

The Land Gap Report - Executive summary

Key messages:

- In their climate pledges, governments are prioritising planting new trees to offset fossil fuel emissions ahead of achieving deep cuts in emissions from all sources along with protecting and restoring existing ecosystems.
- Servicing all of the land-based carbon removal pledges is unrealistic because it would require a land mass half the size of current global cropland, putting potential pressure on ecosystems, food security and Indigenous Peoples' rights.
- Current 'net accounting' methods assume that planting new trees offsets fossil fuel emissions or the destruction of primary forest, but this ignores scientific and ecological principles.
- Evidence shows that Indigenous Peoples and Local Communities with secure land rights vastly outperform both governments and private landholders in preventing deforestation, conserving biodiversity, and producing food sustainably.

This report examines the area of land required to meet projected biological carbon removal in national climate pledges and commitments, finding almost 1.2 billion hectares (ha) of land – equivalent to current global cropland extent – are required to meet them. This finding shows that countries' climate pledges rely on unrealistic amounts of land-based carbon removal, which cannot be achieved without significant negative impacts on livelihoods, land rights, food production and ecosystems. For example, over half of this area (633 million ha) requires a land-use change to achieve the projected carbon removal, with the potential to displace food production including sustainable livelihoods for many small holder farmers. Slightly less than half (559 million ha) would restore degraded ecosystems.

These findings suggest that countries need to reduce their expected reliance on land-based carbon removal in favour of stepping up emissions reductions from all sectors and prioritizing ecosystem-based approaches. We recommend that countries address four interlinked and mutually supported issues related to the use of land in their national climate pledges: (i) greater clarity over assumptions made about the extent, usage and ownership of land in national climate pledges; (ii) prioritizing the protection of primary ecosystems over tree planting efforts, since the latter's mitigation benefits are negligible in the current critical response decade; (iii) ensuring that land-based climate mitigation measures build on and strengthen the rights of Indigenous Peoples, other human rights, livelihoods, and food sovereignty, and (iv) promote multifunctional strategies, such as agroecology, that contribute to socioecological resilience while supporting the realization of various human rights.

The land gap

The growing momentum for climate mitigation has given rise to a new urgency around safeguarding the sustainability of ecosystems, land use and social justice. Net zero pledges by country Parties to the United Nations Framework Convention on Climate Change (UNFCCC) already cover 83 percent of global greenhouse gas (GHG) emissions, and additional pledges are coming from non-state actors, including the private sector. This climate mitigation momentum is crucial to keep global warming within the temperature goal of the Paris

Agreement. However these pledges, collectively geared towards net zero, often rely on land-based carbon dioxide removals (CDR), which are then used to offset a theoretical equivalent amount of fossil fuel emissions in national greenhouse gas inventories. The much needed momentum on climate action also raises serious concerns if the mitigation burden is shifted away from reducing fossil fuel emissions onto land, local communities and ecosystems. While other 'Gap' reports describe a gap between mitigation ambition and the emissions reductions needed to meet the goals of the Paris Agreement, this report demonstrates the gap between governments' reliance on land for carbon mitigation purposes and the role that land can realistically play due to competing needs and in light of human rights.

This *Land Gap Report* shows how countries' climate pledges, if implemented, will increase the demands made on land. The report quantifies the aggregate demand for land-based mitigation in the climate pledges submitted by Parties to the UNFCCC. A key finding is that countries' climate pledges assume that almost 1.2 billion hectares of land can be prioritized for carbon dioxide removal. This land area is larger than the United States of America (983 million ha), and almost four times the area of India (329 million ha). Even more concerning is that over half of the land needed to fulfill climate mitigation pledges – 633 million ha – requires a land-use change through plantations and establishing new areas devoted exclusively to forests, which will compromise the rights of Indigenous Peoples, other human rights, livelihoods and food sovereignty (including the ability of local communities and smallholder farmers to feed themselves). Furthermore, the carbon removals achieved through plantations, afforestation and reforestation, will take a long time and hence not be sufficient in the next critical decades to limit global warming to around 1.5 °C.

The other half of the 1.2 billion ha for carbon removal – 559 million ha – represents restoring degraded lands (such as agroforestry, reduced harvest, or regenerating degraded forests), thereby increasing the productivity and health of ecosystems. This approach of seeking to maintain and augment carbon stocks in existing ecosystems holds more promise for climate and biodiversity and poses fewer threats to other dimensions of sustainability. However, the potential area available for expanding forest cover is uncertain and is dependent on restoration being based on – and bounded by – principles of ecology and human rights. Improved governance and stewardship of land and territories based on such principles is sorely needed to achieve multiple inter-related objectives, primarily linked to rights and livelihoods.

These findings have implications for governments' approach to land-based climate mitigation objectives, including carbon accounting, biodiversity preservation, and the rights and livelihoods of Indigenous Peoples and Local Communities (IPs and LCs).

Conserving primary ecosystems while respecting rights

Conserving all carbon-dense primary ecosystems, and in particular all remaining primary forest – boreal, temperate, and tropical – is critical to climate mitigation efforts, as they store far more carbon compared with harvested forests or plantations. Primary forests represent the highest level of ecosystem integrity along a continuum that reflects degradation from human activities from minimal to severe. Primary forests thus provide the reference condition for assessing change in ecosystem function in the past, as well as potential gains in the future. Patterns of biodiversity that evolve naturally or under

indigenous stewardship comprise the most stable and resilient ecosystems and, within system limits, provide resistance to threats that are increasing with climate change such as pests, disease, drought, floods and fire. Thus, the carbon stored in ecosystems with higher levels of integrity is more stable and resilient.

A better understanding of the essential role provided by primary forests in both global climate systems and mitigation opportunities would accelerate transformative change in conservation management of forests, based on recognition of the carbon retention value and the provision of a wide range of other ecosystem functions and services provided by these irreplaceable ecosystems. So too would an understanding of the importance of the stability, resilience and adaptive capacity of ecosystems for their persistence in a warming climate. Protecting the remaining primary forests and engaging in large-scale ecological restoration of degraded forests is essential to solving the overlapping biodiversity, climate change, social justice, and zoonotic disease crises.

Key factors to achieve transformation include: reforming the rules for carbon accounting; prioritizing forest mitigation actions; identifying and appropriately recognizing the multiple ecosystem functions and services; reducing the risk of loss of carbon stocks due to disturbance events by improving the integrity of forest ecosystems; and reforming policies and practices of governments, businesses and communities to promote synergistic and holistic solutions that foster socioecological resilience.

Secure land rights

Evidence to date shows that IPs and LPs with secure land rights vastly outperform both governments and private landholders with respect to the multiple goals of preventing deforestation, conserving and restoring biodiversity, and producing food sustainably. Moreover, there is impressive overlap between primary ecosystems and the collective landholdings of IPs and LCs. However, recognition of rights to land, resources and/or territory has been partial, limited and fraught, while subject to opposition, violence and elite capture. Despite this, IPs and LCs have proven to be effective stewards of the world's biodiversity and natural resources, reflecting essential contributions that have thus far been inadequately recognized by states, and poorly supported by the broader international community. We draw attention to the ways in which addressing current gaps in capacity and funding leads to important gains in forest conservation and sustainable use with positive benefits for livelihoods.

We argue that the most effective and just way forward for using land-based carbon removals is to ensure that IPs and LCs have legitimate and effective ownership and control of their land and effective voice to self-represent and engage on equal terms – ultimately exercising self-determination – in the pursuit of actions that directly or indirectly affect their lands, territories, livelihoods and collective rights.

Food system transformation towards agroecology

The world's industrial food system represents more than a third of global anthropogenic GHG emissions, by far the largest sector contributor. Industrial cropping, ranching, and land-use changes contribute a quarter of those food-sector emissions. Cropland managed unsustainably is the main anthropogenic source of nitrous oxide, with synthetic nitrogen

fertilizers accounting for most of the global increases in emissions of this potent GHG. Likewise, large-scale conventional agriculture (mainly livestock and rice production) contributes 36 percent of global anthropogenic methane emissions. Land conversion for industrial agriculture and agricultural intensification are the two prime causes of global biodiversity loss through land use change.

The GHG intensity of industrial food production needs to be cut drastically and negative impacts on biodiversity and climate reduced. We argue for agroecological approaches, which restore and conserve ecosystem functions and services based on biologically diverse systems, while strengthening local livelihoods, respecting cultural values and local knowledge systems and promoting site-specific technical and social innovations. Agroecological management that replaces monocrops with crop diversification (such as intercropping, crop rotation, cover crops, prairie strips, and others) has positive effects on reducing GHG emissions and other pollutants. It also has positive effects on productivity, decreasing the so-called 'yield gap' compared to conventional agriculture. Healthy soil properties nurtured by agroecological management that restores and increases organic matter contribute to soil carbon sequestration and soil properties that result in higher resilience to extreme climate events. The contributions of agroecology to equity, justice, inclusion, and dignifying working and living conditions – expressed in improved social well-being, sustainable livelihoods, food sovereignty, and health – make agroecology relevant to the promotion and implementation of a myriad of human rights.

Mitigation and carbon accounting

Current approaches to carbon accounting fail to recognize how the risk of carbon stock loss varies widely depending on ecosystem integrity. They instead consider carbon fungible, and all carbon stocks are in effect assumed to have the same stability, longevity and resilience.

Most problematic, particularly given the use of 'net accounting' to justify achieving 'net zero emissions', is the presumed fungibility of fossil fuel carbon and ecosystem carbon. This assumption has mistakenly allowed removals from forest re-growth to offset an equivalent amount of the emissions from fossil fuel use, industrial agriculture and forest harvesting in national GHG inventories. Similarly, current carbon accounting practices fail to recognize that carbon lost from primary forests is not offset by planting trees – with lower ecosystem integrity in monoculture systems the risk of carbon loss is higher. Harvesting mature trees with the expectation of re-growth creates a carbon debt by permanently reducing the carbon stored in the landscape and increasing the stock in the atmosphere. Similarly, the role of wood products for mitigation has been misrepresented, creating the false impression that carbon stored in products has a greater benefit than in forest and other ecosystems.

These deficiencies would be addressed if governments were to adopt a more comprehensive approach to carbon accounting based on stocks and flows that allows the true change in the carbon stock of the atmosphere to be defined and the mitigation benefits of forests and other ecosystems to be recognized. The rules for carbon accounting need to make provision for reporting information about the carbon stocks and flows in all pools, which is related to the condition of the ecosystem and the impacts of human activities on each pool. Such a comprehensive carbon accounting system is incorporated in the UN System of Environmental Economic Accounting Ecosystem Accounting (SEEA_EA). The

SEEA_EA comprehensive carbon accounting provides an important opportunity to bridge the silos of the Rio Conventions (UNFCCC, UNCCD and CBD) and inform the Sustainable Development Goals by revealing synergies among the objectives of international commitments and demonstrating the benefits from integrating climate and biodiversity actions to better inform and guide decision-making.

Conclusion

Governments' reliance on land-based carbon removal in current climate pledges are unrealistic in terms of available land and unfeasible in terms of the human rights tensions that devoting land primarily to carbon removal implies. Land-based carbon removals make an important contribution to mitigation efforts only if they are accompanied by rapid and deep cuts in fossil fuel emissions from all sources: they complement not offset fossil fuel and other emission reductions. Carbon accounting practices need to provide clearer and more accurate information on the true impacts of different mitigation actions. Information is needed that shows the mitigation benefits of protecting primary forests while restoring ecosystems for more integral, stable and resilient carbon removals. Restoration improves ecosystem functions and services that are relevant for broader ecological and social benefits. Food system transformation based on agroecological principles are critical for achieving socioecological resilience to climate change as well as the promotion and realization of human rights.

Key messages for policy and decision makers:

- The 'net' in net zero must not distract from emissions reductions now: Framing climate targets as 'net zero' risks undermining mitigation action by allowing a trade-off between emissions reductions and removals. Targets based on net accounting obscure the extent to which countries rely on land removals for meeting climate mitigation commitments.
- Ecosystem restoration as a removal could help get us to 1.5 °C if emissions reductions happen now: The scale of CDR that can be achieved sustainably via ecosystem restoration is sufficient to be compatible with a 1.5 °C temperature limit only when coupled with the most ambitious reductions in emissions from all sectors – such as fossil fuel use, industrial agriculture, deforestation and forest degradation related activities.
- We don't have the land availability for unrealistic removals claims: Countries current pledges rely on land use change of an equivalent area to half of global crop land. This reliance on land use change is deeply unrealistic and if implemented will exacerbate existing social and ecological challenges caused by demand for land. There is no available land for expanding energy crop or monoculture plantations.
- Focusing on tree planting deflects attention from the urgency, immediate and multiple benefits of protecting and restoring forest ecosystems. Keeping existing forest ecosystems healthy and functional is the most important contribution of land towards meeting a 1.5 °C temperature limit by avoiding emissions and maintaining stable carbon stocks.
- Agroecology contributes to socioecological resilience and requires higher institutional support: Agroecological principles contribute to climate change adaptation and mitigation by restoring and enhancing ecosystem functions and services, while

respecting and strengthening livelihoods (particularly IPs and LCs), providing enough healthy and diverse food, and fostering human rights promotion and realization.