

implemented within the scope of a federal policy action plan played a crucial role in this reduction^{36,37}. The plan proposed several novel policies and inaugurated a collaborative design for conservation policy planning and implementation.

The strengthening of environmental monitoring and law enforcement under the action plan, which increased law enforcement's capacity to impose binding and costly penalties, was pivotal for reducing forest loss. These efforts were not only effective for forest protection, but also cost-effective, even by very conservative estimates³⁶. The strategic expansion of protected territories served as barriers to advancing deforestation in areas under pressure^{38,39}. Strengthening financial instruments proved to be effective in protecting the forest, while requiring compliance with environmental and land tenure regulations as a condition of accessing credit contributed to reductions in deforestation⁴⁰.

2. Target critical regions and fight illegal activities:

Prioritizing critical areas is important for fighting deforestation, because forest loss in the Amazon is highly concentrated. In Brazil, for example, just twenty-four municipalities account for nearly half of the total area deforested since 2016²⁹. In the past, Brazil's strategy of targeting such municipalities with rigorous environmental enforcement was effective in reducing deforestation³².

In addition, given that deforestation in the region is still overwhelmingly illegal⁴¹, strengthening environmental control is an absolute priority. It is imperative that Amazonian countries eliminate the impunity currently associated with illegal forest clearings. To do this, the country must recover its capacity to provide a binding law enforcement response, which requires restructuring environmental governance to support effective sanctioning procedures and penalties. It is also

critically important to combat illegal land-grabbing. Public forests awaiting designation have been heavily targeted by land grabbers who destroy the forest and forge titles to claim ownership⁴². Fighting this illegal practice is vital, not only because of its direct association with reducing deforestation, but also because it reduces crime, corruption, and violence in rural areas.

3. Account for forest degradation and protect secondary forests:

Forest protection must extend beyond combating deforestation. Forest degradation reduces ecosystem resilience, making it more susceptible to future damage. It also interferes with the provision of ecosystem services, causes biodiversity loss, and reduces the forest's capacity to sequester carbon⁴³. Degradation has been estimated to account for nearly 70% of global carbon emissions from tropical forests between 2003 and 2014, while deforestation accounted for the remaining 30%⁴⁴. The area of degraded forest often exceeds that deforested, yet policy has essentially overlooked the issue. Combating degradation must be incorporated into an Amazonian conservation agenda, as well as in commitments to reduce greenhouse gas emissions².

Amazon conservation policies should pay more attention to boosting and protecting forest regrowth. In 2017, secondary forests covered 235 M km² (or 29%) of the Amazon, 77% of which was in Brazil. While only 9% of emissions from deforestation are offset by carbon sequestration by secondary forests in the Brazilian Amazon, some states, such as the State of Amazonas, offset around 18%.⁴⁵

At present, Brazil has no official system that systematically and regularly monitors these areas. Incorporating secondary vegetation into forest monitoring systems is technically and financially feasible, but requires policy support^{2,46}.

B. GOVERNANCE AT LOCAL SCALES: PROMOTING LOCAL MANAGEMENT AND ENGAGING LOCAL COMMUNITIES

During the Amazon's 12,000 years of Indigenous occupation, Indigenous societies (and more recently Afro-descendant and other traditional communities) developed land-use strategies and technologies that were highly adapted to local environmental conditions¹. This long-term interaction between IPLCs and their environment shaped the structure and composition of Amazonian ecosystems to suit human needs, yet did not disrupt ecosystem functions, and in some cases improved ecosystem services (see for instance, ⁴⁷⁻⁵³). In the absence of large-scale deforestation, Indigenous management practices and tools created and maintained resilient forests to the modern day, while expanding food production systems that provide sustenance and income to millions of people^{50,54}. Indigenous lands, lands held by other traditional communities, and protected areas under different tenure regimes currently cover 48.7% of the Amazon, protecting almost half of its remaining forests, and other terrestrial and aquatic ecosystems⁵⁵. In the Brazilian Amazon, Indigenous peoples act as guardians of 115 million hectares of well-conserved forests⁵⁶, which represent a carbon stock equivalent to more than one year of global greenhouse gas emissions (approx. 10 billion tons of carbon; ⁵⁷; see also SPA's publication 'Role of IPLCs in the Climate Crisis'). Within their territories, IPLCs have also contributed significantly to slow biodiversity loss⁵⁸ and prevent the extinction of iconic species⁵⁹, which are essential to keep ecosystems resilient in the face of adversity⁶⁰. Additionally, Indigenous land-use practices (e.g., shifting cultivation) can favor the regeneration of forests after disturbance, and support the restoration of degraded landscapes⁶¹. Strengthening the sustainable practices and knowledge of IPLCs is key to increasing forest resilience and ensuring livelihoods that enhance

IPLCs' adaptation to climate change. (see also SPA's publication 'Role of IPLCs in the Climate Crisis').

The production of socio-biodiversity products within the Legal Amazon, mostly by IPLCs, reached GDP BRL 11 billion in 2020, with 50.4% of the products going to local markets, 40.7% to the rest of Brazil, and 2.6% to the world market⁶². The region contributes a mere 0.17% of world exports of tropical forest products⁶³. In this sense, value-added marketing strategies already occur in local markets, which recognize territorial identity into the goods, and hence qualify the products and give meaning to their uses, expanding the range of creative opportunities for diversification of uses and strengthening the symbolic appreciation of the products' territorial identity. However, it becomes evident that strengthening this new bioeconomy requires that longer supply chains (i.e., which includes internal markets and abroad) embody such Amazon territorial identity while capturing market values.

Rural production requires stronger governance initiatives and public policies to improve and developing supply chains. Rural producers currently retain 25% of the value generated by the goods they produce. Strengthening governance and providing support to producers can help correct asymmetries in terms of political, financial, and market relationships, especially through the provision of technical assistance and access to credit. This could simultaneously guarantee the technological development of agroecological systems to maintain or recover degraded ecosystems. The main idea behind such initiatives is to ensure IPLC's ancestral and tacit knowledge is in dialogue with Western science, while taking into account the large heterogeneity embedded within IPLCs' practices and potential.

Industrial production and services, which retain 31% and 10.4% of added value, respectively, require

more systemic policies to promote cooperation, both between existing companies and between such companies and other actors in the socio-biodiverse economy. This could generate local productive arrangements that creatively improve endogenous capacities and integrate them with exogenous resources. The building system of socio-biodiverse economy is planned to be a platform for the organization, generation and processing of knowledge and information, capable of comprehensively and operationally promoting economic, social and environmental sustainability.

C. TRANSBOUNDARY COLLABORATIVE MANAGEMENT

Despite the fact that a large proportion of the Amazon is conserved within various types and designations of protected areas, representing an unparalleled opportunity to reverse the impacts of the current trajectory of human intervention and implement a new model of sustainable and socially inclusive development, two main setbacks remain to tackling deforestation and forest degradation:

(i) The growth of protected areas is in one sense a success for conservation; however, conservation may not be the primary objective in most areas, given that nearly 50% of the protected areas already existing allow for resource extraction. Moreover, 14% of the deforestation occurring within the last two decades occurred within Indigenous territories and protected areas.

(ii) Extensive, undesignated public areas are yet to be explored in terms of administrative jurisdictions, land tenure, ancestral territories, and access, and should be designated as no-go areas with a

moratorium on logging activities, or areas under sustainable management.

Addressing these issues requires resources for the management of protected areas and IPLCs' territories by their peoples, and the real and effective participation of IPLCs in planning the investments that affect them.

Evaluations of conservation effectiveness in the Amazon indicate that what is mostly lacking is the implementation of a transboundary conservation vision which would develop comprehensive conservation plans for large ecoregions to ensure connectivity between ecosystems and address transboundary spillovers; this is one of the largest challenges for biodiversity conservation and climate change adaptation globally⁶⁴.

Transboundary conservation plans cannot be successfully implemented without closing the large financing gap between available resources and those required to maintain and restore natural habitats and ecosystem functions; this is particularly challenging in developing countries⁶⁵⁻⁶⁸. In the Amazon region conservation is largely financed with public resources, but there is a consistent tendency to reduce public budgets for environmental management^{31,69}. While the strengthening of public budgets is necessary, it is also key to advance public-private partnerships to design and implement market-based, demand-driven policy instruments to influence land use⁷⁰.

The Biodiversity Financing Initiative (BioFIN)^a identified financial mechanisms to improve conservation in Brazil, mostly in the Brazilian Amazon⁷¹. Recommendations include:

(i) Ecological fiscal transfer (ICMS-E, acronym in Portuguese): A fiscal transfer mechanism in use in

^a BioFIN proposes a criteria for identifying financial solutions combining economic, social and environmental aspects. It prioritizes mechanisms capable of: 1) generating new revenues; 2) delivering better conservation through improved effectiveness, efficiency, and synergies; 3) reorienting or realigning existing financing; 4) avoiding future expenditures caused by the loss of biodiversity and ecosystem services⁷⁸.

some states (including Acre, Amapá, Mato Grosso, Pará, Rondônia, and Tocantins) which redistributes part of the revenues from the Value Added Tax (VAT in English, ICMS in Portuguese) at the state level to municipal governments based on ecological indicators⁷².

(ii) Payments for environmental services (PES): Voluntary or legally-agreed arrangements which encourage the conservation of ecosystem services by offering financial or other economic incentives. In the Brazilian case, most PES programs are related to water conservation or carbon emissions avoidance.

(iii) Environmental Reserve Quotas (CRA for its acronym in Portuguese): An economic mechanism to offset deficits in private properties that do not enforce the minimum standards for native forest protection. Properties with less forest cover than the minimum legal requirement may compensate for their deficit on another property so long as both properties are located in ecologically-equivalent regions⁷³.

(iv) Tourism concessions in protected areas: protected areas administrated by public agencies sign agreements with tour operators (private companies or civil society organizations), involving different tourism-based activities (e.g., tickets, transportation, restaurants, souvenir shops) collecting revenues to support conservation while promoting sustainable development for local communities^{74,75}.

(v) Forest concessions in protected areas: Agreements to allow companies or communities to sustainably exploit non-timber resources from public forests; this encourages value chains for non-timber products, creates local jobs, and generates revenue for public administration⁷⁶.

These solutions have the potential to create large-scale economic opportunities. Even though many of these instruments are based on private business, they require the active involvement

of the public sector, through fiscal or regulatory instruments. There is a need to adapt such financial mechanisms to local political and institutional contexts. In Brazil, weak public management capacity, institutional uncertainties, and political opposition to environmental policy are the main obstacles to large-scale implementation of these instruments.

In Colombia, UNDP (2021)⁷⁷ proposes a Biodiversity Credit System, based on the concept of “habitat banks”, in which private companies fulfill obligations by buying or selling “credits” in areas where compensation requirements are merged. Also, they implement actions for the preservation, improvement, or restoration of ecosystems to compensate for negative impacts on biodiversity. It is estimated that approved, licensed projects can finance up to USD 4 million from pending compensation obligations⁷⁷. Another possibility for Colombia is the use of royalties in areas of environmental interest, such as paramos, mangroves, or dry forests. This includes projects aimed at controlling deforestation and protecting biodiversity in the territories with the highest deforestation rates. In this case, it is estimated that a minimum of USD 98 million could be available to enhance both the execution of the public budget and the influence in the formulation of the investment budget⁷⁷.

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