestrial biomes and ecoregions, frequently covering areas that are not otherwise protected. Half of the world's 14 terrestrial biomes are more than 30% covered by IPLC lands (Figure 4). Of the 847 global terrestrial ecoregions (including rock and ice), 75% overlap to some extent with IPLC lands (Figure 5). Ninety-one ecoregions are more than 75% covered by IPLC lands, and 179 are more than 50% covered. For some ecoregions, IPLC governance is their only form of protection.

What does this mean?

IPLCs are the custodians of a diverse cross-section of the world's terrestrial ecosystems. Since IPLC lands cover some ecoregions that have no (or very minimal) protection from non-IPLC protected areas (such as the Mandara Plateau woodlands in Africa, and Northeast Himalayan subalpine conifer forests in Asia), ecological representation can only be achieved through sustaining and supporting IPLCs in their current roles as custodians to these areas, including by recognizing their tenure rights.

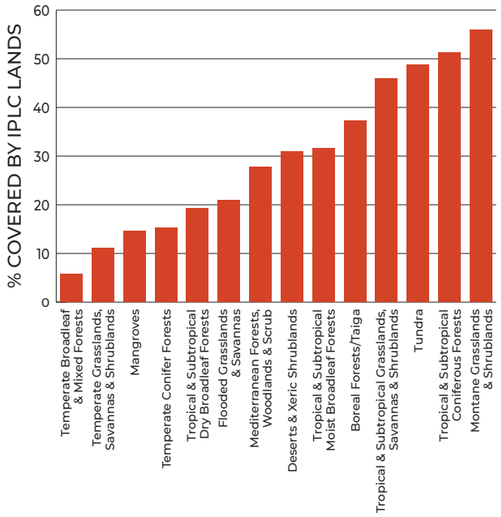


Figure 4. *Coverage of terrestrial biomes by IPLC lands.*

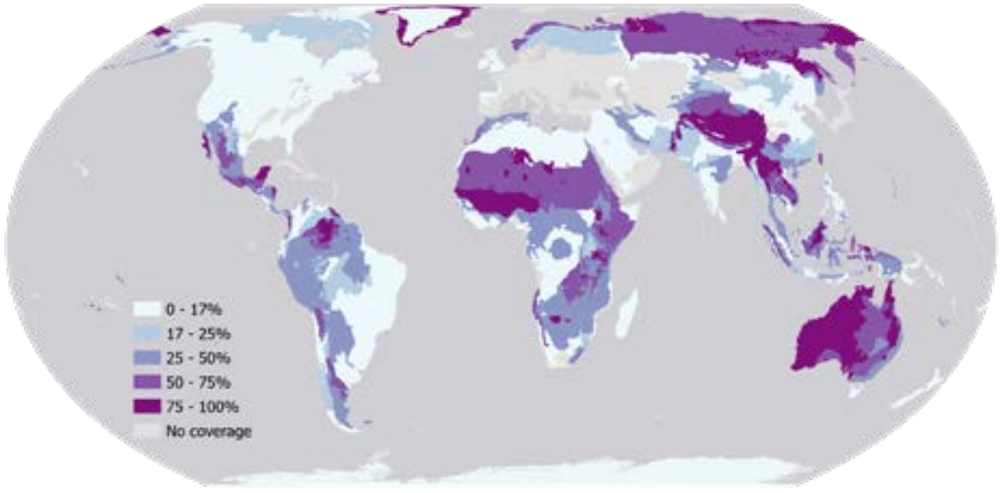


Figure 5. *Coverage of terrestrial ecoregions by IPLC lands. Precise ecoregion boundaries are shown since IPLC lands boundaries are not discernible.[29] Please note the important caveats listed above, including that IPLC lands are underestimated for some countries, e.g. Canada and Mongolia.*

29 See Notes on approach and interpretation of results in the Introduction.

Ecological condition of IPLC lands

Context

Ecological integrity of landscapes is often measured by the extent of human influence (Riggio *et al.*, 2020). Following this approach, the Global Human Modification dataset (Kennedy *et al.*, 2018) is used as a proxy for ecological condition because it identifies the extent to which the current land area has been modified by human impacts, such as human settlement, agriculture, and infrastructure. Thus, a lower level of modification indicates lands that are likely to be in relatively better ecological condition. The GHM covers a wider range of land use impacts, and at a finer scale, than modification datasets used in previous studies. The use of this proxy is for ecological condition only and does not cover threats to IPLC lands.

Most IPLC lands remain in good ecological condition.

What did we find?

Of IPLC lands globally, 64% have no or low human modification (i.e. less than 10% modified by humans) and are therefore in relatively good ecological condition (Figure 6); 27% have moderate human modification (>10-40% modified) and thus are in moderate ecological condition; and 9% are highly modified (>40% modified) and likely of poorer ecological condition. These results indicate that most IPLC lands remain in good ecological condition. Furthermore, IPLC lands make up 42% of all global land in good ecological condition (65.92 million km^2, (Kennedy *et al.*, 2019). With the addition of Local Community lands, this finding supports and slightly surpasses the finding of Garnett *et al.* (2018) on the ecological condition of Indigenous Peoples' lands alone (based on the Human Footprint Index).

IPLC lands make up 42% of all global land in good ecological condition (65.92 million km^2).

Figure 6. *IPLC lands with no or low human modification (used as a proxy for good ecological condition), shown as presence or absence of these IPLC lands per 1-degree grid cell to obscure specific IPLC land boundaries.[30] Grid cells that are not covered do not necessarily lack IPLC lands in reality (please see the important caveats listed above).*

What does this mean?

IPLC lands have largely been maintained in good ecological condition. Lands with low and moderate human modification warrant increased attention to prevent loss of biodiversity and ecosystem services (Kennedy *et al.*, 2019); these two conditions cover 91% of IPLC lands in this analysis.

30 See Notes on approach and interpretation of results in the Introduction.

Future development pressure on IPLC lands

Context

Although IPLCs have diverse intentions for their lands and may embrace opportunities for development, many IPLCs currently face unwanted development pressures from resource extraction, commodity production, mining, energy and transport infrastructure (IPBES, 2019). To explore the extent to which commodity-driven pressures on IPLC lands might increase in the future, the base layer was overlaid with a cumulative index of potential future pressures (DPI). Areas of high potential development pressure that overlap with IPLC lands are those that are highly suitable for development expansion by agriculture, energy (renewables and oil and gas), mining and urban sectors due to the presence of large quantities of unexploited resources, and infrastructure that supports extraction and transport of those resources. In addition, the analysis looks at the overlap between areas in good or moderate ecological condition (see section 5.5) and areas of high potential development pressure.

What did we find?

Over 25% of IPLC lands could face high pressure in the future from commodity-driven development (Figure 7). Currently, 80% of IPLC lands with high potential future development pressure are in good or moderate ecological condition. Figure 8 shows these lands, covering an area of 8.9 million km^2.

Over 25% of IPLC lands could face high pressure in the future from commodity-driven development.

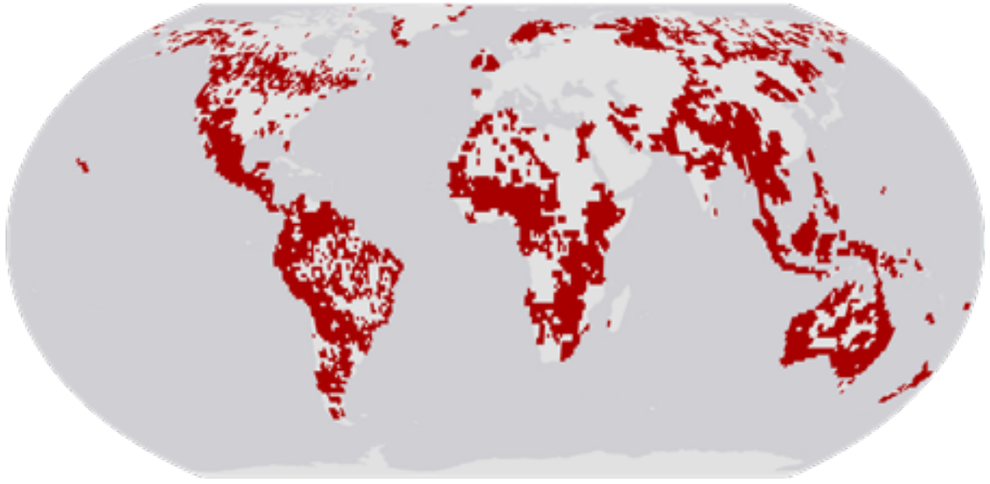


Figure 7. *IPLC lands that are subject to high potential development pressure, shown as presence or absence of these IPLC lands per 1-degree grid cell to obscure specific IPLC land boundaries.[31] Grid cells that are not covered do not necessarily lack IPLC lands in reality (please see the important caveats listed above).*

31 See *Notes on approach and interpretation of results* in the Introduction.

What does this mean?

While ecological condition within many IPLC lands is presently good (see section 5.5), this could change significantly in the future. These future pressures are not inevitable; however, by being aware of these issues now, there is an opportunity to proactively address and plan for future changes. The formalization of rights to lands and resources is of particular importance in this context, as is equipping IPLCs with tools to address unwanted development.

The formalization of IPLC rights to lands and resources is of particular importance.

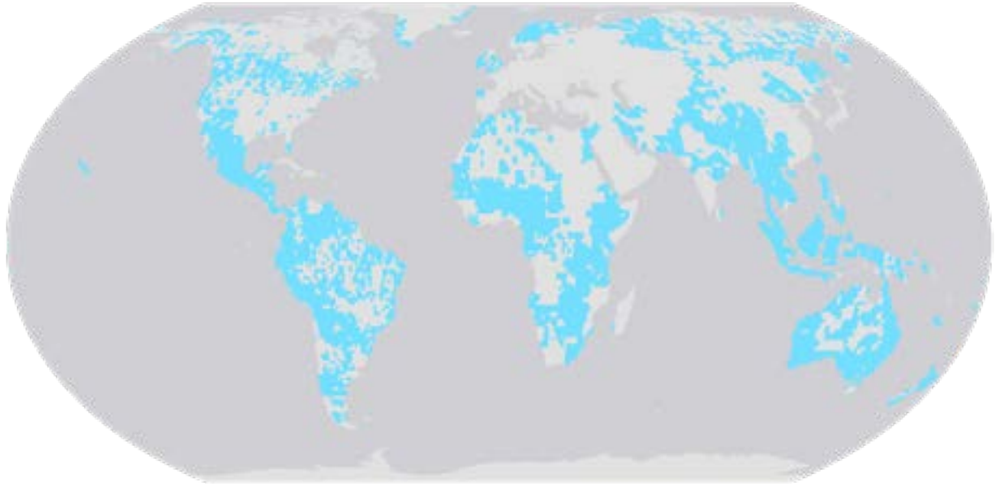


Figure 8. *IPLC lands that currently have low to moderate human modification and high potential future development pressure, shown as presence or absence of these IPLC lands per 1-degree grid cell to obscure specific IPLC land boundaries.[32] Grid cells that are not covered do not necessarily lack IPLC lands in reality (please see the important caveats listed above).*

32 See *Notes on approach and interpretation of results* in the Introduction.

6. National case studies

National case studies are included in this report to provide a more in-depth overview of how vital IPLC lands can be to conservation at the national level. Ecuador and the Philippines were chosen due to the availability of good-quality data. The source data are viewable online through LandMark, meaning that clearer visualizations of the importance of IPLC lands, showing precise boundaries, can be displayed in this section.

Like other studies conducted at country or regional level (e.g. Corrigan *et al.* 2018; Artelle *et al.,* 2019; Schuster *et al.,* 2019), these analyses provide more refined results and a deeper look at the significance of IPLC lands at national level, substituting global with national datasets where possible. In the case of Ecuador and the Philippines, data on legal recognition are available, providing an additional lens through which to explore relationships between rights and recognition of IPLCs and ecological outcomes.

Ecuador

In Ecuador, IPLC lands cover over one-quarter (29%) of the land area. There may be additional IPLC lands not included in this map.

KBA coverage

IPLC lands overlap partially or wholly with 50 of Ecuador's 123 KBAs (Figure 9a). Forty-six percent of the total area covered by KBAs in Ecuador falls within IPLC lands (an area of over 43,000 km^2). Furthermore, five KBAs are contained entirely within IPLC lands and have no coverage from non-IPLC protected areas, which signifies the role of IPLC lands in conserving areas that are particularly important for biodiversity.

Biogeographic region coverage

IPLC lands also overlap at least partially with all 16 of Ecuador's biogeographic regions (Figure 9b), demonstrating that IPLCs are vital allies in achieving representative conservation in Ecuador. Notably, the Tigre-Pastaza region (the third largest in Ecuador) is 99% covered by IPLC lands. Within this area, there is little overlap with non-IPLC protected areas.

Ecological condition

64% of IPLC land in Ecuador has low human modification, likely indicating good ecological condition.

Current and future development pressures

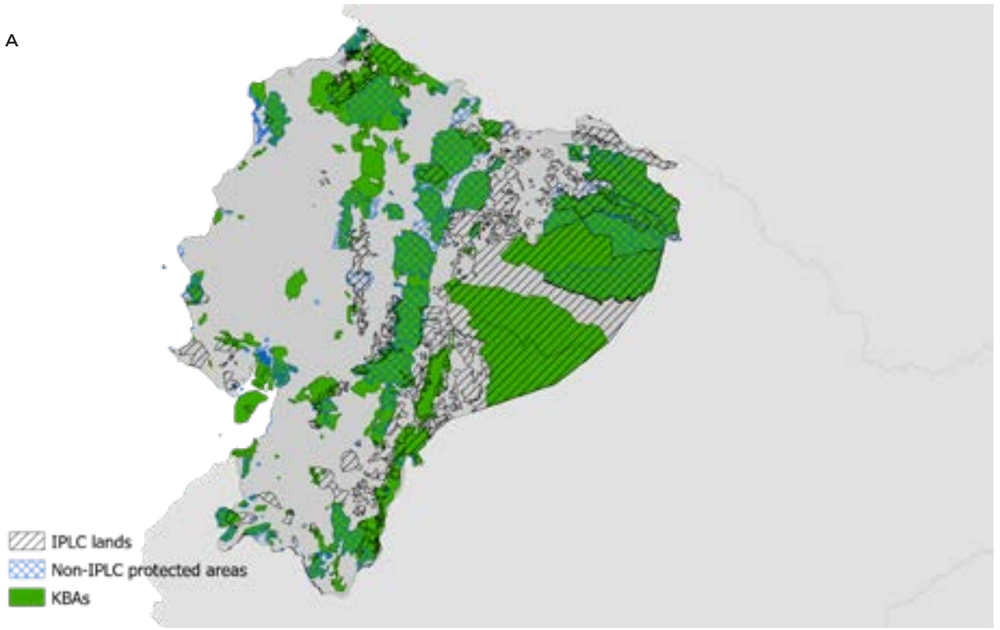
These lands are not free from development pressures, with 31% of the IPLC land area containing active oil and gas concessions (Figure 9c). An analysis of the DPI data suggests that such pressures may increase in the future (Figure 9d), and that the potential for development pressure may be higher in lands with less formal recognition.[33] This lack of recognition might correspond to IPLCs carrying less weight in negotiations over potential development pressures. It could also undermine their authority to act as decision-makers, creating a greater risk of unsustainable development.

What does this mean?

With appropriate recognition of rights to land and territories and support for IPLC governance systems, following IPLC consent, the IPLC lands identified in this analysis could double the area protected or conserved in Ecuador from 22% (UNEP-WCMC, 2021a) to 44% (Figure 9). Thirty-five percent of lands acknowledged by the government but not documented may face high potential development pressure, compared with 17% of lands that are both acknowledged by the government and documented. These future development pressures are not inevitable, but the results highlight the need to ensure that IPLCs are supported to reject unwanted external development pressures, including through improved tenure security, capacity-building and investment to enable engagement and leadership by IPLCs in development decision-making. This could also include support to steer development in ways that align with their cultures and values, such as through impact mitigation planning that takes into account social and cultural values (e.g. Heiner *et al.,* 2019).

33 Formal recognition in this context refers to legal recognition of tenure or occupation by the national government, and/or formal documentation of tenure or occupation.

A



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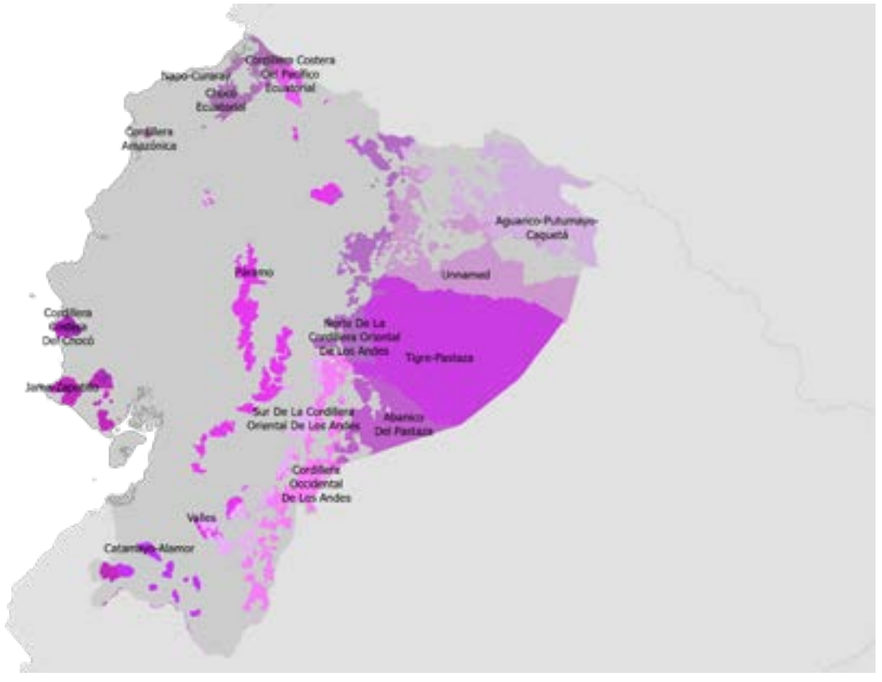

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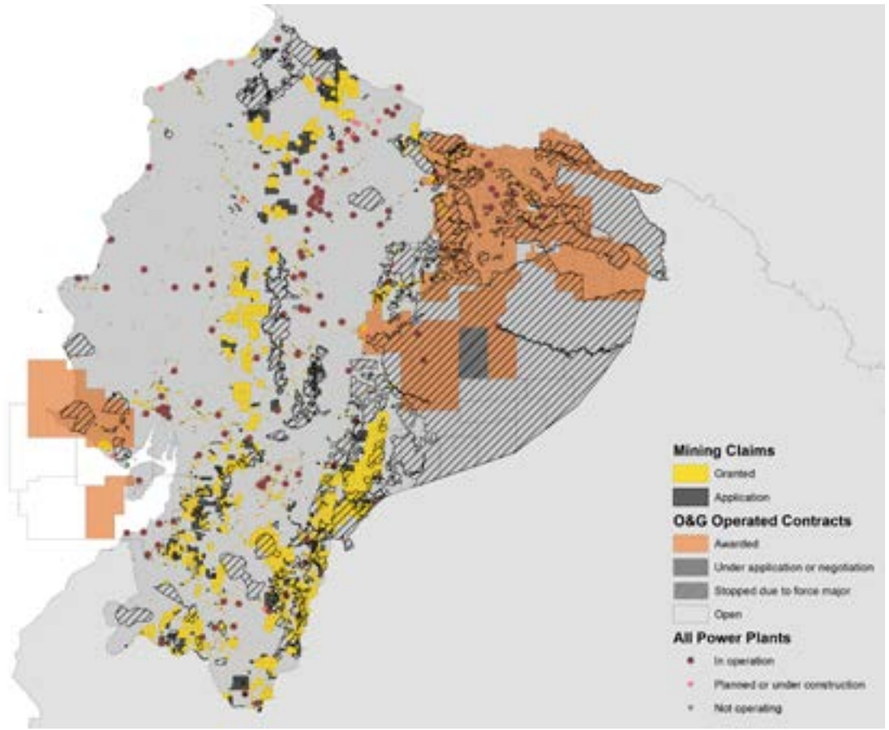

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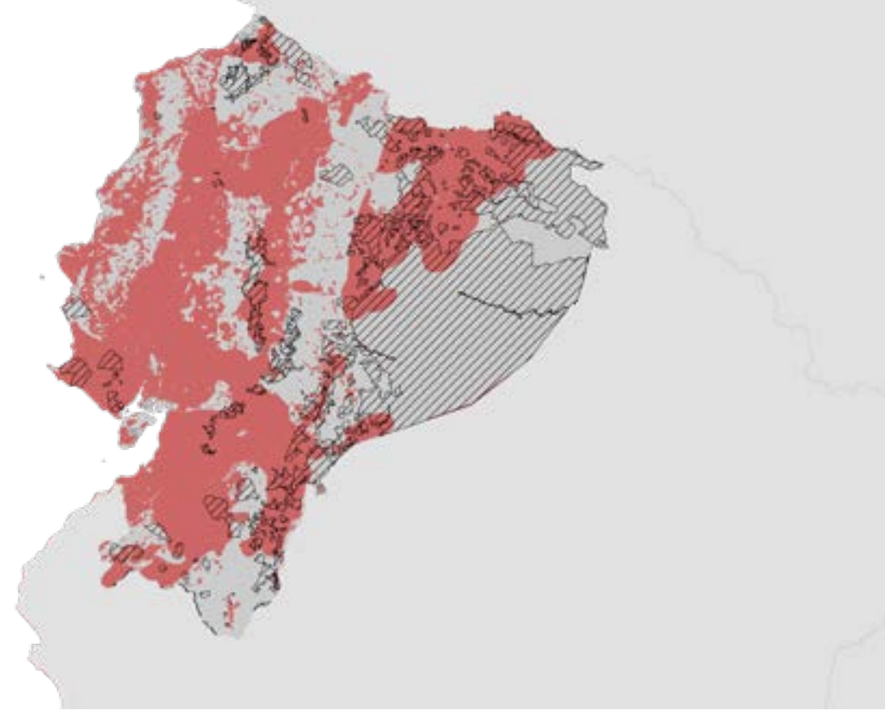

Figure 9. *IPLC lands in mainland Ecuador:* ***A.*** *Terrestrial KBAs, IPLC lands and non-IPLC terrestrial protected areas.* ***B.*** *Biogeographic regions contained within IPLC lands.* ***C.*** *Concessions and power plants overlapping IPLC lands.* ***D.*** *IPLC lands (hatched) and areas of high potential future development pressure (red). Precise IPLC land boundaries are shown because the data can be viewed through LandMark.*[34]

34 See Notes on approach and interpretation of results in the Introduction.

Philippines

In the Philippines, IPLC lands are similarly vital for conservation, covering at least 15% of the country. There may be additional IPLC lands not included in this map. With appropriate recognition of rights to land and territories, and support to the associated IPLC governance systems, following IPLC consent, IPLC lands could increase the area protected or conserved in the Philippines from 16% (UNEP-WCMC, 2021b) to 27%.

KBA coverage

IPLC lands overlap with 88 of the country's 129 KBAs (an area of over 18,000 km^2). Two KBAs that lack coverage by non-IPLC protected areas are 100% covered by IPLC lands, and 25% of the country's total KBA area is covered by IPLC lands (Figure 10a).

Ecoregion coverage

Of the 12 ecoregions in the Philippines, eight overlap at least partially with IPLC lands. Four of these are more than 20% covered by IPLC lands (Figure 10b).

Ecological condition

As in the case of Ecuador, a large area of IPLC land in the Philippines has experienced only low levels of human modification, indicating good ecological condition, but parts of this same area may face greater pressures in the future. One-third of IPLC land is currently in good ecological condition. Not all IPLC lands are free from industrial development, however, with 53 active power plants located in IPLC lands.

Future development pressure

In the future, 23% of IPLC land in the Philippines may face high development pressure (Figure 10c).

What does this mean?

IPLC lands are vital to ecologically representative conservation in the Philippines, and to the protection of many of the country's most important areas for biodiversity. All data used for the Philippines case study, accessed through LandMark, are for lands both acknowledged by the government and documented. This fact is encouraging given that almost a quarter of IPLC land in the country could face high development pressure in the future. However, it is important to acknowledge that unrecognized lands are less likely to be mapped. Unmapped lands will also require appropriate recognition and support in order to retain their conservation values into future, various development pressures.

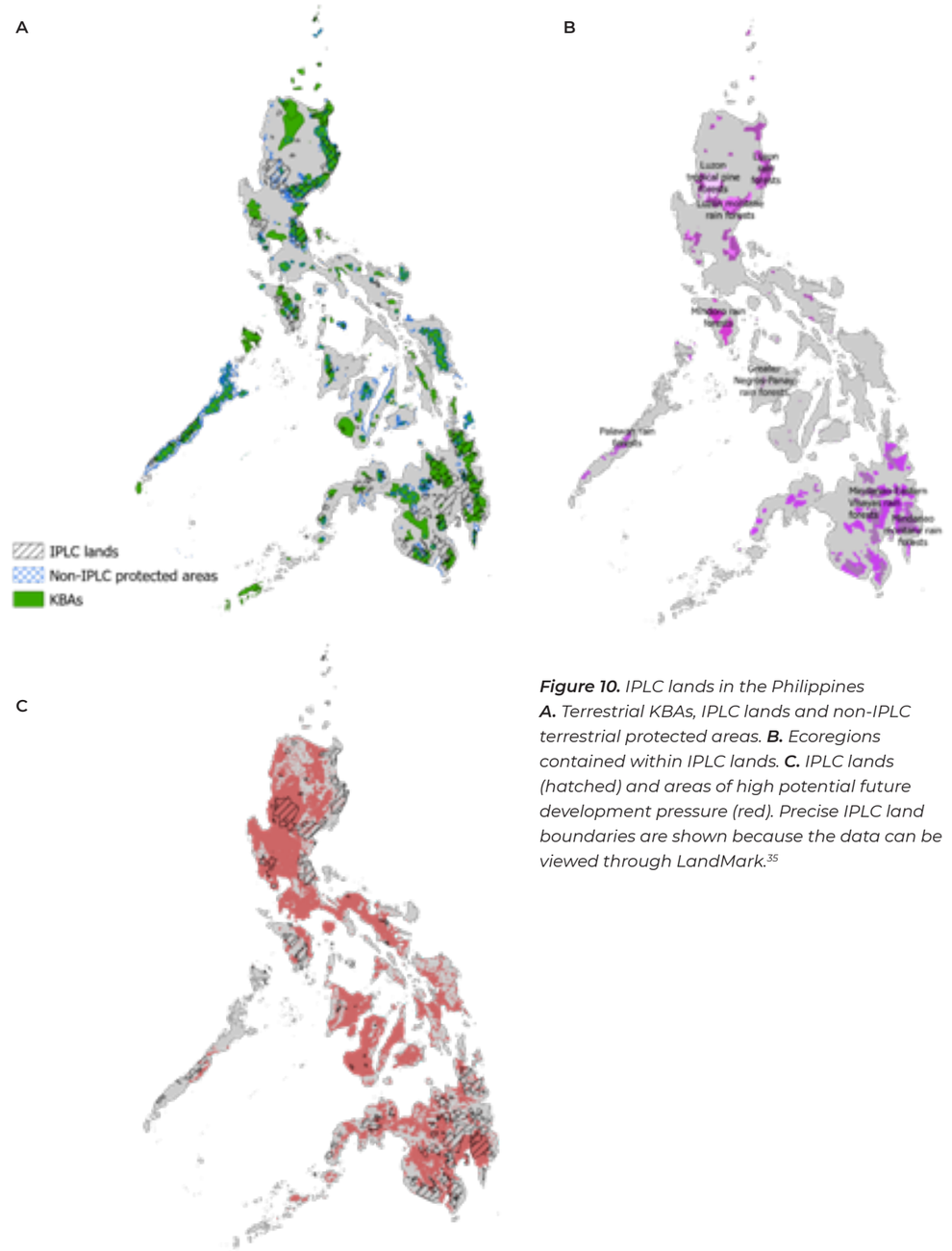

Figure 10. *IPLC lands in the Philippines* ***A.*** *Terrestrial KBAs, IPLC lands and non-IPLC terrestrial protected areas.* ***B.*** *Ecoregions contained within IPLC lands.* ***C.*** *IPLC lands (hatched) and areas of high potential future development pressure (red). Precise IPLC land boundaries are shown because the data can be viewed through LandMark.*[35]

35 See Notes on approach and interpretation of results in the Introduction.

7. Future research and recommended actions

This technical report provides analytical evidence that global conservation targets can only be reached in collaboration with IPLCs and through acknowledgement of IPLCs' historical and current contributions, solutions and leadership. The sustainability of IPLCs' contributions and solutions to the biodiversity crisis relies on the full recognition and exercise of their rights, supported through diverse means.[36] The science-based findings from this report provide a range of opportunities for actions that can be taken in the realms of research, policy and law, funding, capacity-building, advocacy and awareness, and organizational strategies.

The sustainability of IPLCs' contributions and solutions to the biodiversity crisis relies on the full recognition and exercise of their rights, supported through diverse means

The recommendations here focus on Indigenous Peoples as well as *Local Communities* where the latter, *as defined in this report, exhibit one or more of the following characteristics: having customary rights, having a culture strongly linked to their lands in a custodianship relationship, or self-identifying as having the characteristics of Indigenous Peoples despite the government not recognizing them as such.*

While this is not a comprehensive set of recommendations, it is informed by the findings of this report and by consultations with the contributors and IPLCs who reviewed the findings and suggested pathways forward.

These recommendations and critical actions can be undertaken by governments, intergovernmental organisations, and non-governmental organizations such as conservation organizations, as well as by scientists, the private sector and donors, in collaboration with and under the advisement of IPLCs, including through free, prior and informed consent processes. In addition to providing support for IPLCs, future work should identify and address the root causes of systemic challenges experienced in particular by Indigenous Peoples.

Lastly and very importantly, as noted at the beginning of this report, IPLCs will require different forms of recognition and support based on a variety of circumstances, and these should be identified and requested by the IPLCs themselves as part of their self-determination and self-strengthening processes (see Sajeva *et al.*, 2019). As such, the applicability of the recommendations below, and methods for their implementation, will vary based on the different characteristics of IPLCs,[37] with some needing more urgent or diverse forms of support given their unique contexts, historical or current disturbances, and various aspirations.

Broaden and strengthen recognition of rights

1. As leaders in global environmental governance, IPLCs should be core partners in the deliberation and implementation of global policy relating to, inter alia, the environment and sustainable development.

2. IPLCs should be supported in their custodianship role, in the pursuit of their self-determined priorities and approaches to sustainable development, and in the conservation and use of their lands and territories. Importantly, this support should prevent the introduction of external development pressures (such as energy production, urbanization, and industrial agricultural pressures) as well as externally proposed conservation efforts in IPLC lands without free, prior and informed consent.

3. There is a need for greater respect, recognition and formalization of the collective and customary tenure rights of IPLCs over the lands, territories, waters and resources that they have traditionally owned or governed, so that they can survive and prosper. Moreover, securing IPLC land rights can be a cost-effective and efficient way to slow climate change and accelerate sustainable development.[38]

4. When overlaps with protected areas under the governance of any actor other than IPLCs are excluded, IPLC lands in good ecological condition cover 17.5% of the world's terrestrial surface is principally dependent upon the practices, knowledge, innovations and values of IPLCs. Recognition of this significant role should be expanded. Mapping and research become positive support tools when backed by policies and actions that appropriately utilize these outputs.

36 There are situations when the lands of indigenous peoples, and to a larger degree those of local communities, are not in an ideal state. This can be due to disruptions in traditional culture and practices arising from external factors such as displacement, encroachment or outside influences, often leading to impoverishment resulting in the weakening of the custodianship of these communities over their lands and territories. These 'disrupted' communities should not be excluded from relevant recommendations set forth in this section. Instead, greater impetus on self-strengthening processes that restore cultural and governance integrity, and build their capacity to implement these recommendations on their own or in partnership with other organizations, should be the foundation for further supportive action. See: Sajeva et al. (2019). ICCA policy brief 7. On meanings and more.

37 One recent approach to describing community characteristics is explained further in Saveja et al. (2019).

38 www.wri.org/news/land-matters-how-securing-community-land-rights-can-slow-climate-change-and-accelerate

5. Where IPLC lands and non-IPLC protected areas overlap, IPLCs (including women, children and youth, and elders) should be acknowledged for their historic leadership and governance as well as their ongoing efforts in conservation, informed by traditional ecological knowledge. IPLC-led governance or shared governance arrangements such as co-management approaches should be considered in consultation with IPLCs. This should include the attribution of designated rights to use, manage and otherwise benefit from land and resources. Changes in governance arrangements should be implemented only after free, prior and informed consent has been given.

6. As evidenced in this report and elsewhere, IPLCs have demonstrated their roles as critical custodians of nature.[39] As such, and to enable their capacities into the future, the rights of IPLCs to lands and resources need to be appropriately recognized, protected and enforced. IPLCs should be recognized and supported as critical leaders in conservation and sustainable management (both at local and global levels), with resources that can maintain and build on their existing knowledge of natural areas, and capacity support to manage land at large scales where drivers of biodiversity loss and climate change are having extensive and adverse impacts.[40]

7. Where IPLCs have rights to their lands and territories recognized, they may nevertheless urgently need support for registration and titling and the necessary upfront work, including advocacy to help shape an enabling legal and policy environment: all together, this is often a long, challenging and expensive process.[41]

Enhance documentation of IPLC territories, lands and inland waters

Appropriate support is needed for documentation by IPLCs of their own territories, lands and waters.

8. Appropriate support is needed for documentation by IPLCs of their own territories, lands and waters (including through participatory mapping and Indigenous research methodologies) to ensure more evidence from the local scale is available to and accounted for in national and global decision-making processes that affect IPLCs. Such evidence could also inform good practices to be replicated across other IPLC territories, lands and waters.

9. IPLCs may need ongoing, reliable and supported access to technical resources (e.g. smartphones, drones or monitoring equipment) for documentation.

10. Knowledge-sharing and capacity-building in multiple languages, including Indigenous languages, as well as culturally appropriate tools and methodologies, could enhance and support equitable governance and effective management, and increase capacity for securing IPLC-led governance and management.

IPLCs need access to quality data.

11. IPLCs need access to quality data. Robust documentation, at the local level in particular, requires access to high-resolution imagery and data for mapping by communities, which includes documenting the environmental, social, economic and cultural values their lands hold.

12. Further work is needed to map and document coastal and marine areas under IPLC governance or ownership, enabling land-focused analyses such as those reported here to be extended into the marine realm.

13. Conservation organizations should employ greater social science capacity and increased social awareness of human well-being considerations for inclusive conservation and cross-cutting issues such as gender, human rights, the inclusion of children and youth, and the importance of livelihoods. For example, training could be expanded to include social science methods and the development of practitioner tools and resources for implementation in project monitoring and evaluation.

14. There is a need to develop and adopt more stringent protocols for data collection, its ownership, who can access it, and how to protect it. In addition, there should be investment in developing standards and guidance for how to do this in a way that honours and protects the interests of IPLC partners.[42]

15. In addition to setting priorities, IPLC professionals should have the opportunity to collaborate and ideally lead on data collection, mapping, data processing, analysis, strategizing and communication of results.

39 See multiple documented case studies at www.iccaconsortium.org/index.php/category/national-local-en/grassroot-discussions-en/. See also FAO and FILAC (2021) Forest governance by indigenous and tribal peoples. An opportunity for climate action in Latin America and the Caribbean; and IIED (2020) Unseen Foresters. An assessment of approaches for wider recognition and spread of sustainable forest management by local communities. For a reflection on IPLCs historic role in conservation see also footnote 47 in Annex I.

40 This report shows IPLCs have been and are good custodians to global landscapes (see previous footnote), even without having their rights recognized. However, it is beyond the purpose and scope of this report and analysis to make recommendations related to accountabilities of IPLCs. Instead, the findings can hopefully further inform the dialogue and implementation of any decisions that relate to rights, responsibilities and accountabilities from all actors.

41 Notess, L. and Veit, P. 2018. The Scramble for Land Rights. www.wri.org/publication/scramble-for-land-rights.

42 See, for example, training opportunities for the Canadian First Nations' OCAP principles – ownership, control, access, and possession – at fnigc.ca/ocap-training.

Expand sustainable financial support and capacity-building opportunities

16. The format of capacity-building opportunities and financial support should be informed by and ideally determined by IPLCs.

17. Multiple mechanisms should be considered to facilitate the flow and availability of resources and support to IPLCs. For example, donors (including those from public and private sectors) could provide greater direct access and sustainable support for financial resources to IPLCs which would enable recommended actions.

18. IPLCs can be empowered through training in administrative and technical capacities to engage with donors and manage subsequent projects and contractual obligations.[43]

More work is needed to secure multiple sources of financing.

19. Support for conservation outcomes and livelihoods could be provided through long-term, sustainable conservation financing for IPLCs. Sustainable financing is currently a significant challenge for IPLCs, especially in more remote locations. More work is needed to secure multiple sources of financing, including Indigenous women's financing.

20. IPLCs should be further empowered to steer development that aligns with their livelihoods, addresses collective human rights and ambitions, acknowledges social and cultural values, ensures free, prior and informed consent, and includes Strategic Social and Environmental Impact Assessment as well as Human Rights Impact Assessment processes that reflect potential impacts on their values, rights and resources. Insights can be drawn, for example, from the Akwe:Kon Guidelines[44] and UNDRIP.[45] Though there are several social and environmental frameworks and systems with different levels of commitment, they need better alignment and grounding in international human rights law.[46] This will also help support and monitor compliance.

21. Political, legal, financial and other mechanisms are needed to sustain IPLC self-determined governance systems, collective rights, responsibilities, and livelihoods. Such mechanisms should take into account the diverse challenges faced by IPLCs, including isolation, declining and ageing populations, lack of essential services, and urbanization, noting that many of these challenges are subject to rapid change. Policies and mechanisms should be inclusive, intercultural, and attentive to the needs of Indigenous Peoples, women and other marginalized groups.

Increase the appropriate use of conservation mechanisms

22. Diversifying leadership in conservation could be mainstreamed as a mechanism to support IPLCs in their own conservation initiatives. This includes avoiding the imposition of top-down, overlapping designations such as (non-IPLC) protected areas. It also entails designating protected areas and OECMs on IPLC lands only where these are requested and governed (including through shared governance) by IPLCs themselves.

23. Actions can be taken to work closely with IPLCs and government entities in instances where national designation of IPLC-governed protected and conserved areas can reduce imminent threats, such as destructive mining, extensive industrial agricultural expansion and energy development practices.

IPLCs can be empowered by creating capacities to monitor.

24. IPLCs can be empowered by creating capacities to monitor and effectively address encroachment from third parties as a way to reduce threats. It is also important to strengthen IPLCs' own systems of monitoring, control and

43 Similarly, the FAO and FILAC (2021) argue: 'it is important to invest in improving the governance of indigenous and Afro descendent territories and indigenous and tribal organizations. That requires striking a balance between strengthening the indigenous and tribal peoples' technical and administrative capacity and dynamizing more participatory processes: extending their reach, while deepening their local roots. Over time, new more "hybrid" structures must emerge to accompany and finance the communities and their organizations. All these efforts must prioritize meaningful participation in decision-making by women and youth.'

44 Akwe:kon guidelines are available at www.cbd.int/doc/publications/akwe-brochure-en.pdf.

45 The UN Declaration on the Rights of Indigenous Peoples can be found at www.un.org/development/desa/indigenouspeoples/declaration-on-the-rights-of-indigenous-peoples.html.

46 For this reason the Global Landscapes Forum (GLF), the Indigenous Peoples Major Group (IPMG) for Sustainable Development, and the Rights and Resources Initiative (RRI) are collaborating to produce a simple set of principles that applies existing international legal requirements and best practice standards (known as the gold standard) to guide all landscape-level actions and investments supported by civil society organizations and institutions, companies and investors – whether local, national or international.

accountability to give sustainability to their institutional frameworks and governance, ensuring that their territories can be maintained and continue to provide cultural and ecosystem services.

25. IPLC lands should be counted towards area-based conservation targets only once they have been granted appropriate recognition and support, and only with the free, prior and informed consent of their IPLC custodians.

Expand research agenda and inclusivity of IPLC leadership

26. Priority should be given to expanding and enhancing the quality and quantity of marine and freshwater data used in these types of analyses. This will ensure greater and more accurate representation of IPLCs and their role as custodians of coastal, marine and freshwater resources and associated habitats.

27. Research should consider cross-cutting and social science issues such as human well-being, gender, youth and development. Like other key actors such as governments and donors, conservation organizations should expand their social science capacity and support IPLCs in the exploration and further strengthening of spiritual, cultural and livelihood values of IPLC lands.

28. Research should consider other environmental benefits beyond those purely relating to biodiversity, such as the contributions of IPLC lands to climate mitigation and adaptation (e.g. meeting the water needs of the future), to nature-based solutions, and to human health (e.g. pandemic prevention). While the biocultural heritage values of IPLC lands cannot be considered or measured in monetary terms, in some cases it may be informative and possibly beneficial to conduct economic valuations of the ecosystem services arising from IPLC lands.

29. There is a need to explore the links between development pressures and human rights violations, including against human rights and environmental defenders. This includes identifying how state policies can successfully prevent human rights violations where they intersect with conservation.

30. Research should investigate the technological mechanisms that might support enhanced monitoring and appropriate enforcement measures for IPLC lands.

31. There is a need to more fully understand the implications of tenure insecurity on land management practices and associated ecological outcomes and processes. However, research studies should not exacerbate contentious issues around land rights and claims, unintentionally undermining the cooperation that many institutions – such as those represented by this report's contributors – seek to promote.

32. Collaborative approaches and the sharing of research methodologies and data can help encourage transparency that results in a shared and expanded knowledge base. Finding ways to further understand the extent and variable management approaches of IPLC lands needs more collective research.

As is noted in this global analysis, there are research gaps that, if filled, could help support IPLCs to care for their lands and waters and support their livelihoods on their own terms, providing benefits at multiple scales for nature and for people. Further work is needed at national and local levels to determine additional actions and research that could help support IPLCs in these contexts. Building a more comprehensive, robust and accurate spatial dataset of IPLC lands will take time, collaboration, and care to help ensure no adverse impacts or harm is inflicted in the process.

Further work is needed at national and local levels

A shared call to action

This report is the result of a first, broad collaboration of organizations and individuals from different backgrounds but with a shared goal: to better understand, highlight and support IPLCs and their critical role as custodians of lands, territories, resources and waters with immense value for biodiversity, climate resilience and ecosystems. Further building on this shared goal, the collaborators aim to continue the development of science, policy and practice in support of and together with IPLCs. We encourage others to respond to a shared call to action as part of this process:

As collaborators on this report, we commit our collective experience, convening power and resources to advancing science, policy and practice in support of Indigenous Peoples and Local Communities and their efforts to protect, conserve, sustain and restore their lands and waters, and in the protection and respect of their human rights. We also call on governments, IGOs, NGOs and civil society, along with other stakeholders, including the private sector, to join us in this effort. This report is the first step in the commitment to make our scientific and technical capacities and efforts available to help accelerate the recognition of Indigenous Peoples' and Local Communities' rights, and to safeguard their territories and resources based on qualitative and quantitative data and scientific evidence, combined with and supported by traditional and Indigenous expert knowledge, as a basis for policy decisions, legislation, and advocacy.

As collaborators on this report, we commit to and invite all other conservation organizations to respect and uphold human rights standards (including the UN Declaration on the Rights of Indigenous Peoples and other relevant conventions such as the International Labour Organisation's Indigenous and Tribal Peoples Convention, 1989 No. 169), develop, apply and monitor social and environmental safeguards, and appropriately support the governance, knowledge systems and self-determination of current and future generations of Indigenous Peoples and Local Communities.

To this end, we commit to uphold and fully respect the distinct and differentiated rights of Indigenous Peoples and Local Communities. We further commit to collaborate along shared principles and agreed practices to support the self-determination and self-empowerment of Indigenous Peoples and Local Communities, recognising their leadership role and guidance in the inclusive and effective conservation of biodiversity, sustainable development, and mitigation of climate change.

8. Conclusion

Many global leaders used the landmark UN Biodiversity Summit in September 2020, as well as preparations for the upcoming UN Decade on Restoration, to highlight the essential role that IPLCs play in sustaining, restoring and valuing nature. As noted in this report, there is growing evidence at multiple scales highlighting the critical history and knowledge of those who live closest to the lands and waters on which the world depends. The analyses completed here link IPLC lands with good ecological condition, and further explore the pressures, threats and opportunities related to these lands and those who own or govern them.

Progress towards updated global targets for biodiversity, including those such as spatial targets for 30% coverage by protected and conserved areas by 2030, will depend on taking into account the leadership, roles and contributions (both historic and current) of IPLCs, including women, children, youth and elders, as well as supporting diversity of equitable governance. With 32% of the world's land owned or governed by IPLCs – and 64% of this IPLC land in good ecological condition – it is clear that IPLCs must be core partners in achieving new and ambitious conservation targets. The analysis of potential future pressures, however, shows that the continued conservation of these lands cannot be taken for granted. These potential pressures, in combination with a widespread lack of formalized rights for IPLCs over lands and resources, suggest that the contribution of IPLC lands towards area-based conservation targets will depend on their appropriate recognition and ongoing support.

Progress towards global targets for biodiversity, including 30 by 30, will depend on the leadership, roles and contributions of IPLCs.

The contribution of IPLC lands towards area-based conservation targets will depend on their appropriate recognition and ongoing support.

Once secured, these vast lands have the potential to maintain biodiversity, promote the realisation of diverse human rights, maintain connectivity across the landscape, and provide natural solutions to a range of societal challenges, including mitigating climate change, sustaining ecosystem services, and protecting human health. At the same time, the diverse cultures, knowledge, and practices of IPLCs will be sustained. In the end, all people and nature will benefit.

In the end, all people and nature will benefit.

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Annex 1. Datasets used in global analysis

Non-IPLC protected areas: WDPA (February 2020), polygons only. Minus sites where GOV_TYPE = Indigenous Peoples or Local Communities, STATUS = Proposed or Not Reported, and UNESCO MAB sites. These sites were excluded following the usual method for deriving coverage statistics from the WDPA. Terms of use: www.protectedplanet.net/en/legal

Key Biodiversity Areas (BirdLife International, 2019): Areas identified as globally important for biodiversity. Digital boundaries of Key Biodiversity Areas from the World Database of Key Biodiversity Areas. September 2019 Version. Available at www.keybiodiversityareas.org/site/requestgis. The KBA Programme supports the identification, mapping, monitoring and conservation of KBAs to help safeguard the most critical sites for nature on our planet – from rainforests to reefs, mountains to marshes, deserts to grasslands and to the deepest parts of the oceans. The World Database of Key Biodiversity Areas is managed by BirdLife International on behalf of the KBA Partnership, comprising 13 of the world's leading conservation organizations. Identifying KBAs involves taking a global view of species conservation. The KBA criteria do not just consider populations of species but also their habitats and ecosystems. Applying the KBA criteria ensures that the global population of a species is assessed and the most important populations for that species as a whole are identified, including maintaining the genetic variation needed to adapt to a changing planet. Terms of use: www.keybiodiversityareas.org/info/dataterms

Terrestrial ecoregions and biomes (Dinerstein *et al.,* 2017): A dataset providing a biogeographic regionalization of the Earth's terrestrial biodiversity. This new map (2017) offers a depiction of the 847 ecoregions (including rock and ice) that represent our living planet. Ecoregions are ecosystems of regional extent. This new map is based on recent advances in biogeography – the science concerning the distribution of plants and animals. The original ecoregions map has been widely used since its introduction in 2001, underpinning the most recent analyses by ecologists of the effects of global climate change on nature to the distribution of the world's beetles to modern conservation planning.

Global Human Modification (Kennedy *et al.,* 2018; Kennedy *et al.,* 2019): GHM provides a measure of the ecological condition of terrestrial lands globally based on the extent of human modification by activities ranging from human settlement to agriculture, transportation, mining, and energy production (Kennedy *et al.,* 2019). The GHM maps the degree of human modification globally, based on the physical extent and intensity of impact of anthropogenic stressors associated with human settlement (population density, built-up areas), agriculture (cropland, livestock), transportation (major roads, minor roads, two-tracks, and railroads), mining, energy production (oil wells and wind turbines), and electrical infrastructure (powerlines and night-time lights). While the GHM captures some of the most significant human-induced stressors, it does not capture them all, including timber production or selective logging, pastureland, recreational use, spread of invasive species, or hunting. This map also does not account for climate change, which is better modelled as a separate process from land use change.

The GHM also emphasizes mapping human activities that are known to negatively impact natural systems (Salafsky *et al.,* 2008); but it is acknowledged that some human activities, especially in the context of lands customarily governed by IPLCs, may modify the environment for the better through the building of landesque capital that can protect biodiversity and provide critical environmental services (IPBES, 2019). GHM is a continuous surface of human modification scaled from 0-1 and reflects the proportion of modification within each 1km^2 land area based on the median year of 2016. Following Kennedy *et al.* (2019), GHM was binned into three classes of human modification, ranging from low (HM ≤ 0.10), to moderate (0.10 < HM ≤ 0.40), to high (0.40 < HM ≤ 1.00) based on breakpoints informed by the global distribution of GHM values, empirical land intensity metrics (Brown and Vivas, 2005; Alkemade *et al.,* 2009), and theoretical (Gustafson and Parker, 1992) and empirical thresholds to habitat loss (Swift and Hannon, 2010; Yin *et al.,* 2017). Low modified lands represent natural or semi-natural areas that are no more than 10% modified and have less than two overlapping human stressors; moderately modified lands are >10 to 40% modified and have less than three overlapping human stressors; and highly modified lands are human-dominated areas with over 40% modification and five or more overlapping human stressors. Similar to other assessments of Indigenous lands (Garnett *et al.,* 2018), the GHM is used to proxy ecological conditions, where land areas with low human modification reflect relatively natural or semi-natural lands in good ecological condition, much of this occurring on lands occupied and customarily governed by IPLCs. Low modified lands are not necessarily free from human presence nor exclude traditional or subsistence land uses by IPLC communities, such as shifting cultivation, agroforestry, hunting, or harvesting of flora and fauna.[47] Low modified lands are those areas with low mapped human influence, and are not necessarily equivalent to the extent of native vegetation in a region or to areas with high ecosystem integrity or native species intactness.

47 The extent to which pre-Columbian societies altered Amazonian landscapes is debated. See Levis, C. et al. (2017). See also Dunbar-Ortiz, R. (2015); Fernández-Llamazares, A. et al. (2020); Fletcher, M. et al. (2021) and Stephens, L. (2019).

Cumulative Development Potential Index (TNC, 2019): This is a cumulative development pressure map created by combining previously published Development Potential Indices (DPIs) (Oakleaf *et al.,* 2019) for renewable energy, oil and gas, mining, and agricultural sectors; and an urban pressure map based on global urban growth projections from 2020 to 2050 (Zhou *et al.,* 2019). Each individual index ranks the suitability of land for future development expansion by these sectors based on a) land constraints that restrict development (e.g. suitable land cover, slope); b) land suitability for sector expansion based on resource availability (sector-specific yields); and c) siting feasibility of new development (e.g. ability to transport resources or materials, access to demand centres, existing development, and other economic costs associated with resource siting). Each DPI was categorized per country based on standardized z-score ranges following Oakleaf *et al.* (2019), as low (≤25th percentile), moderate (>25th – 75th percentile), or high (>75th percentile). Then a cumulative development index was created by combining all sectors, maintaining the highest development pressure category per cell. The cumulative DPI score indicates the relative suitability or 'readiness' of IPLC lands to be developed by commodity-based economic sectors. However, the DPIs should not be used to denote the exact location of development siting, given that they do not account for national- or regional-level production demands due to uncertainties or lack of data on per-sector projections.

Ecosystem services: Fifteen provisioning, regulating, and cultural ecosystem services mapped by finding the top 30% of highest-performing pixels from the aggregate relative realized output of Costing Nature, v3 (fully documented at www.policysupport.org/costingnature). The services covered are carbon storage and sequestration, nature-based tourism, culture-based tourism, water provisioning, hazard mitigation, commercial timber, domestic timber, commercial fisheries, artisanal fisheries, fuelwood, grazing, non-wood forest products, wildlife services, wildlife dis-services, and environmental aesthetic quality. Map and area analyses exclude Greenland and Antarctica. This work is in preparation for publication in the academic literature (Collins *et al.*, *in prep*) and should not be shared or used without the co-authorship of Dr Mark Mulligan, King's College London.

Annex 2. Datasets used in national analyses

LandMark data: for the analysis of legal recognition of IPLC lands, LandMark data was used in place of the base layer (information on legal recognition was not available for the non-LandMark datasets).

Key Biodiversity Areas (September 2019, polygons only): *KBAs* (details as above in Annex 1) (BirdLife International, 2019)

National data on biogeographic units, Ecuador: (Ministerio del Ambiente del Ecuador, 2020). Biogeographic units (*Unidad biogeográfica*) of Ecuador are derived from the physiognomy of the vegetation, landscape criteria, climatic conditions, and floristic components.

Terrestrial ecoregions and biomes (Dinerstein *et al.,* 2017), Philippines (details as above in Annex 1).

Oil and gas concessions: DrillingInfo, an offering of Enverus, 2020

Mining concessions: SNL Metals and Mining, an offering of S&P Global Market Intelligence, 2020.

Power: S&P Global Market Intelligence, a division of S&P Global. World Electric Power Plants Database. Accessed through S&P PLATTS portal. www.platts.com

Global Human Modification (Kennedy *et al.,* 2018; Kennedy *et al.,* 2019): *GHM* (details as above in Annex 1).

Cumulative Development Potential Index (Oakleaf *et al.*, 2020): *DPI* (details as above in Annex 1).

Annex 3. Detailed methodology

General

All datasets are terrestrial/freshwater only. Datasets with marine components were clipped to the terrestrial component of the country and territory boundary layer.[48] All areas were calculated in the Mollweide projection. Analyses were carried out in ArcPro unless otherwise specified.

Creation of the base layer

The datasets described in Table 3 were converted to WGS 84 (where necessary), combined and dissolved. The dissolved layer was intersected with country and territory boundaries and with the WDPA (with IPLC protected areas excluded) (see Annex 1). The layer therefore has two records per country/territory: IPLC lands overlapping with non-IPLC protected areas and IPLC lands only. Unique IDs were assigned to each of the records. This layer is referred to as the base layer.

The base layer contains three fields:

- UID (unique identifier)
- WDPA (overlap/no overlap with non-IPLC protected areas): 1/0
- ISO3 (country or territory code)

Coverage

The base layer was dissolved by the WDPA field, and the area within and outside non-IPLC protected areas was calculated. The base layer was fully dissolved to find the total area.

Global Human Modification, GHM

The GHM was converted to a polygon feature class (maintaining cell boundaries), with 10 gridcode scores representing the degree of modification. The GHM was dissolved by gridcode score and converted to WGS 84. The base layer was intersected with the GHM and the area overlapping each gridcode score was calculated. The categories low, moderate and high (combining high and very high) were used following Kennedy *et al.* (2019). Percentages are of the total area covered by both the GHM layer and base layer.

Cumulative Development Potential Index, DPI

The DPI was converted to a polygon feature class (maintaining cell boundaries), with seven gridcode scores representing the cumulative development potential. The DPI was converted to WGS 84 and intersected with the base layer. The resulting layer was dissolved by gridcode score and the WDPA field, and the area overlapping each gridcode score was calculated. The categories low, moderate and high were used following Oakleaf *et al.* (2019). Percentages are of the total area covered by both the DPI layer and base layer.

Key Biodiversity Areas, KBAs (BirdLife International, 2019)

KBAs (polygons only) were clipped to the terrestrial component of the country/territory boundary dataset and the total area of KBAs was calculated. The base layer was clipped to the KBA layer and the area of the clipped layer was calculated.

Ecoregions and biomes

The total area of each ecoregion was calculated. Ecoregions were intersected with the base layer. The area of each ecoregion covered by the base layer was calculated. Biome coverage was calculated by summing the coverage results for the ecoregions constituting each biome.

National analyses (method as above if not specified)

Ecuador biogeographic regions

The Ecuadorian Biogeographic Units dataset was reprojected from its native UTM Zone 17S (EPSG:32717) projection to Mollweide (ESRI:54009). It was not clipped to the global national boundary layer since the biogeographical units layer is already derived from an official Ecuadorian national boundary, so this method avoided removing nationally recognized information. The total area of each biogeographic unit, the total area of the intersection between each biogeographic unit and each base layer category (WDPA code 0 or 1), and the percentage of each biogeographic unit covered by each base layer category were calculated. All geospatial analyses were done in a PostGIS enable database (v3.0.1).

Ecosystem services analysis

Fifteen provisioning, regulating, and cultural ecosystem services were combined and mapped by finding the top 30% of highest-performing pixels from the aggregate relative realized output of Costing Nature, v3 (fully documented at www.policysupport.org/costingnature). Map and area analyses exclude Greenland and Antarctica. This work is in preparation for publication in the academic literature (Collins et al., *in prep*) and should not be shared or used without the co-authorship of Dr Mark Mulligan, King's College London.

Mining concessions

Mining concessions were filtered to the study countries. Non-active (expired or under application) concessions were removed, and the remaining active concessions were intersected with the base layer. Results were summed by country.

48 For country and territory boundaries, we use a dataset combining Exclusive Economic Zones (EEZ; VLIZ 2014) and terrestrial country boundaries (World Vector Shoreline, 3rd edition, National Geospatial-Intelligence Agency). A simplified version of this layer has been published at Nature Scientific Data journal (Brooks et al., 2016) and is available here: http://datadryad.org/resource/doi:10.5061/dryad.6gb90.2

Oil and gas concessions

Oil and gas concessions were filtered to the study countries. Non-active (expired or under application) concessions were removed, and the remaining active concessions were intersected with the base layer. Results were summed by country.

Power plants

Power plants were filtered to the study countries. Non-active facilities were removed, and the remaining active sites were intersected with the base layer. Results were summed by country.

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Notes

Notes

Supported by:
Federal Ministry
for the Environment, Nature Conservation
and Nuclear Safety
based on a decision of the German Bundestag