

Pathways Alliance for Change and Transformation (PACT)¹



Indigenous Peoples, Local Communities, and Trade in Terrestrial Carbon Markets: Time to Recognize Their Rights, Support Their Organizations, and Impose a Moratorium on Terrestrial Carbon Trade²

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Introduction

Indigenous Peoples and local communities throughout the world have long stewarded forests, dry lands, grasslands, and other ecosystems in their territories for sustenance, cultural vibrancy, and economic livelihoods. Indigenous and community stewardship has been the basis their tenure institutions and political self-determination. Indigenous and community traditions, environmental knowledge, and land governance have supported thriving communities for generations. Indeed, Indigenous Peoples' governing institutions for forest stewardship are now also recognized as being critically important for climate change mitigation and sequestration of terrestrial carbon (Etchart 2017, Garnett et al. 2018).

¹ The [Pathways Alliance for Change and Transformation](#) (PACT) is a small, strategic coalition of Indigenous Peoples and local community led research and activist institutions and academic allies. PACT's vision is to catalyze the system transformation at all levels to support the priorities and values of Indigenous Peoples and local communities and their organizations. The core strategy to achieve PACT's vision is to strengthen the self-determination of emerging Indigenous and community scholar-activists, strengthen Indigenous and community-led research, and deepen the relationships between them within and across regions.

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At the same time, Indigenous Peoples and local communities are engaged in ongoing struggles to maintain their tenure and governance institutions because nation states, corporations, and other actors do not respect their self-determination and rights. The quickly growing interest in carbon markets and offsets by governments and corporations in the Global North has rapidly fueled greater pressure and threat against Indigenous and local communities. In Central Africa, for example, where most forest lands are already allocated by government to agriculture, mining, conservation, and forest industries, essentially every new major forest carbon project has generated violent conflicts with local peoples (BHRC 2023, Mongabay 2022, RFUK 2020). Few governments formally recognize Indigenous and community rights over carbon even in their own lands and ecosystems, or their rights to the capacity of their lands and ecosystems to sequester carbon and avoid emissions (RRI 2021a). More concerning, a rapidly growing number of governments are asserting public ownership over all terrestrial carbon (Baker Makenzie 2022, Bloomberg 2023, FAO 2022). Between 2018 and 2022 alone, the four major tropical forest governments of Indonesia, the Democratic Republic of the Congo, Mozambique, and Gabon enacted laws or decrees that establish the central government as owner of all terrestrial carbon (FAO 2022). Further exacerbating these trends, anthropogenic climate change, pollution, and land and resource theft all threaten and undermine Indigenous capacity to maintain healthy forests even where Indigenous communities have lived in flourishing relationships with forests for centuries.

Despite such challenges, Indigenous Peoples and local communities have raised their voices compellingly, calling for mitigation of climate change through uplifting Indigenous rights, their stewardship of diverse ecosystems, and their organizations, initiatives, and financial mechanisms. In Indonesia for example, AMAN filed a lawsuit contesting the government of Indonesia's assertion of public ownership of all terrestrial carbon in the country and has established a new financial mechanism as an alternative to channel funds directly to communities (AMAN 2022). In Nepal, Indigenous Peoples organizations have contested the REDD+ benefit sharing mechanism as it provides limited respect and support to customary governance institutions (Sherpa et al. 2018). In Kenya, Indigenous Peoples and their organizations are mobilizing to ensure both their land and procedural rights are fully recognized in the government's proposed amendments to the 2016 climate change act and other efforts to promote the international carbon trade (ILEPA 2023). Indigenous Peoples and local community voices and initiatives require support, respect, and resources from the international community.

The Global Alarm of Climate Change

Today, Indigenous Peoples and local communities are caught in the crosshairs of global alarm about the unprecedented, documented, and accelerating threats of climate change and biodiversity loss. These global threats are leading decision makers across jurisdictions to pursue multiple avenues to reduce emissions and protect biodiversity.

Carbon sequestration in forests, grasslands, and other ecosystems and a suite of nature-based solutions have emerged as promising options to address climate and sustainability challenges confronting humanity (Bossio et al. 2020, Fu et al. 2021). There is substantial scientific evidence that forests and other ecosystems are underutilized in terms of carbon sequestration and that far more carbon storage in terrestrial ecosystems is possible through concerted action. Recent estimates suggest plants and soils contain four times the amount of carbon in the atmosphere, and that it is possible to sequester an additional 300GTC in forests (Pugh et al. 2019, Walker et al. 2022). Drylands are also of critical importance in carbon cycling and their role in a climate-neutral world is underappreciated (Hanan et al. 2021, Stringer et al. 2012). The carbon storage capacity of Indigenous and local community

lands and ecosystems worldwide are similarly underestimated. Indigenous and community lands in 24 countries that constitute 60% of all tropical forests alone are estimated to hold at least 253GtC of carbon (RRI 2021b).

But many climate policy “solutions” for terrestrial sequestration are flawed. They are being adopted hastily and without meaningful consultation with Indigenous Peoples and local communities, and they are often structured whereby the respect of indigenous land and carbon rights is an option to be decided by partner governments. As a result, government and corporate proponents are effectively marginalizing Indigenous Peoples and local communities by ignoring their institutions, knowledge, experience, and autonomy. Further, many non-Indigenous and non-community-based political leaders and climate experts are advocating for carbon sequestration through market mechanisms in Indigenous territories and community forests. Often, this advocacy pays little attention to whether these projects reflect Indigenous and community traditional practices, rights, and self-determination goals (Erbaugh et al. 2020).

Rightfully, Indigenous and community leaders are concerned that they are not viewed as actual rights holders, much less equal partners, in the use of their ecosystems for climate mitigation purposes. They are vigilant of the reality that non-Indigenous and non-community-based approaches to carbon sequestration threaten to downplay and ignore their historical forest and carbon stewardship. They are concerned that the establishment of a property right to carbon risks unraveling their rights to other features of their ecosystems, such as biodiversity or water, and will lead to further commodification and government and corporate capture of their lands, cultures, and identities. They are similarly concerned with the asymmetrical balance of knowledge and power concerning all aspects of the carbon trade, and the almost complete lack of legal remedies and procedural justice for communities when their rights and the corporate commitments to them are not respected (ILEPA 2023). Based on their experience, practical wisdom, and knowledge, they are also skeptical about whether market and central control-based sequestration approaches can generate reductions in emissions or improvements in terrestrial sequestration.

Such skepticism is well founded. Centralized control and profit-driven forest carbon markets threaten to replicate the negative sustainability impacts of market-driven growth and centralized state policies that are at the root of climate change and biodiversity loss. Yet, many researchers, corporate staff, and policy makers continue to advocate for centralized control over forest carbon and forest carbon markets as the mechanisms for emissions reduction. For example, the LEAF Coalition, a public-private partnership established by northern governments and corporations to promote international offsets with forest carbon projects, and other initiatives that privilege government-led jurisdictional trades, incentivize tropical forest governments to centralize carbon ownership. These proponents of centralized state control should step back from their advocacy, reexamine the historical, ongoing, and future risks of their approach, and consider Indigenous and local community leadership, knowledge, and self-determination as fundamental principles for terrestrial emissions reduction.

Indigenous and local community skepticism is paralleled by the skepticism demonstrated by the potential private sector investors in these markets. Low carbon prices in most voluntary carbon markets are simply inadequate for effective carbon sequestration. A recent Report of the High-Level Commission on Carbon Prices, led by economists such as Joseph Stiglitz and Nicholas Stern, estimated that carbon prices higher than \$40-80 per ton of CO₂ by 2020 (and \$50-100 by 2030) are necessary to induce the behavioral changes that will reduce emissions consistent with the Paris Climate Treaty’s commitments (Stiglitz et al. 2017). While prices in compliance markets approach these ranges (although for tons of

carbon rather than for tons of carbon dioxide), no voluntary forest carbon market prices even come close (Shell & BCG 2022). In voluntary markets, carbon prices range between \$1.00 to 8.00 per ton of carbon, and there is little evidence of a trend towards prices moving towards the higher end of this range.

Research also calls into question whether purely market-based and even central government-driven efforts can achieve long-term positive effects (Roopsing et al. 2019, Groom et al. 2022). Advocates and project developers for forest carbon sequestration have vastly overstated and exaggerated the mitigation effects of voluntary carbon sequestration projects (Badgley et al. 2022, West et al. 2020, 2023). Centrally driven attempts to appropriate indigenous and local rights to carbon are vulnerable to elite capture, leakage, and corruption that have troubled forest policies in tropical contexts. Climate policies and voluntary terrestrial mitigation efforts, without meaningful attention to indigenous and community interests, priorities, and rights, have often foundered as for example with tree plantation programs around the world (Andersson et al. 2016, Rana & Varshney 2023).

Building on Indigenous and Local Capacities

New policies and interventions for expanding forest carbon sequestration must be founded on fundamental principles that respect the rights, voices, and actions of Indigenous Peoples and local communities (Whyte 2020). Both voluntary carbon markets and compliance-based carbon sequestration require clarity of tenure rights (Shockley & Snell 2021). Where tenure rights are formalized without respect for historic claims and without inclusive and equitable rightsholder consultations, injustice results. For example, wind energy installations in Oaxaca, Mexico, marginalized the socio-cultural rights of indigenous communities, leading to what has been called, “transactional colonialism” (Ramirez & Böhm 2021). Cipler (2014) shows how transnational advocacy for Indigenous rights has mostly received only symbolic recognition in international fora of the United Nations (UN) without the institutional changes that would lead to meaningful change for the lived realities of Indigenous Peoples (see also, Doolittle 2010).

Ignoring and relegating Indigenous Peoples and local communities to the background are unjust continuations of past paternalism. Doing so threatens the effectiveness of efforts to use forests and land for carbon sequestration. Indeed, existing research on policies that attempt to reduce terrestrial emissions through incentive-based or market mechanisms such as REDD+ raise serious concerns about the effectiveness of such policies (Duchelle et al. 2018). Carbon sequestered in above and below ground stores in indigenous and community lands (e.g., in trees, soils, and below-ground biomass) is a direct consequence of Indigenous peoples and local communities’ stewardship.

Research on existing carbon sequestration initiatives underscores the reality of indigenous and community concerns, highlighting the critical importance of involving them to improve the prospects of successful mitigation through for terrestrial carbon sequestration efforts (FAO 2022, Blackman & Veit 2018, Fischer et al. Forthcoming). Where tree planting and restoration are aligned with the interests of smallholders, local communities, and Indigenous Peoples, trees and forests endure, serving both a savings and a security function, and in the process sequestering carbon (Chambers & Leach 1989, Shackleton et al. 2011). Equally importantly, such alignment also ensures that those relying on forests for their very livelihoods and futures are not further marginalized through ill-considered and unthinking forest carbon projects.

Many Indigenous peoples and local communities remember how earlier generations of scientists and policy makers mistakenly viewed forests primarily as a source of timber and revenues.

Conception of forests only as sinks for carbon commits the same grave mistake. Efforts to maximize timber production – by clearcutting, industrial-scale selective logging of the trees with the highest market value, and monoculture tree plantations – led to extraordinary human rights violations, facilitated growth in inequality and conflicts, and caused unparalleled environmental losses from local to global scales. As present-day decision makers bake new policy instruments for carbon sequestration into policy, many Indigenous Peoples and local communities face the real possibility that the policy prescriptions for global climate change mitigation will cause them far greater harm than climate change would (Whyte 2020).

New initiatives to achieve terrestrial mitigation therefore must recognize the multi-functional nature and the critical sociocultural importance of forests. Numerous Indigenous peoples and local communities have expressed that they have long recognized the multi-functional nature of trees, forests, and forested landscapes as part of their knowledge systems and worldviews. Engaging and working with them has enormous potential for success in terrestrial mitigation as well as biodiversity conservation.

The threat of voluntary and compliance forest carbon markets to Indigenous Peoples' and local communities' rights and wellbeing

After colonialism and subsequent several decades of struggle for forest rights by Indigenous Peoples and local communities, carbon markets and bids for centralized control over forest carbon are now emerging as among the greatest threats to the rights of Indigenous Peoples and local communities. Unheeding focus on terrestrial carbon and its value in the context of climate change has the potential of wiping out prior gains that Indigenous Peoples and local communities have secured through decades long struggles.

Creating carbon offsets-based markets in the absence of Indigenous and community rights recognition increases conflicts. Many forest areas are already conflict ridden, with revenues from the sale of illegally harvested timber often generates political dynamics that marginalize Indigenous Peoples and local communities and their forests rights. The emergence of carbon markets and efforts by unscrupulous actors to gain control over forest carbon has the potential to exacerbate existing conflicts. In a bid to secure participation of key private sector actors, certification standards are threatened with dilution, especially where Indigenous Peoples and local community rights are concerned. Such dilution is especially concerning because of the existence of multiple certification bodies and protocols that embody different levels of concern for Indigenous and community consent, and the often-limited capacity of indigenous and community organizations to master the many complicated dimensions of carbon science, credits, legal liabilities and risks, and the lack of legal remedies when projects go wrong (ILEPA 2023).

These trends are worsened by governments in several Lower- and Middle-Income Countries (L&MICs). Many governments, instead of guaranteeing Indigenous Peoples' and local communities' rights to forest carbon, have initiatives underway for complete capture and ownership of forest carbon. To add insult to injury, rules under article 6 of the Paris climate treaty do not recognize the importance and role of indigenous participants in negotiations over forest carbon rights (RRI 2021). New rules for implementation of Article 6 thus have strong potential to further weaken tenure and rights of Indigenous Peoples and local communities, dilute standards in the name of securing private sector participation and empower governments and market actors to further undermine Indigenous and community rights and livelihoods.

Conclusion

There is clear evidence that forest carbon offsets and markets work in ways that are far from achieving the goals their advocates have stated and sought (West et al. 2023). The solution to their challenges is not simply better accounting and estimation methods for carbon in forested areas. Overwhelming evidence shows that current terrestrial carbon sequestration approaches will be ineffective if they fail to recognize Indigenous Peoples' and local communities' rights. Recognizing Indigenous Peoples and local communities' carbon rights includes rights to self-determination, free-prior and informed consent, and cultural and linguistic integrity in decision-making over projects in their homelands and territories. Such rights will protect respect for indigenous and community decision-making and leadership in the stewardship of above-ground biomass and sub-surface carbon as well as biodiversity and other related features of their natural ecosystems.

In summary, gaps between the hopes of advocates that forest carbon markets will substantially reduce emissions and the reality of continuing terrestrial emissions can be attributed to four challenges:

- Advocates of forest carbon offsets overestimate the effectiveness of payments for sequestering carbon;
- Unreliable estimates of sequestered carbon and unclear mechanisms for ensuring permanence and preventing leakage make carbon markets an inefficient mechanism for sequestering terrestrial carbon;
- Low and variable carbon prices, and high variation in compensation for sequestration in voluntary carbon projects thwart behavioral changes for substantial carbon sequestration, suggesting that direct payments and compensation are inadequate to achieve meaningful behavior change or carbon sequestration;
- The high opportunity costs of alternative land uses mean that donors, governments, and other market actors are unlikely to offer reasonable prices for incremental carbon storage in forests or other natural ecosystems.

Continuation of support for forest carbon markets and trade is little more than the continuing triumph of hope over reality. Ignoring the evidence that Indigenous Peoples and local communities demonstrably store substantial carbon in their homelands and territories is continued adherence to a flawed ideology in which assumptions of clear rights and low transaction costs does not match the reality of carbon markets. Failing to act on proven strategies to safeguard forests and terrestrial carbon by working with Indigenous Peoples and local communities is to persist with a paternalist, exclusionary, and colonial past. It is past time to recognize that Indigenous Peoples and local communities steward carbon and ecosystems not because of the market value of forest carbon but because of the centrality of these ecosystems for their culture and livelihoods. This centrality constitutes the fundamental climate-focused reason for recognizing their rights to forests and forest carbon.

Recommendations

In light of compelling scientific evidence and on the basis of securing a long-term and viable future for Indigenous Peoples and local communities, we call for:

1. A moratorium on forest carbon trade. Such a moratorium would include a pause in current forest carbon market- and compliance-based policies and initiatives for carbon sequestration

that do not explicitly, proactively, and comprehensively, require respect for Indigenous Peoples and local communities' carbon rights, whether or not they are recognized in formal, national legal or regulatory frameworks. This moratorium must also include a pause in decision making related to Article 6.4 until that article explicitly requires respect for Indigenous Peoples and local communities' rights, and commensurate steps in Article 6.8 on non-market-based carbon sequestration. Similarly, there should be a pause in the disbursement of donor funds to support terrestrial mitigation initiatives until rights to carbon are allocated on fairness principles that take the interests and sovereignty of Indigenous Peoples and local communities into account.

2. Indigenous Peoples and local community representation in the key international supervisory bodies determining the future of the carbon trade. Any equitable implementation of the provisions in Article 6.4 and Article 6.8 of the Paris Treaty will only be possible with Indigenous Peoples and local communities' representation on Supervisory Body of Article 6.4, in all discussions regarding Article 6.8, as well as the Subsidiary Body for Scientific and Technological Advice (SBSTA) and the Subsidiary Body for Implementation (SBI) of the Conference of the Parties' Paris Agreement.
3. Comprehensive and broad-based recognition of Indigenous Peoples and local communities' tenure rights to above and sub-surface carbon in land and forests that are part of their homelands and territories, together with the development and implementation of initiatives and mechanisms that finance rights-based compensation to Indigenous Peoples and local community organizations linked to historical stewardship of their ecosystems and carbon.
4. Support for Indigenous Peoples and local community-led capacity development and research into the role and importance of rights- based terrestrial carbon sequestration, equity-based engagement between Indigenous Peoples and local communities and external actors, and mechanisms to further strengthen existing Indigenous Peoples and local communities' successes in terrestrial carbon sequestration.

Faith in the so-called proven mechanisms for emissions reduction is misplaced and bears the potential for enormous harm to those who depend on forests both for their livelihoods and the continuation of their traditional knowledge, spiritual values and cultural practices. Such faith ignores Indigenous Peoples' and local communities' long-standing stewardship of forests that has already played an important role in mitigating emissions. There is clear evidence that terrestrial carbon sequestration can be enhanced by respecting indigenous and local community land tenure and rights, treating them as rights holders and partners, and co-developing climate solutions.

References:

- AMAN (Alliance of Indigenous Peoples of the Archipelago). (2022). *Menggugat Penyelenggaraan Nilai Ekonomi Karbon oleh Negar*. Bogor, Indonesia: AMAN.
- Andersson, K., Lawrence, D., Zavaleta, J., & Guariguata, M. R. (2016). More trees, more poverty? The socioeconomic effects of tree plantations in Chile, 2001–2011. *Environmental Management*, 57, 123-136.
- Baker McKenzie (2022). Client Alert. Indonesia: New carbon emission regulations - Green shoots?
- Badgley, G., Freeman, J., Hamman, J. J., Haya, B., Trugman, A. T., Anderegg, W. R., & Cullenward, D. (2022). Systematic over-crediting in California's forest carbon offsets program. *Global Change Biology*, 28(4), 1433-1445.
- BHRRRC (Business and Human Rights Resource Council). (2023) Des paysans expulsés pour des crédits carbone au Congo. <https://www.business-humanrights.org/en/latest-news/des-paysans-expuls%C3%A9s-pour-des-cr%C3%A9dits-carbone-au-congo/>
- Blackman, A., & Veit, P. (2018). Titled Amazon indigenous communities cut forest carbon emissions. *Ecological Economics*, 153, 56-67.
- Bloomberg (2023) Global Carbon Market in Turmoil After Zimbabwe Grabs Offset Money: <https://www.bloomberg.com/news/articles/2023-05-18/global-carbon-market-in-turmoil-after-zimbabwe-grabs-offset-money#xj4y7vzkg>
- Bossio, D.A., Cook-Patton, S.C., Ellis, P.W., Fargione, J., Sanderman, J., Smith, P., Wood, S., Zomer, R.J., Von Unger, M., Emmer, I.M. & Griscom, B.W. (2020). The role of soil carbon in natural climate solutions. *Nature Sustainability*, 3(5), 391-398.
- Canadell, J. G., Monteiro, P. M., Costa, M. H., Da Cunha, L. C., Cox, P. M., Eliseev, A. V., ... & Lebehot, A. D. (2021). Global carbon and other biogeochemical cycles and feedbacks. in IPCC AR6WGI, Final Government Distribution vol. chapter5 hal-03336145.
- Chambers, R., & Leach, M. (1989). Trees as savings and security for the rural poor. *World Development*, 17(3), 329-342.
- Ciplet, D. (2014). Contesting climate injustice: Transnational advocacy network struggles for rights in UN climate politics. *Global Environmental Politics*, 14(4), 75-96.
- Doolittle, A. A. (2010). The politics of indigeneity: Indigenous strategies for inclusion in climate change negotiations. *Conservation and Society*, 8(4), 286-291.
- Duchelle, A. E., Simonet, G., Sunderlin, W. D., & Wunder, S. (2018). What is REDD+ achieving on the ground? *Current Opinion in Environmental Sustainability*, 32, 134-140.

Erbaugh, J. T., Pradhan, N., Adams, J., Oldekop, J. A., Agrawal, A., Brockington, D., ... & Chhatre, A. (2020). Global forest restoration and the importance of prioritizing local communities. *Nature Ecology & Evolution*, 4(11), 1472-1476.

Etchart, L. (2017). The role of indigenous peoples in combating climate change. *Palgrave Communications*, 3(1), 1-4.

FAO (Food and Agriculture Organization), (2022). Carbon rights in the context of jurisdictional REDD+: Tenure links and country- based legal solutions. UNEP, UNDP, FAO, UN- REDD.

Fischer, Harry et al. Forthcoming. Community forest governance and synergies between carbon, biodiversity, and Livelihoods. *Nature Climate Change*

Friedlingstein, P., Jones, M. W., O'Sullivan, M., Andrew, R. M., Bakker, D. C., Hauck, J., ... & Zeng, J. (2022). Global carbon budget 2021. *Earth System Science Data*, 14(4), 1917-2005.

Fu, C., Chen, Z., Wang, G., Yu, X., & Yu, G. (2021). A comprehensive framework for evaluating the impact of land use change and management on soil organic carbon stocks in global drylands. *Current Opinion in Environmental Sustainability*, 48, 103-109.

Garnett, S. T., Burgess, N. D., Fa, J. E., Fernández-Llamazares, Á., Molnár, Z., Robinson, C. J., ... & Leiper, I. (2018). A spatial overview of the global importance of Indigenous lands for conservation. *Nature Sustainability*, 1(7), 369-374.

Groom, B., Palmer, C., & Sileci, L. (2022). Carbon emissions reductions from Indonesia's moratorium on forest concessions are cost-effective yet contribute little to Paris pledges. *Proceedings of the National Academy of Sciences*, 119(5), e2102613119.

Hanan, N. P., Milne, E., Aynekulu, E., Yu, Q., & Anchang, J. (2021). A role for drylands in a carbon neutral world? *Frontiers in Environmental Science*, 9, 539.

Hayes, T., & Persha, L. (2010). Nesting local forestry initiatives: Revisiting community forest management in a REDD+ world. *Forest Policy and Economics*, 12(8), 545-553.

ILEPA (Indigenous Livelihood Enhancement Partners). (2023). A synopsis of the status and trends of carbon credits and markets in Kenya: The place of Indigenous Peoples. Report for the Rosa Luxemburg Foundation. Nairobi: *Indigenous Livelihood Enhancement Partners*.

Mongabay (2022). DRC. The Minister of the Environment involved in a land grabbing project for the benefit of carbon credits. <https://fr.mongabay.com/2022/12/rdc-la-ministre-de-lenvironnement-impliquee-dans-un-projet-daccaparement-des-terres-au-profit-de-credits-carbone/>

Pugh, T. A., Lindeskog, M., Smith, B., Poulter, B., Arneeth, A., Haverd, V., & Calle, L. (2019). Role of forest regrowth in global carbon sink dynamics. *Proceedings of the National Academy of Sciences*, 116(10), 4382-4387.

RFUK (Rainforest Foundation UK), (2020). REDD-MINUS: The rhetoric and reality of the Mai Ndombe REDD+ programme. London: *Rainforest Foundation UK*.

Ramirez, J., & Böhm, S. (2021). Transactional colonialism in wind energy investments: Energy injustices against vulnerable people in the Isthmus of Tehuantepec. *Energy Research & Social Science*, 78, 102135.

Rana, P., & Varshney, L. R. (2023). Exploring limits to tree planting as a natural climate solution. *Journal of Cleaner Production*, 384, 135566.

Roopsind, A., Sohngen, B., & Brandt, J. (2019). Evidence that a national REDD+ program reduces tree cover loss and carbon emissions in a high forest cover, low deforestation country. *Proceedings of the National Academy of Sciences*, 116(49), 24492-24499.

RRI (Rights and Resources Initiative). (2021a). Status of legal recognition of Indigenous Peoples', Local Communities' and Afro-descendant Peoples' rights to carbon stored in tropical lands and forests. Washington DC: *Rights and Resources Initiative*.

RRI (Rights and Resources Initiative). (2021b). Significance of community held territories in 24 countries to global climate. Washington DC: *Rights and Resources Initiative*.

Shackleton, S., Delang, C. O., & Angelsen, A. (2011). From subsistence to safety nets and cash income: exploring the diverse values of non-timber forest products for livelihoods and poverty alleviation. *Non-Timber Forest Products in the Global Context*, 55-81.

Shell and BCG. 2022. The Voluntary Carbon Market: 2022 Insights and Trends. <https://www.shell.com/shellenergy/othersolutions/carbonmarketreports.html> (Accessed on Sept. 3, 2023).

Sherpa et al. 2018. Nepal: Customary Resource management a Foundation for REDD+. From Customary Tenure Systems and REDD+: Ensuring Benefits for Indigenous Peoples <https://www.tebtebba.org/index.php/resources-menu/publications-menu/books/61-customary-tenure-systems-and-redd-ensuring-benefits-for-indigenous-peoples/file>

Shockley, J., & Snell, W. (2021). Carbon markets 101. *Department of Agricultural Economics, University of Kentucky: Economic and Policy Update*, 21.

Stiglitz, J. E., Stern, N., Duan, M., Edenhofer, O., Giraud, G., Heal, G. M., ... & Winkler, H. (2017). High-Level Commission on Carbon Prices. Report of the High-Level Commission on Carbon Prices. Washington, DC: World Bank. License: Creative Commons Attribution CC BY 3.0 IGO

Stringer, L. C., Dougill, A. J., Thomas, A. D., Spracklen, D. V., Chesterman, S., Speranza, C. I., ... & Kopolov, G. (2012). Challenges and opportunities in linking carbon sequestration, livelihoods and ecosystem service provision in drylands. *Environmental Science & Policy*, 19, 121-135.

Walker, W. S., Gorelik, S. R., Cook-Patton, S. C., Baccini, A., Farina, M. K., Solvik, K. K., ... & Griscom, B. W. (2022). The global potential for increased storage of carbon on land. *Proceedings of the National Academy of Sciences*, 119(23), e2111312119.

West, T. A., Börner, J., Sills, E. O., & Kontoleon, A. (2020). Overstated carbon emission reductions from voluntary REDD+ projects in the Brazilian Amazon. *Proceedings of the National Academy of Sciences*, 117(39), 24188-24194.

West, T. A., Wunder, S., Sills, E. O., Börner, J., Rifai, S. W., Neidermeier, A. N., ... & Kontoleon, A. (2023). Action needed to make carbon offsets from forest conservation work for climate change mitigation. *Science*, *381*(6660), 873-877.

Whyte, K. (2020). Too late for indigenous climate justice: Ecological and relational tipping points. *Wiley Interdisciplinary Reviews: Climate Change*, *11*(1), e603.