LAND MATRIX

Large-scale land acquisitions for carbon offsetting: Green grabbing or just transition?

Analytical report on land-based offset projects | 2025

Authors:
Christoph Kubitza, Quentin Grislain, Nikka Rivera, Gabi Sonderegger, Jann Lay

Contributors:
Raymond Samndong, Grace Art, Lucía Cuellar, Kate Dooley, Marie Gradeler, Roberto Interdonato, NGO Forum Cambodia, Carlos Ortega, Griselda Salas

Editing:
Danya-Zee Pedra

Design/layout:
Media Chef

Publishers:
Centre for Development and Environment (CDE), University of Bern; Centre de coopération internationale en recherche agronomique pour le développement (CIRAD); German Institute for Global and Area Studies (GIGA); with Bern Open Publishing (BOP)

Citation:
Kubitza, Christoph; Grislain, Quentin; Rivera, Nikka; Sonderegger, Gabi; Lay, Jann (2025). Large-scale land acquisitions for carbon offsetting: Green grabbing or just transition? Analytical report on land-based offset projects. Bern, Montpellier, Hamburg: Centre for Development and Environment, University of Bern; Centre de coopération internationale en recherche agronomique pour le développement; German Institute for Global and Area Studies; with Bern Open Publishing.

DOI: 10.48620/91000
ISBN (e-print): 978-3-03917-112-5
ISBN (print): 978-3-03917-111-8

The e-print version is available at: www.landmatrix.org

Acknowledgements

We express deep gratitude to Danya-Zee Pedra (ILC) for her commitment and dedication in editing and producing this report. Special thanks also go to Angela Harding (ILC), Christof Althoff (GIGA), Marie Gradeler (CIRAD) and Kurt Gerber (CDE) for developing and maintaining the global database, Lucía Cuellar (INENCO), Oleksandra Romanova (Ecoaction), Angela Harding (ILC) and Nikka Rivera (AFA) for coordinating the data collection in the regions, and GIGA's research assistants Grace Art and Carolin Müller for their excellent input.

Field studies in Indonesia and Madagascar were supported by the Lincoln Institute of Land Policy through the project "Can standards for carbon-offset projects effectively prevent green grabbing? Evidence from local communities in the Global South" (Research on the benefits, challenges, and implications of land-based mitigation strategies).

Not least, the Land Matrix partners wish to express our appreciation to all Land Matrix members within the network who have significantly contributed to data collection and data quality improvement. Finally, we would like to thank our donors for their generous financial support, without which this report would not be possible.

Contents

List of figures

List of tables

List of boxes

Acronyms

ACCU	Australian Carbon Credit Unit
ACR	American Carbon Registry
AFA	Asian Farmers' Association for Sustainable Rural Development
AFOLU	Agriculture, Forestry, and Other Land Use
ARR	Afforestation and Reforestation
ASEAN	Association of Southeast Asian Nations
CAR	Climate Action Reserve
CBTRs	Community-based tenure rights
CCB	Climate, Community & Biodiversity
CCP	Core carbon principles
CDE	Centre for Development and Environment
CDM	Clean Development Mechanism
CFS-RAI	Committee on World Food Security Principles for Responsible Investment in Agriculture and Food Systems
CIRAD	Centre de coopération internationale en recherche agronomique pour le développement
CO_2	Carbon dioxide
COP	UN Climate Change Conference
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
CSO	Civil society organisation
DRC	Democratic Republic of the Congo
Ecoaction	Centre for Environmental Initiatives Ecoaction
ERA	Ecosystem Restoration Associate
ERC	Ecosystem Restoration Concession
ERS	Ecosystem Restoration Standard
ETS	Emissions Trading System
EU	European Union
FCPF	Forest Carbon Partnership Facility
FOC	Framework of collaboration
FPIC	Free, Prior and Informed Consent
FUNDAPAZ	Fundación para el Desarrollo en Justicia y Paz
GHG	Greenhouse gas
GIGA	German Institute for Global and Area Studies
GIZ	Gesellschaft für Internationale Zusammenarbeit
GS4GG	Gold Standard for the Global Goals
Ha	Hectare
HTI	Industrial Plantation Forest scheme
ICCA	Indigenous Peoples' and Local Communities' conserved area

ICVCM	Integrity Council for the Voluntary Carbon Market
IDR	Indonesian rupiah
ILC	International Land Coalition
ILO	International Labour Organisation
IPs & LCs	Indigenous Peoples and local communities
IPCC	Intergovernmental Panel on Climate Change
IUPJL-HL	Environmental Service Business Permission in Protected Forest
LAC	Latin America and the Caribbean
LMI	Land Matrix Initiative
LMIC	Low- and middle-income country
LSLA	Large-scale land acquisition
MoU	Memorandum of understanding
NDC	Nationally Determined Contribution
NGO	Non-governmental organisation
OKI	Ogan Komering Ilir
PES	Payment for ecosystem services
RECONCILE	Resource Conflict Institute
REDD+	Reducing Emissions from Deforestation and Forest Degradation
RFP	Regional Focal Point
SDGs	Sustainable Development Goals
SMPP	Sumatra Merang Peatland and Project
TIST	The International Small Group and Tree Planting Programme
UK	United Kingdom
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
VCM	Voluntary carbon market
VCS	Verified Carbon Standard
VCU	Verified carbon unit
VGGT	Voluntary Guidelines on the Responsible Governance of Tenure
VIIRS	Visible Infrared Imaging Radiometer Suite
VNL	VIIRS Nighttime Lights
VSS	Voluntary Sustainability Standards
WWC	Wildlife Works Carbon

The Land Matrix Initiative and the scope of this report

The Land Matrix Initiative (LMI) is a partnership between the Centre de coopération Internationale en Recherche Agronomique pour le Développement (CIRAD), Centre for Development and Environment (CDE) at the University of Bern, German Institute for Global and Area Studies (GIGA), Gesellschaft für Internationale Zusammenarbeit (GIZ), and International Land Coalition (ILC) at global level, and the Asian Farmers' Association for Sustainable Rural Development (AFA), Centre for Environmental Initiatives Ecoaction, Fundación para el Desarrollo en Justicia y Paz (FUNDAPAZ), and the Resource Conflict Institute (RECONCILE) in Kenya at regional level.

Established in 2009 to address the gap in robust data on the true extent and nature of the "global land rush", the LMI has evolved into an independent land monitoring initiative that promotes transparency and accountability in decisions over large-scale land acquisitions (LSLAs) in low- and middle-income countries (LMICs) in response to the need to monitor such complex investment flows. We do this by collecting, capturing, and sharing data about LSLAs at global, regional, and national level on our online open access platform. Our four Regional Focal Points (RFPs), located in Africa, Asia, Eastern Europe, and Latin America are responsible for data collection in their respective regions. We aim to systematically collect data for deals targeting agricultural production, timber plantations and extraction, carbon sequestration and offsetting, and renewable energy production, as well as case studies for tourism, industry, and mining in LMICs. Specifically, we record transactions that entail a transfer of rights to use, control, or own land through sale, lease, or concession; that cover 200 ha or more; and that have been concluded since the year 2000. We also mostly consider land deals that imply the potential conversion of land from smallholder production, local community use, or important ecosystem service provision to commercial use. In previous analytical reports by the LMI, we examined transnational deals in the agricultural sector. In this report, our focus shifts to deals centred on land-based carbon offsetting in LMICs aimed at compensating for emissions elsewhere. Finally, deals are only included in our public database for countries in which there is information on at least one investor name, one data source, and either the intended, contracted, or operational size. This explains why our database is not exhaustive, although we strive to get more precise and complete data on each deal where possible.

This report is based on a snapshot of the data available in our database taken on 7 July 2025. Since the database is continuously updated and data quality improved, the exact numbers and information available in this report may differ from the information available on the website currently. Our data are open-access and can be retrieved through www.landmatrix.org. Please refer to our frequently asked questions at www.landmatrix. org/faq for a list of the countries we actively monitor, or to find out more about how we capture, analyse, verify, and use the data.

Executive summary

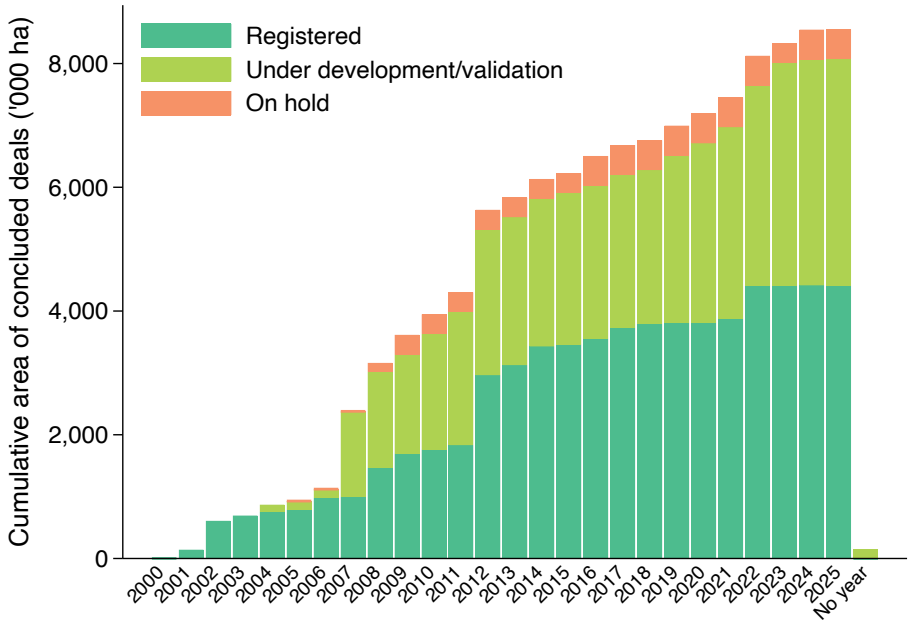
With demand for land remaining high in the agricultural sector, large-scale land acquisitions (LSLAs) continue to reshape rural landscapes and communities in low- and middle-income countries (LMICs). In the last years, however, a critical but often underestimated new force has added further pressure to land: the growth of carbon markets. Their expansion—in particular of the voluntary carbon market (VCM)—has picked up pace in the recent decade, driven by the implementation of nature-based solutions as carbon offsets in the Global South, although their integrity has been called into question due to overestimation of emission reductions. Crucially, while such land-based investments can generate environmental and socioeconomic co-benefits, they require extensive land resources, which are frequently obtained through the acquisition of large tracts of land that are seldom genuinely idle. This practice poses significant risks to the land rights of smallholders, pastoralists, and Indigenous Peoples and local communities (IPs & LCs) that depend on secure access to land for their livelihoods.

The "green land grab" for carbon offsets: How much and where?

Within this context, the Land Matrix Initiative (LMI) has been documenting LSLAs for individual offset projects designed to generate tradable carbon credits in the VCM. Of the 217 deals recorded in our database, 183 are concluded and listed in carbon credit registries:

- These projects already cover approximately **8.8 million hectares worldwide**, an area comparable to the size of Austria or Jordan.
- They represent nearly **one-third of the magnitude of the global rush for agricultural land** that began in the late 2000s—an expansion that has so far accumulated around 30 million hectares in LMICs.
- Offset projects relying on **LSLAs are concentrated in Brazil, the Republic of the Congo, and the Democratic Republic of the Congo (DRC)**, with more than one million hectares each. In Asia, significant activity was also documented in Indonesia, with close to half a million hectares.
- **Avoided-deforestation projects are the major contributor, totalling 7 million hectares.** Reforestation and afforestation projects also cover almost 1.5 million hectares.

Figure: Cumulative area of concluded LSLAs for carbon offset projects by registration status



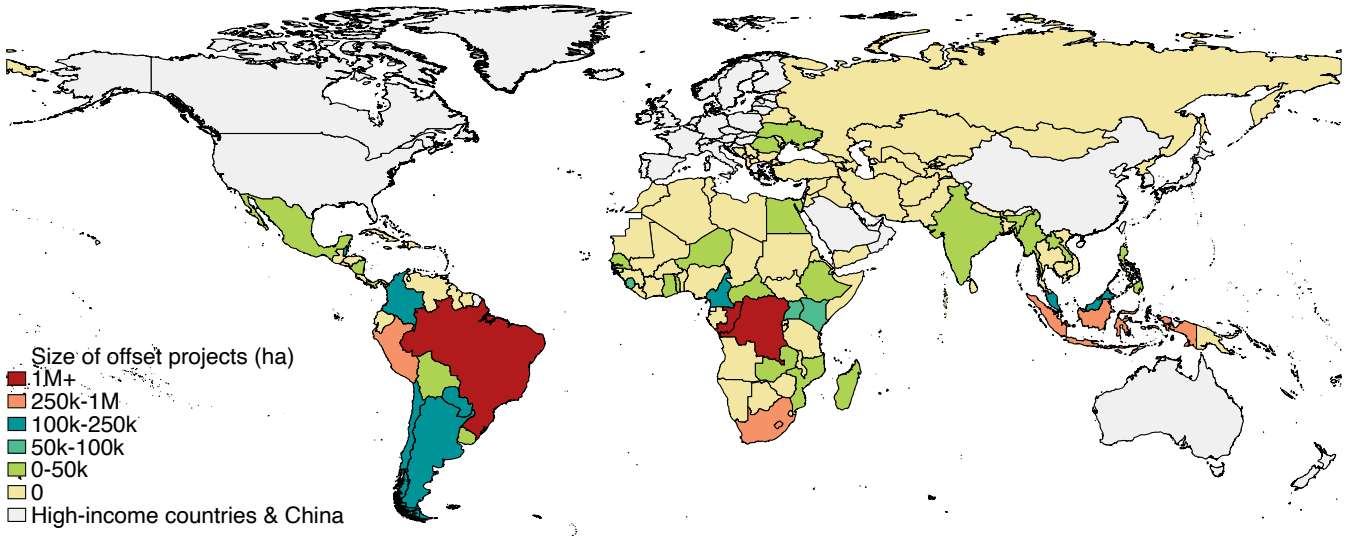
Notes: The year of land acquisition (conclusion of land contract) is provided in the figure. For some deals, the year of the land acquisition was not available. These deals are recorded without a specified year in the last column. If operations were abandoned, the area is set to zero. Figure is based on concluded deals that are listed in carbon credit registries (n=183).

New players in the field: Project developers and certification bodies

Demand from companies seeking to achieve carbon neutrality—along with emerging linkages to compliance markets and UN trading mechanisms—has mobilised a diverse array of actors on the supply side of the VCM that are involved in the documented land acquisitions.

- While a few non-governmental organisations have acquired land for carbon offsetting, the vast majority of actors are from the private sector. Alongside companies well versed in agricultural or forestry operations, **specialised carbon project developers participate in deals to procure land in LMICs**.
- The ultimate parent **companies involve a mix of foreign and domestic companies**, including countries of origin from the Global North such as the USA and the UK, as well as core target countries like Brazil and Colombia.
- **Verra's Verified Carbon Standard (VCS) is the most pervasive carbon standard for offset projects relying on LSLAs** in the world, covering close to three quarters of all documented projects. Some VCS projects are also certified by the Climate, Community & Biodiversity (CCB) standard, which includes more comprehensive safeguards to protect IPs & LCs. The Gold Standard for Global Goals comes second, but only applies to very few projects.
- A review of the dominant standards shows that many include **no clear guidance for benefit sharing**. Although consultation and Free, Prior, and Informed Consent (FPIC) processes are mentioned in all reviewed standards, a closer examination of the documents reveals that their requirements are weak.

Figure: Map of target countries of LSLAs



Notes: Map is based on concluded deals that are listed in carbon credit registries (n=183).

Climate mitigation for the planet and people?

Carbon markets have strongly embraced the narrative of benefitting both the planet and its people. However, besides the actual mitigation potential of the VCM in its current state remaining questionable—particularly due to overstated claims regarding emissions reductions—the idea that it will reliably generate social and economic co-benefits for remote communities also warrants scepticism. In fact, as our data highlight, there are several significant associated risks, especially for projects linked to LSLAs.

- **Key target countries, particularly in Central Africa, have weak land governance systems** that can further exacerbate the risk of displacement, marginalisation, and conflict, above all for communities with customary tenure rights.

- In the past, IPs & LCs living in remote regions were shielded from external investments to some extent due to their inaccessibility and limited infrastructure, reducing the risk of displacement and land appropriation. This has changed with the surge of carbon offset deals, however, and **many projects are now concentrated in remote areas** that have limited population density and little infrastructure.

- While projects may in theory deliver important environmental co-benefits that could lead to higher biodiversity and climate resilience, which are important for natural resource-dependent communities, other **co-benefits such as employment generation are limited**.

- Since carbon standards often include only vague requirements in terms of benefit sharing, **implementation and coverage of benefit-sharing arrangements is based on the discretion of project developers.** Consequently, as a number of case studies attest to, projects frequently fall short of promises, with considerable gaps between pledged and realised benefits.

Policy recommendations

This report argues that without rigorous global and national safeguards, carbon offset projects based on LSLAs risk exacerbating social and environmental injustices that occurred in the wake of past waves of land acquisitions in other sectors. While acknowledging that citing all necessary reforms for the VCM extends beyond the scope of this analysis, we have formulated four key policy recommendations based on the documented evidence.

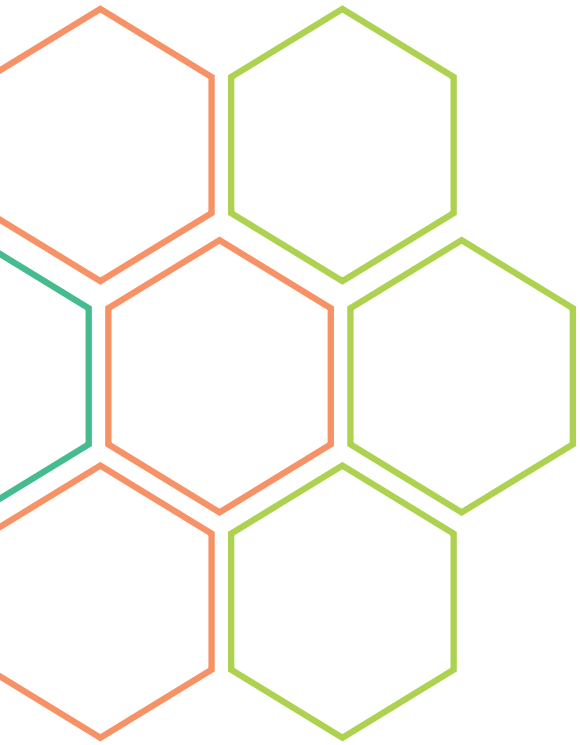
1. Rebalance the share between offset projects based on LSLAs versus community or farmer-based projects. This includes persistent efforts to legally recognise the land rights of IPs & LCs, coupled with stronger FPIC processes to ensure both genuine participation in carbon markets and protection against green grabbing.

2. Implement more comprehensive carbon standards. The guidance provided in dominant standards is insufficient for large-scale projects acquiring land in remote and at times conflict-ridden regions of the world. For large-scale land-based offset projects, more comprehensive requirements are needed on consultations, FPIC, and benefit sharing.

3. Strengthen alignment with global governance frameworks. Strict compliance with frameworks such as the Voluntary Guidelines on the Responsible Governance of Tenure (VGGT) should be promoted. Many governance frameworks have been built on the experience of past episodes of land acquisitions and the lessons learned need to be better integrated in the carbon market space.

4. Improved transparency and accountability remain a *sine qua non* for land transactions in the carbon market. This is necessary to exert more public control over a largely decentralised system and should include public disclosure of land contracts and benefit-sharing agreements. In addition, robust monitoring and transparency initiatives are essential to increase public oversight. Lastly, extensive capacity-building efforts for affected communities are critical to address entrenched power asymmetries and to support a just and inclusive climate transition.

This report demonstrates that without meaningful adjustments, this sector risks repeating past mistakes by prioritising large-scale projects that neglect customary land tenure systems—the foundation of local livelihoods worldwide. However, the integrity challenges facing the VCM extend beyond issues of justice. A growing body of research has questioned the actual climate benefits delivered by land-based carbon offset projects. Taken together, these findings cast fundamental doubt on the current contribution of land-based carbon offset projects to more sustainable development trajectories, underscoring the urgent need for profound reform in the VCM and stringent eligibility criteria for compliance markets and UN mechanisms.



1

Taking stock of large-scale land acquisitions for land-based carbon offsets

Transnational large-scale land acquisitions (LSLAs) have shaped the economies, social structures, and whole landscapes in targeted countries for centuries. Rooted in colonial history, LSLAs re-emerged as a global issue in the late 2000s following sharp price spikes in agricultural commodities. During this period, investors worldwide rushed to acquire land in low- and middle-income countries (LMICs), seeking to capitalise on the growing demand for agricultural products, often entailing severe land conflicts (Lay et al. 2021). Since then, LSLAs have been associated with a variety of trends, ranging from biofuel production to renewable energies and transition minerals (Borras Jr. et al. 2011; Bourgoin et al. 2024).

This report argues that, beyond these trends, pressure on land in LMICs is increasingly fuelled by an unexpected factor: global action against climate change using so-called nature-based solutions[1]—that manage, protect, and restore ecosystems—involving large tracts of land. These measures have been promoted as a strategy to counter the global rise in greenhouse gas (GHG) emissions, although there is evidence that the actual climate benefits are exaggerated (West et al. 2023). Crucially, various actors, including United Nations (UN) bodies such as UN Special Rapporteurs and the Intergovernmental Panel on Climate Change (IPCC), highlighted that land-based climate mitigation projects might also pose significant socio-economic risks to local populations, threatening their customary tenure systems and local livelihoods (Calvin et al. 2023; UN Human Rights Special Procedures 2024).

Land-based climate mitigation is not an entirely new endeavour in LMICs. For decades, foreign development agencies, state actors, and non-governmental organisations (NGOs) have implemented measures such as nature conservation programmes and reforestation and afforestation projects to address climate change mitigation alongside other objectives (Blanc 2020). These projects often took place within global initiatives that pledged to protect and restore forests or funding pledges of private companies (Seddon et al. 2021). In the last two decades, however, climate change mitigation has evolved from being mostly a public concern to encompassing decentralised private-sector involvement both on the supply and demand side, creating a new business model for many companies. This shift is exemplified by the rise of the voluntary carbon market (VCM), where private entities are part of the mix of actors who design and implement carbon-offset projects, matching the growing demand from other companies who wish to compensate some of their hard-to-abate emissions (see Box 1 for more details on the VCM).

Many large corporations now use the VCM to meet their climate targets. For example, in 2024, the top three buyers in the VCM were Shell, Microsoft, and Eni (AlliedOffsets 2025). However, unlike compliance markets, such as the European Union (EU) Emissions Trading System (ETS), the VCM is a decentralised market where private actors voluntarily buy and sell carbon credits that represent the avoidance, reduction, or removal of GHG emissions using a baseline-and-credit system. Yet the distinction between the independent voluntary and government-regulated markets is becoming increasingly blurred, with national and global schemes often allowing the usage of carbon credits certified by private certification bodies that are traded in the VCM[2]. This includes, for instance, UN mechanisms such as the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). Another example of these interactions is the Clean Development Mechanism (CDM), a UN mechanism for carbon trading, through which a wide variety of actors created carbon offset projects.[3] Crucially, while national governments bought credits for compliance reasons through the mechanism, private actors were also able to buy carbon credits for both compliance and voluntary purposes.

The VCM has experienced various peaks and troughs over its 20-year history, most notably in the 2010s, when demand and prices did not meet initial expectations, leading to numerous bankruptcies. Then, after seeming to bounce back in 2021, a severe integrity crisis in 2022 led to another major setback, with demand and prices slumping again. In the last two years, however, although not completely recovered, demand and prices in the market have been steadier (AlliedOffsets 2025; Ecosystem Marketplace 2024). In addition, future global mechanisms, such as Article 6.2 and 6.4 of the Paris Agreement, could further accelerate the expansion of the VCM. Moreover, decisions on Article 6.4 by the UN Framework Convention on Climate Change (UNFCCC) at the UN Climate Change Conference in 2024 (COP29) have seen national governments start to move towards establishing a centralised mechanism, whereby entities can sell carbon credits to countries aiming to meet

[1] The term is contested and at times ill-defined (IPES-Food 2022). We use the term land-based carbon offsets in the report.
[2] The distinction between the independent VCM and government-regulated carbon schemes has become increasingly blurred due to growing overlaps and complexities. For example, in Colombia, carbon credits can be used to offset carbon tax liabilities. Additionally, eligible credits from the VCM will be also used by the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) scheme, further bridging the gap between voluntary and regulatory frameworks. Lastly, CDM projects have also changed into projects certified by private companies, such as Verra and Gold.
[3] A carbon offset is "a reduction in GHG emissions – or an increase in carbon storage (e.g., through land restoration or the planting of trees) – that is used to compensate for emissions that occur elsewhere" (Broekhoff et al. 2019).

their Nationally Determined Contributions (NDCs) (Dooley et al. 2022; UN Human Rights Special Procedures 2024).

The main VCM actors are also preparing to ensure their credits are eligible for Article 6.4, as well as for CORSIA (Ahonen et al. 2022), while a proposal from the EU suggests that millions of tonnes of carbon dioxide could be offset by 2040 by purchasing carbon credits from other parts of the world to reach European climate goals (Carbon Market Watch 2025). The future developments of these mechanisms could substantially fuel the demand for carbon offsets as a consequence—and for land to implement these projects.

Indeed, while carbon offsets can be technology-based, including wind farms or measures to increase energy efficiency such as new cooking stoves, the VCM is still dominated by nature-based solutions that rely on accessing large tracts of land (Meitner 2024). Many of these carbon-offset projects secure their access to land through partnership agreements that allow local communities to retain ownership and participate in benefit sharing, but others take place on state land or involve large-scale concessions and land purchases. The latter trend is particularly worrying, and calls for further scrutiny in light of several studies pointing to the profound impacts these land deals can have on local livelihoods and land rights (Carbon Market Watch 2023; Friess 2024; Human Rights Watch 2024; Hunsberger et al. 2017; Dooley et al. 2022). A recent report also highlighted that numerous reforestation and afforestation projects in the VCM resulted in land grabs that violated the land rights of local communities (GRAIN 2024). Of further concern, many carbon offsets with low implementation costs are located in LMICs (Glennerster and Jayachandran 2023), where land governance systems are often weak or poorly enforced (Lay et al. 2021). Moreover, land acquisitions contribute to rising land concentration and exacerbate existing economic and social inequalities, which directly conflicts with both national and global development goals (Anseeuw and Baldinelli 2020).

In this report, we argue that, apart from the severe methodological issues of the VCM that call into question the actual climate benefits, the rise of private sector actors acquiring land for carbon offset projects creates significant risks for local livelihoods and land rights in LMICs. With few stringent social safeguards and in the presence of deficient land governance systems in many target countries, land acquisitions linked to global climate mitigation should be considered an additional potential driver of global land inequality and a limiting factor for resource access of local communities (Mercandalli, Hadrien, and Pierre 2025). As rights to biosequestered carbon are vested with existing land and forest rightsholders, customary rightsholders confront significant new risks based on existence as well as degree of legal recognition of their rights (Cordes, Cotula, and Polack 2025). If transaction and allocation of carbon rights[4] affect other land rights, such as through concession, leases, or outright purchases, the risks for communities could be severely exacerbated. Current integrity initiatives must go beyond just environmental integrity to also address the current lack of social integrity in the market (Sarmiento Barletti et al. 2025).

In 2024, in response to the growing need for more systematic monitoring of LSLAs in the VCM, the Land Matrix Initiative (LMI) began to strategically collect data on carbon offset projects that access land through LSLAs. Whereas earlier LMI reports primarily focused on transnational agricultural deals (Anseeuw et al. 2012; Lay et al. 2021; Nolte, Chamberlain, and Giger 2016), in this report, we turn our attention to the rising pressure from LSLAs for carbon offsetting—covering both domestic and transnational deals—and examine their role in driving land acquisition. Specifically, we analyse only those deals in which carbon is removed or emissions are avoided or reduced for the explicit purpose of generating carbon credits for sale to entities seeking to offset their emissions.

A limited number of recognised carbon accounting methods for nature-based offsetting require extensive land resources. This report therefore concentrates on projects related to forest landscapes—including Reducing Emissions from Deforestation and Forest Degradation (REDD+) initiatives, reforestation, and afforestation—as well as, albeit to a lesser extent, wetland restoration, conservation, and grassland management (see Box 1 for further details). Our work is related to the literature on green grabbing—understood as "the appropriation of land and resources for environmental purposes" (Fairhead, Leach, and Scoones 2012)—which describes how environmental and climate change mitigation schemes can be used to motivate and justify large-scale land transactions (Borras Jr. et al. 2022), as well as the broader discussion on just climate transitions, focusing on the rights of communities in the Global South (IPES-Food 2024).

[4] Carbon rights are defined as "the right to benefit from sequestered carbon and/or reduced greenhouse gas emissions" (Streck 2020).

Box 1: Scope of the report within the voluntary carbon market

Carbon markets using baseline-and-credit systems allow companies to purchase carbon credits instead of directly reducing their own emissions. These credits are used to claim «carbon neutrality» or «net-zero» status by compensating for emissions through equivalent reductions elsewhere. Carbon credits are issued by carbon credit registries that certify projects that avoid, reduce, or remove GHG emissions. These activities mainly take place in a decentralised system commonly known as the VCM, which is governed by a small number of certification bodies and registries. This report focuses on land-based carbon offset projects that applied to or registered with these certification bodies and that, in addition, rely on the practice of LSLAs (see Box 2). While countries such as Brazil, Costa Rica, and Peru have developed, or are in the process of developing, their own national systems for carbon offsetting—especially for REDD+ and domestic climate actions, these systems are not yet fully integrated into the global offset market and are therefore not included in this report.

Carbon credits can be categorised into three types: Carbon avoidance credits that prevent emissions, such as avoided deforestation; carbon reduction credits that lower emissions compared to previous levels, such as improved fuel efficiency or reduced methane emissions; and carbon removal credits that remove and store carbon dioxide (CO_2) through, for example, reforestation or direct air capture (Meitner 2024). For this report, we exclusively focus on land-based offset projects involving avoidance and removal as they cover large tracts of land and often affect land rights through LSLAs. This includes projects on avoided deforestation, afforestation and reforestation, wetland restoration and conservation, grassland management, and improved forest management. We do not include carbon farming projects because, although a change in agricultural practices may occur, land rights mostly remain unaffected.

Although the VCM is distinct from compliance markets, the boundaries between the two can be blurred—particularly in relation to the CDM. Established under Article 12 of the Kyoto Protocol, the CDM was the first major international offset mechanism set up by the UNFCCC (Hultman, Lou, and Hutton 2020). A wide range of actors developed carbon offset projects within the CDM framework and, while originally designed for compliance use by states, private sector actors also participated, purchasing credits for both compliance and voluntary purposes—similar to the business models later adopted by Verra and Gold Standard. However, in 2012, the CDM faced a sudden collapse in credit prices, undermining its financial viability. Despite this, some private entities continued using CDM credits to offset emissions, often disregarding the scheme's declining credibility. Speculative investors also entered the space, purchasing CDM credits in anticipation of a market rebound (Kainou 2022). In addition, some projects have transitioned CDM credits to the Article 6.4 trading platform or to Verra's VCS. We hence also include carbon projects registered with the CDM that can be identified as LSLAs.

The CDM is not the only UN carbon scheme that closely interacts with the VCM. Most carbon avoidance credits are generated under the framework of REDD+, a framework based on the idea of global results-based forest-carbon payments. REDD+ implementation on the ground, however, is de facto an umbrella term for different types of initiatives based on country context and certification standards (Wunder et al. 2024). Two distinct approaches to finance REDD+ projects exist, including a market-based mechanism, which involves the trading of carbon offsets in VCM, and a fund-based mechanism, which includes the Forest Carbon Partnership Facility (FCPF) hosted by the World Bank, the UN-REDD Programme, and official development aid (Garcia et al. 2021). In this report, we refer to voluntary REDD+ projects under the market-based mechanism that are listed in carbon credit registries and involve LSLAs, as well as individual projects under jurisdictional REDD+ approaches, such as in the Maï-Ndombe region.

1.1 History repeating itself with a land rush for carbon offsets?

By July 2025, the Land Matrix database had recorded 217 land-based carbon offset projects at various stages of implementation worldwide. These projects had either secured land access through a LSLA after the year 2000 or were in the process of doing so (see Box 2 for a detailed definition of LSLAs). Of these, 183 projects involve concluded land deals—defined as cases where credible sources confirm either a signed land contract or an oral agreement. At the time of reporting, these projects had either achieved final registration in a carbon credit registry, were undergoing the application process, or were put on hold. As of 2025, these 183 projects cover a total of 8.8 million hectares (ha)—comparable to that of a country such as Austria or Jordan. Of this area, 4.8 million ha—corresponding to 105 projects—are already registered under various carbon standards. A further 3.9 million ha (74 projects) are currently undergoing the application process in carbon credit registries, while a few projects totalling 0.5 million ha have been put on hold.[5]

In addition, 0.6 million ha of concluded deals where projects were later withdrawn from carbon registries, 1.1 million ha of failed land deals, and 1.2 million ha of intended acquisitions plausibly linked to carbon offsetting have been recorded in the database. It is important to note, however, that data coverage for these latter categories is likely incomplete. Moreover, the database is continuously updated, reflecting the volatility of the carbon market. The figures presented here therefore capture only a specific point in time and may no longer fully align with the open-access database in the future.

Box 2: Defining large-scale land acquisitions in carbon markets

In line with the scope of the LMI database, this report only includes carbon offset projects where a transfer of land rights occurred after the year 2000 in LMICs. For LMICs, we use the World Bank classification as of 2010, but exclude China due to the lack of a country partner. We include both deals where the land was not under the consolidated ownership of a single entity before the LSLA, and where ownership changed from one owner to another after 2000. The term "deal" refers to LSLAs. LSLAs, or land deals, occur through two primary modes of access: concessions and leases; and land purchases.

In our definition, we exclude carbon projects where only a transfer of carbon rights takes place without any substantial change to other land rights. For instance, if project proponents sign agreements with the owner or rights holder of the selected project area to obtain only access permissions and carbon rights, we do not include the deal. Based on this definition, we exclude, for example, projects involving smallholder farmers and tree-planting efforts on their land. In these deals, project developers often provide technical assistance and tree saplings, while farmers provide the land and often also the manual labour. In most of these projects, the revenue from selling carbon credits is shared between the involved parties. Some of these projects may involve official leasing agreements for smallholder land, but these are typically limited in scale and scattered across large areas. We therefore do not include projects implemented on dispersed smallholder land where smallholders retain long-term land ownership and benefit from the intervention, as the focus of the LMI is on land concentration and inequality. Projects situated on the recognised territories of IPs & LCs, where communities maintain land ownership while partnering with project developers in the VCM, are likewise excluded. We also exclude projects where the state retains land ownership but enters into agreements with project developers to share project revenues. Specifically, we exclude administration or management contracts in which the state grants non-state entities—usually NGOs—management responsibilities over the land. For instance, in Madagascar, as in many other countries, forest lands are officially owned by the government, and private ownership is not permitted. However, the Ministry of Environment and Forestry granted, for example, the Wildlife Conservation Society exclusive management rights over the Makira area through a management delegation contract (Favretto et al. 2020).

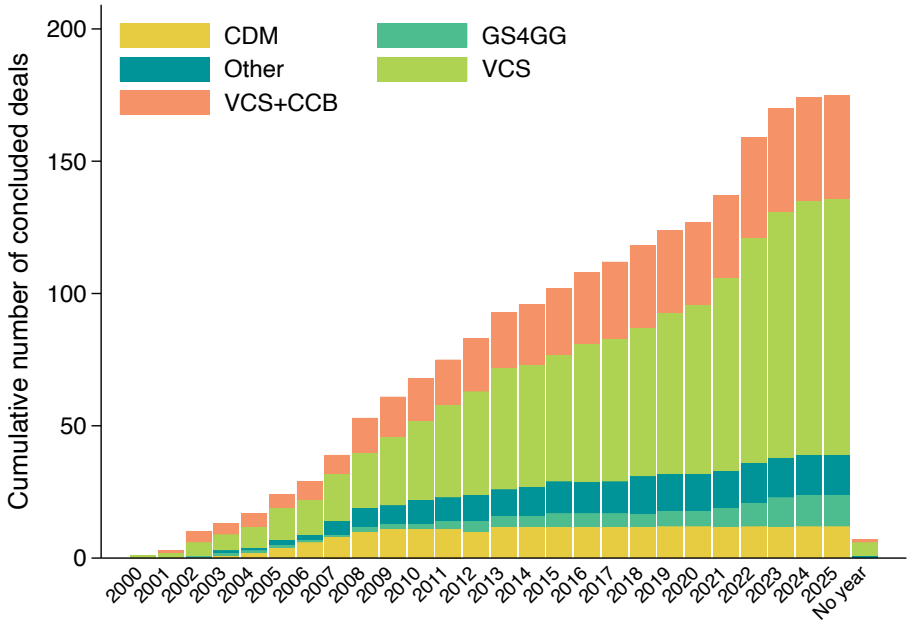
[5] The latter projects have already partly abandoned operations.

With LSLAs for carbon offsetting now encompassing nearly 9 million ha, these deals already amount to almost one-third of the scale of the global rush for agricultural land that began in the late 2000s—an expansion that has so far accumulated around 30 million ha in LMICs. This earlier wave of land acquisitions was widely criticised for driving land grabbing and adversely affecting local livelihoods. In response, policies such as the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries, and Forest (VGGT) and the Committee on World Food Security (CFS) Principles for Responsible Investment in Agriculture (RAI) were promoted to strengthen land governance and foster more responsible investment practices. At the same time, new technological and organisational approaches were developed to address the challenges of documenting large-scale land transactions, most notably the establishment of the Land Matrix network and the creation of national land observatories in selected countries (Anseeuw et al. 2012). Beyond policy responses, the surge in global demand for agricultural land also prompted extensive academic research across various disciplines (Anseeuw et al. 2012; Borras Jr. et al. 2011; Lay et al. 2021). By contrast, evidence on the impacts of LSLAs for carbon offsetting—particularly regarding land conflicts and local livelihoods—remains largely case-study-based, and only a few studies provide evidence building on regional and global datasets.

There are, however, important differences between LSLAs for carbon offsetting and other forms of land-based investments. First, many offset projects do not involve major land use changes since they focus on avoiding emissions through forest conservation measures, as evidenced by the more than one-third of these recorded deals being earmarked for avoided-deforestation projects (REDD+), covering over 6 million out of the nearly 9 million ha. Second, carbon offsetting is often only one of various investment objectives. For instance, many projects simultaneously seek to generate revenue through timber production or tourism services, while a number are also timber plantations for wood and fibre, often established on formerly degraded land. In fact, about one-quarter of recorded offset projects list timber production, mostly through selective logging, among their investment intentions—a practice that frequently raises doubts about the projects' ultimate climate benefits. Third, as we will argue in a later section, numerous land deals are located in remote regions, which may reduce the likelihood or intensity of land conflicts. Still, even with these caveats, offset projects have already affected millions of hectares of land, and while direct land-use change might be limited, studies and reports nevertheless document several serious human-rights violations by either directly excluding people from their land or by reducing their rights to the natural resources they can harvest from their land (GRAIN 2024; He and Wang 2023).

As illustrated in Figure 1, while the number of land-based carbon offsets has continuously grown over time, a notable surge occurred between 2000 and 2025. Although the figure

Figure 1: Cumulative number of concluded LSLAs for carbon offset projects by standard



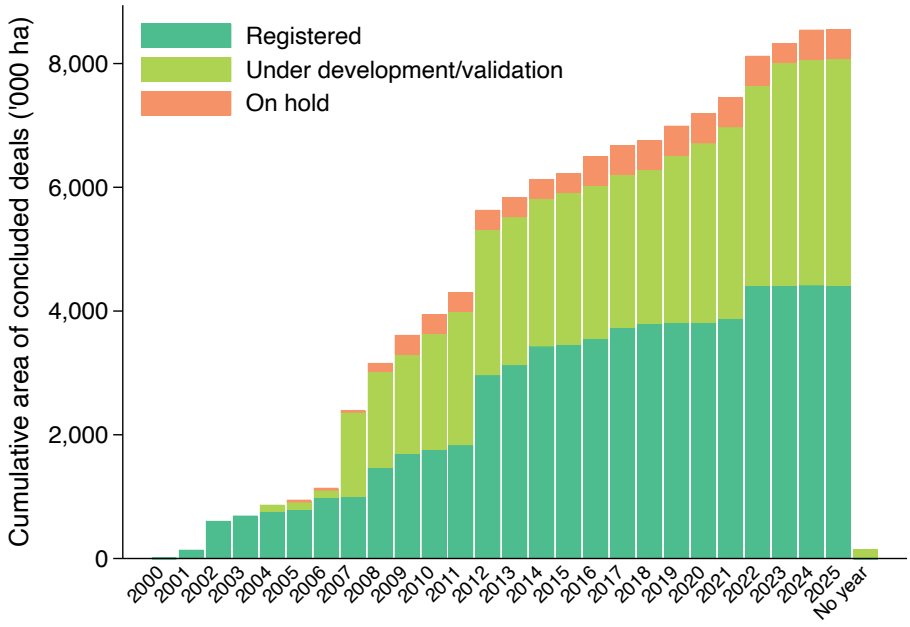
Notes: The year of land acquisition (conclusion of land contract) is provided in the figure. For some deals, the year of the land acquisition was not available. These deals are recorded without a specified year in the last column. Figure is based on concluded deals that are listed in carbon credit registries (n=183).

captures the timing of the initial land acquisition, in many cases, formal project registration—such as with Verra's VCS—actually occurred several years later. The data reveal another distinct uptick in land acquisitions between 2019 and 2022, likely driven by heightened activity in the VCM. After 2022, this momentum appears to slow, potentially due to the integrity crisis in the VCM that emerged over the credibility of REDD+ methodologies, leading to a sharp drop in credit prices (AlliedOffsets 2025; West et al. 2023).

Figure 1 also demonstrates that successive surges in acquisitions have been driven by different carbon credit registries and mechanisms. For example, many of the earliest offset projects were registered under the CDM, which, since 2000, enabled project-based emission reductions in developing countries to be credited. Although the CDM collapsed in 2012, a number of projects have persisted by securing alternative financing or transferring to other registries, including those under Article 6.4 of the Paris Agreement, with Verra's VCS becoming the dominant standard, outsizing its major competitor the Gold Standard for Global Goals (GS4GG). Figure 1 further reveals that only a minority of VCS-certified projects are also certified under the more comprehensive Climate, Community & Biodiversity (CCB) standard. The CCB label, applied in conjunction with Verra's registry, is intended to certify premium credits that emphasise social and environmental co-benefits as well as alignment with the Sustainable Development Goals (SDGs). Other less prominent standards that have certified projects based on LSLAs include Cercarbono, BioCarbon Standard, and the Ecosystem Restoration Standard.

To provide further detail on changes in size over time, Figure 2 shows the cumulative size of carbon offset projects based on LSLAs from 2000 to 2025. While there was a sharp increase between 2005 and 2012, coinciding with the peak years of the Kyoto Protocol's CDM, growth slowed between 2013 and 2018 following the collapse of the CDM, picking up again after 2019 potentially due to increased interest in the VCM. The figure also indicates that a significant number of LSLAs—covering roughly 4 million ha—are still awaiting approval in registries. Notably, many of these recently listed applications are linked to land acquisitions that occurred several years earlier. In terms of acquisition types, 19% of the carbon offset projects are based on concessions, 32% on leases, and 42% on outright purchases, with the remaining 7% falling into other or mixed categories.

Figure 2: Cumulative area of concluded LSLAs for carbon offset projects by registration status



Notes: The year of land acquisition (conclusion of land contract) is provided in the figure. For some deals, the year of the land acquisition was not available. These deals are recorded without a specified year in the last column. If operations were abandoned, the area is set to zero. Figure is based on concluded deals that are listed in carbon credit registries (n=183).

Box 3: Data preparation, assumptions, definitions, and biases

The Land Matrix Regional Focal Points (RFPs) and global partners together systematically searched various databases and registries of carbon offset projects to identify those related to LSLAs that match the definitions provided in Boxes 1 and 2. We focused on carbon standards that seek international credibility and reviewed carbon crediting programmes that applied for assessment under the Core Carbon Principles (CCP) by the Integrity Council for the Voluntary Carbon Market (ICVCM 2025).* We then excluded carbon credit registries that, upon inspection, were found not to play a role in land-based projects in LMICs related to LSLAs. This includes the American Carbon Registry (ACR), Climate Action Reserve (CAR), Global Carbon Council, Plan Vivo, Isometric, Puro.earth, Riverse, and Wilder Carbon, either due to their geographic focus or the types of projects these registries support. For instance, the ART TREES follows a jurisdictional approach, the reviewed Plan Vivo projects transacted through the S&P Global Environmental Registry (S&P Global 2025), and the Social Carbon registry (Social Carbon 2025) did not include projects based on LSLAs. We were then left with the following carbon credit registries: the VCS, GS4GG, Cercarbono, and the Ecosystem Restoration Standard (ERS). In addition to the carbon programmes listed for assessment, we also reviewed the BioCarbon Standard via the Global Carbon Trace registry since it includes multiple projects relevant to our definition (Global CarbonTrace 2025). Lastly, as discussed in Box 1, we also reviewed the CDM registry due to its overlaps with the VCM (UNFCCC 2025).

To identify projects in carbon credit registries that align with our definitions, we reviewed original registry data and built upon existing databases that compile information on offset projects. We first used data last updated in October 2024 from the Voluntary Registry Offsets Database of the Berkeley Carbon Trading Project (Haya et al. 2024), which contains all carbon offset projects listed by the Gold Standard and Verra (VCS). We then used the International Database of REDD+ Projects and Programmes: Linking Economics, Carbon and Communities (ID-RECCO), a free and public database on REDD+ projects (ID-RECCO 2025). The two databases overlap, as many REDD+ projects are registered with the VCS. We also directly reviewed the registries listed in the CCP assessment, including Cercarbono (Cercarbono 2025), and the ERS (ERS 2025).

It is important to note that our data collection process includes caveats. First, some projects did not include sufficient information to assess if the projects were related to a LSLA after the year 2000. Our database therefore always provides a lower bound of the actual extent of LSLAs. The lack of information was most severe for small projects that did not attract international or even national attention. Some large projects also showed significant transparency gaps, particularly grouped projects involving multiple landowners. In these cases, the project descriptions often yielded little information on the size of the individual properties or the acquisition dates. Second, much of our data rely on information provided by the registries. While we supplement project descriptions and monitoring reports with research papers, media coverage, and reports from NGOs—and our RFPs use their local contacts in target countries to verify information—the registry data still play a central role in shaping our dataset. As a result, we may under-report the number of land conflicts or human rights violations associated with these projects. To partially address this limitation, we also conducted primary data collection. Specifically, we complemented the registry data with in-depth field research by Land Matrix partners in three countries to better understand and document the local impacts of carbon offset projects. This included field research on two offset projects in Laos (Geissel et al. 2024), two offset projects in Indonesia (Kubitza, Art, Izzudin, et al. 2025), and one offset project in Madagascar (Grislain and Kubitza 2025).

* This includes ACR, ART TREE, Cercarbono, Global Carbon Council, CAR, ERS, Gold Standard, Isometric, Plan Vivo Foundation, Puro.earth, Riverse, Social Carbon, Wilder Carbon, and VCS as of February 2025.

The total size of carbon offset projects—close to 9 million hectares, as documented in this report—is based on projects that can be clearly identified as LSLAs initiated after 2000. However, transparency is limited for some projects, particularly grouped initiatives, making it difficult to assess whether new land acquisitions have actually taken place. At the same time, negotiations have been entered into for millions of hectares of additional land such as in the case of the Dubai-based investor Blue Carbon, which has signed memoranda of understanding (MoU) or frameworks of collaboration (FOC) with a number of African countries, including Angola, Kenya, Liberia, Tanzania, Zambia, and Zimbabwe, covering an area comparable to the size of Great Britain. Yet, these deals remain highly opaque, and it is unclear whether they will rely on state land—likely state forests—where only carbon

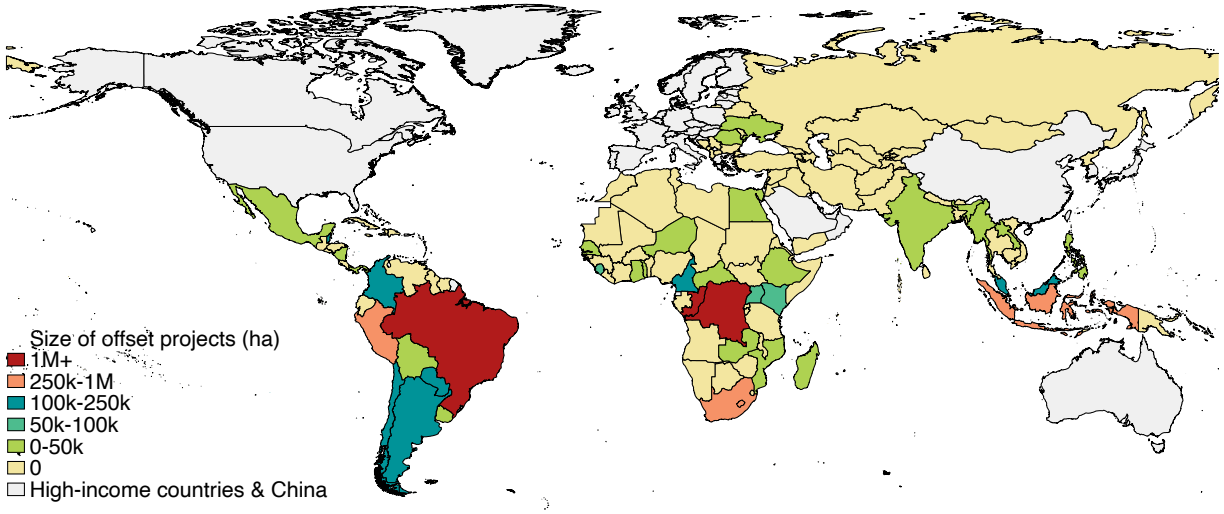
rights are transferred, or whether they will involve leases and concessions that hand investors full territorial control. For this reason, they are not included in the statistics presented in this report (see Box 3 for details on data preparation and biases).[6] Nevertheless, while excluded from our dataset, such oversized investment intentions highlight both the dynamism of the carbon offset market and the looming risk of a dramatic surge in projects. If realised, they could multiply the market's current scale many times over.

It must also be acknowledged that the mechanisms for exerting control over land in the carbon sector are more diverse than in other sectors. While the land areas recorded in this report reflect carbon offset projects involving private-sector acquisitions, many projects—particularly in countries like Cambodia—are implemented through MoU between governments and international NGOs that assign the control over state forest to the NGOs. These arrangements, though not involving formal land transfers, can have significant implications for land rights (see Box 4). This highlights that the carbon sector's impact on land governance extends beyond LSLAs, operating through more subtle but sometimes equally consequential forms of control.

1.2 Emerging hotspots for land acquisitions

The land deals documented in our database for carbon offset projects mostly target a few selected hotspot regions scattered across the globe. Based on contracted land area, as shown in Figure 3, which maps the size and location of these projects, the 10 largest target countries are led by Brazil (2.49 million ha) and the Republic of the Congo (1.79 million ha), with the Democratic Republic of the Congo (DRC) in third position (1.16 million ha). Peru (834,171 ha), South Africa (495,195 ha), Indonesia (435,868 ha), Paraguay (219,253 ha), Colombia (147,194 ha), Chile (145,233 ha), and Belize (145,233 ha) follow. Together, these 10 countries make up close to 90% of the total recorded size of LSLAs for carbon offsets globally.

Figure 3: Map of target countries of LSLAs



Notes: Map is based on concluded deals that are listed in carbon credit registries (n=183).

The map illustrates that carbon offset projects based on LSLAs exhibit a strong regional concentration in tropical and subtropical regions. The largest concentration is found in South America, which hosts over 4 million ha of contracted land. This is closely followed by Central Africa, with approximately 3.1 million ha—mainly driven by large-scale REDD+ projects in countries like the Republic of the Congo and the DRC. Southeast Asia ranks third with over 613,045 ha. In contrast, Western Africa registers moderate engagement, hosting 168,699 ha. The rest of Asia (excluding China) as well as the Middle East and North Africa regions show little activity. These patterns differ considerably to the agricultural LSLAs seen during the global land rush of the late 2000s, most visibly in Central Africa.

[6] Blue Carbon deals include LMI deals #10915, #10738, #10839, #10917, #10473, #10472.

Box 4: Caught in the middle: Local communities and Cambodia's carbon conservation landscape

In Cambodia, forest carbon projects have been expanding across protected areas through a form of quiet, functional land transfer—without any formal acquisition. This mechanism explains why such projects have not been included in the definition of the report (see Box 2). Projects in places like Keo Seima, Southern Cardamom, Lomphat, and Samkos operate through MoU between international NGOs and government ministries, granting conservation actors operational authority over more than a million hectares of state-classified land. While legal ownership remains with the state, these agreements allow project developers to enforce land-use rules, patrol forests, and limit access, effectively shifting decision-making power away from communities and into the hands of intermediaries.

This shift is particularly concerning in forest areas historically stewarded by IPs & LCs under customary tenure. Because much of this land remains untitled, the legal system defaults to classifying it as state property, leaving customary users unrecognised. The REDD+ projects then build their governance regimes on top of this gap. In Southern Cardamom, for instance, Wildlife Alliance oversees ranger teams and implements restrictions across more than 400,000 hectares—without holding land titles, but with full authority over access. In Lomphat, NGO-led patrols similarly enforce conservation rules, often limiting the use of areas that communities previously relied on for foraging, resin collection, and seasonal hunting. These restrictions are introduced despite the absence of formal land transfers, signalling a deeper shift in how forest access is regulated.

Across multiple sites, communities describe a narrowing of their livelihood options. Longstanding practices have become restricted or prohibited, and in some areas, people report being fined or warned for entering zones that had always been part of their daily routines. These changes often occur without sustained dialogue or the meaningful introduction of alternatives. In the early stages of project development, consultations were held to inform communities of the incoming conservation activities. But in most cases, these did not evolve into sustained processes. In Lomphat and Samkos, civil society actors have pointed to the absence of participatory mapping or real opportunities to negotiate boundaries. In Southern Cardamom, communities say that while the conservation rules were explained to them, they were not invited to shape them. Households that migrated later or were not present during the initial consultations often find themselves excluded altogether, raising questions about the inclusiveness and sustainability of consent. Keo Seima stands out as an example where some degree of rights recognition and livelihood support were integrated. Community land claims were supported through titling efforts, and benefit sharing was coupled with agroforestry and organic farming initiatives. But in other sites like Lomphat and Boeung Per, reported benefits remain minimal—mostly small-scale trainings or equipment distributions, with limited transparency around financial flows or the distribution of carbon revenue.

Monitoring also appears uneven. While carbon stocks and biodiversity indicators are routinely tracked, the same attention is not given to the social and governance aspects of these projects. Grievance mechanisms, where they exist, are often internal, informal, or routed through government agencies that are also part of the project's delivery. In Southern Cardamom, for instance, documented grievances rarely reach formal resolution. Worse still, in some cases, enforcement actions have reportedly involved military or police units, with allegations of evictions and property destruction that project developers deny, but which underline the risks when conservation is pursued through coercive means.

These cases point to a growing disconnect between formal ownership and actual control—where land may remain on paper with the state, but in practice is governed by conservation NGOs with limited community oversight. And while some ecological outcomes—like the reappearance of rare species in Lomphat—have been observed, these gains have not always come with protections for customary tenure or guarantees for livelihoods. As carbon finance continues to shape conservation strategies, the experiences in Cambodia offer a cautionary reminder where rights recognition cannot be an afterthought, and livelihoods and access must be central—not incidental—to conservation planning

Box 5: New frontiers of carbon markets? The case of Argentina

Latin America and the Caribbean have seen sustained progress in the implementation of instruments aimed at reducing and offsetting greenhouse gas emissions, both in voluntary and compliance markets. In 2024, the region accounted for 28.3% of the global carbon credits in circulation, making it the second-largest supplier after Asia (Development Bank of Latin America and the Caribbean 2025). However, this supply remains highly concentrated, with more than 90% of the forest carbon credits issued between 2015 and 2023 corresponding to Brazil, Colombia, Guatemala, Mexico, and Peru, indicating limited participation from the rest of the countries in the region (Blanton et al. 2024).

Argentina serves as a particularly illustrative case of low engagement in carbon markets. The country has not yet established a comprehensive national legal framework regulating carbon offset mechanisms, nor has it implemented internal systems that assign explicit value to emissions. According to the Land Matrix database, there are seven large-scale land-based carbon projects in the country, covering 137,327 ha—equivalent to 0.04% of its surface. These projects, which have all started operations on the ground, are situated on privately owned lands. In most cases, access to land occurred through outright purchases, which reinforces long-term territorial control dynamics. All projects are registered under Verra's VCS, although only two are formally registered and authorised to issue credits. The remainder are in the preliminary stages of development or validation.

Despite the limited involvement of Argentina in carbon markets, interest in carbon offsetting mechanisms has increased significantly in recent years. One prominent example is the province of Salta, a region heavily impacted by the expansion of the agricultural frontier. Concurrently, it has gained relevance in national discussions on carbon markets, not only due to its ecological vulnerability but also because of its potential for developing conservation and reforestation initiatives involving native forests. In 2024, the Ministry of Production and Sustainable Development organised the First Provincial Carbon Forum, an event that brought together actors from the public, private, academic, and social sectors to discuss technical, financial, and social guidelines for a transparent and territorially contextualised implementation of offset mechanisms (Salta Gobierno 2024).

The emergence of large-scale, land-based carbon offset projects in Argentina, particularly in provinces with active agricultural frontiers, signals an initial phase of integration into the VCM. Nevertheless, despite having favourable biophysical conditions and technical capacities that could position the country as a relevant regional actor, the limited number of formally accredited projects highlights the need for a coherent, transparent regulatory framework aligned with international standards. However, such a framework would need to guarantee the fair sharing of benefits, respect for land rights, and the effective inclusion of local stakeholders. In this context, and considering the historical pressure on native forests generated by the expansion of the agricultural frontier, a critical question arises: can these initiatives evolve into socially just strategies for forest conservation and restoration, or will they replicate extractive dynamics tied to land appropriation that have long defined the region?

For instance, countries such as the Republic of the Congo and the DRC, which were only marginally affected at that time (with approximately 140,000 ha and 250,000 ha respectively allocated for agricultural production[7]), largely because of their remote forest regions and inadequate infrastructure, have now emerged as central players in the carbon market precisely for these reasons.

Other factors shaping the uneven distribution of offset projects relying on LSLAs across countries, as documented in Figure 3. Some countries, for instance, have yet to develop comprehensive national carbon frameworks. This scenario can be seen in the case of Argentina, for example (see Box 5), which, despite its vast land area, only plays a minor role in the VCM. Some countries have also created political hurdles for project developers, such as in Papua New Guinea where a moratorium on REDD+ VCM projects was issued in 2022 that was only recently lifted (Lang 2025). Similarly, in Madagascar, a decree was enacted in 2021 establishing state ownership over all carbon credits generated within the country. This provision significantly restricted the participation of NGOs and private-sector actors in carbon market activities. It is only since 2025, with the issuing of a new decree, that a wider range of stakeholders—including public and private entities, whether national or foreign—has been allowed to generate, claim ownership of, and trade emission reductions, provided they meet certain conditions (Grislain 2025).[8]

[7] LMI data as of 22.04.2025 using the default filter and all deals with agriculture as intention of investment (except unspecified agriculture).
[8] In response to mounting concerns, the Malagasy government launched a reform process in late 2024 to revise this regulatory framework. This effort culminated in the adoption of Decree No. 2025-626 on June 6, 2025, which substantially broadens access to the forest carbon market. This regulatory shift opens new avenues for participation in carbon credit initiatives and is expected to stimulate growth in carbon offset projects across Madagascar.

There are also specific drivers that have enabled LSLAs for carbon offsetting in certain countries. First, the ecological potential for nature-based solutions—such as forest cover—matters, as REDD+ projects are more easily established in countries with abundant forest resources. Second, domestic compliance policies in some countries drive demand for carbon credits, which in turn stimulates supply. Third, countries offer different entry points for carbon offset projects, either by facilitating land acquisition or by repurposing existing land deals. Finally, in countries where customary tenure is weakly recognised, project proponents are often able to secure access to large areas of land that may appear unoccupied for development. Below, we provide examples of three countries across three continents to illustrate these drivers.

The DRC is home to Africa's largest primeval forest, covering about 150 million ha (Forest Carbon Partnership Facility 2025). All land in the country is state-owned, with the government granting either perpetual or ordinary concessions. To date, the Land Matrix has recorded about 14 million hectares of concessions in the DRC, including 13 million ha of logging concessions, with carbon offset projects gaining prominence on 1.16 million ha. Significantly, carbon rights in the country are governed by the same legal framework as forest concessions, allowing for relatively easy conversion of logging concessions into conservation concessions for REDD+ implementation (Nhantumbo and Samndong 2013). For instance, in 2009, 348,000 ha of land held by Safbois/Jadora for logging were repurposed for carbon sequestration (Deal #3214). In 2018, 300,000 ha of land held by Somicongo for logging were also repurposed for carbon sequestration (Deal #8906). Lastly, the Portuguese-owned company Norsudtimber, linked to 13 recorded deals[9], may also be in the process of converting part of its timber concessions into carbon offset projects without a transparent process (Pallares 2022).

In Asia, Indonesia stands out as a primary target for carbon offset-based LSLAs. This trend is largely driven by the country's existing concession system, which has already opened the door for the expansion of sectors such as palm oil. A significant portion of these deals are managed through Ecosystem Restoration Concessions (ERCs). Established in 2004, ERCs grant holders the right to restore former production forests and generate revenue from carbon credits, non-timber products, and ecosystem services such as biodiversity protection and ecotourism (Buergin 2016).[10] This regulatory framework which facilitates LSLAs is also reflected in the types of offset projects implemented. In all reviewed registries, we identified 20 land-based carbon offset projects, covering just over one million ha in total. A large share of these projects (eight in total) has relied on LSLAs to access land, covering about half of the total size (Kubitza, Art, Bourgoin, et al. 2025). In contrast, projects based on community land tend to be smaller and fewer in number, reflecting the inadequate legal recognition of community land rights in many regions of Indonesia, which limits the potential for offset projects on community land (Rights and Resources Initiative 2023).

In Latin America, Colombia stands out as a hotspot in terms of number of LSLAs, with 19 concluded deals recorded, covering 147,194 ha. However, these deals are mostly small in size and often relate to reforestation or afforestation projects. Moreover, while Colombia has large areas of rainforest, most large-scale avoided-deforestation projects are located within legally recognised territories of Indigenous Peoples and therefore do not qualify as LSLAs. Nevertheless, private sector actors have heavily engaged in carbon removal projects, driven by domestic policies in the country, such as the national carbon tax on emissions released from fuel combustion, implemented in 2017. The tax must be paid by producers and importers of liquid fossil fuels, although they are also allowed to use carbon offsets instead (Carvalho et al. 2022). With several other countries following a similar path, this could increase future demand in the region. For instance, in 2023, Chile introduced a mechanism that allows companies to reduce their carbon tax liabilities by using credits generated from specified methodologies under the CDM, VCS, and GS4GG. Brazil is also in the process of drafting a framework that would leverage existing VCM standards (World Bank 2024).

[9] These include the following deals: #4979, #5018, #5238, #5225, #5229, #5231, #5232, #5233, #5236, #5240, #5248, #8478, #8479.
[10] Other concession schemes that allow carbon offsetting also exist, including the Industrial Plantation Forest (HTI) scheme or Environmental Service Business Permission in Protected Forest (IUPJL-HL). To further streamline carbon-specific initiatives, Indonesia introduced an additional forest license in 2009 for carbon sequestration and storage.

2

New players in the field: Project developers and certification bodies

Land-intensive investments in LMICs have always been a global business, with high-income countries mobilising capital to invest in target countries—usually labelled, often misleadingly, as land-abundant. During the scramble for agricultural land in the late 2000s, actors from countries like the Netherlands, United Kingdom (UK), and United States of America were frequently among the top-ten investor countries (Lay et al. 2021). Today, the structure of the VCM is likewise characterised by the involvement of global actors predominantly based in high-income countries, including international project developers, buyers, and a small number of presiding international carbon standards, reviving narratives rooted in colonial histories (Borras Jr. et al. 2011). Similar to other land-based investments, this structure has made carbon offset projects a hotly contested issue within broader debates on just transitions. Adding to the complexity is the role of LSLAs, which introduce another layer of socio-political and ethical challenges in cases where capital and knowledge from high-income countries contribute to violations of the land rights of Indigenous Peoples and local communities (IPs & LCs)—violations which are often insufficiently prevented and mitigated by the provisions of carbon standards. The following section further discusses and explains the role of international companies and carbon standards within the enterprise of carbon offsetting.

2.1 Global origins of diverse investors and developers

The distinct but interconnected roles in establishing and managing carbon offsetting projects are played by a range of actors, from the landowners themselves to the project developers and operating companies. While landowners hold the legal rights to the land—whether through purchase, concession, or lease—and may grant project rights to other parties, the operating companies, as defined in the Land Matrix database, are typically responsible for implementing and managing projects on the ground.[11] Project developers, on the other hand, are responsible for designing projects and ensuring compliance with carbon standards,[12] although they often take on the operational role as well or even acquire land ownership, thereby combining functions across domains.[13]

The methodological challenges associated with implementing carbon offset projects necessitate the involvement of specialised carbon offset project developers in LMICs. For example, in Indonesia, international developers play a key role by bringing in expertise, funding, and global partnerships, with Forest Carbon (Singapore), InfiniteEARTH (China), and YL Forest Co., Ltd. (Japan) actively involved in major carbon offset deals, working alongside local Indonesian companies (Deals #10888, #10568, #10906). Similarly, in Madagascar, Canopy Energies SAS, based in France, obtained a 35-year emphyteutic land lease for reforestation (Deal #10636) and in Colombia, NatureRe Capital AG, based in Switzerland, is driving forward a number of projects (Deals #10602, #11273). Meanwhile, EcoPlanet Bamboo Group, a company focusing on the industrialisation of bamboo as a viable and environmentally attractive alternative fibre that is based in the United States, is involved in seven deals, reaching all the way from Ghana (Deal #10362) and South Africa (Deal #10860) in Africa, to the Philippines (Deal #11063) in Asia. Although new specialised companies started to become involved in land acquisitions in LMICs, some actors are already well-versed in the practice of LSLAs within other sectors such as agriculture and forestry. For instance, while Zambian company Sable Transport Limited (Investor #38423) has been producing various food crops in the country for more than a decade based on LSLAs[14], it is also now involved in the RuConserve project, Zambia's first VCS-verified REDD+ project, acquiring about 40,000 ha of land in 2001 to do so (Manda and Mukanda 2023).

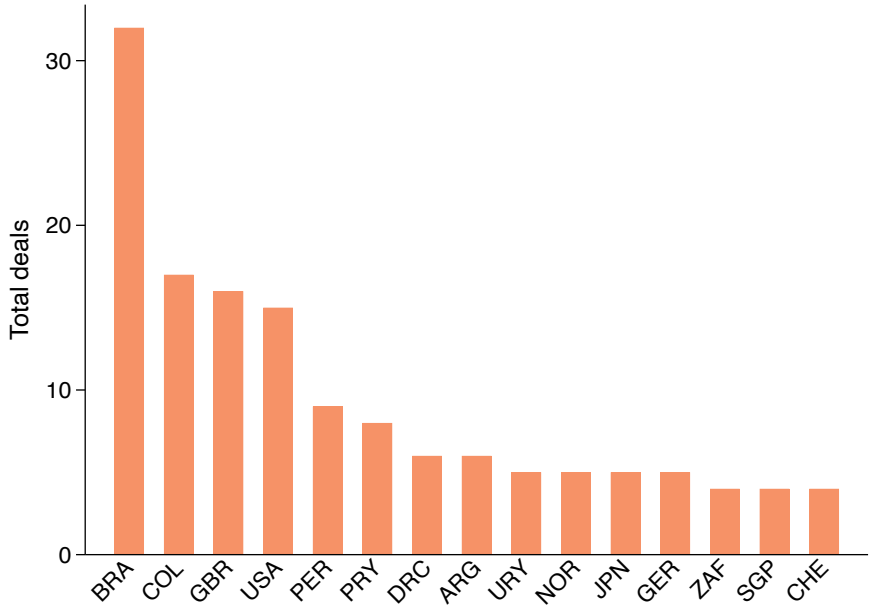
Aside from domestic actors, large international conglomerates that have been involved in numerous agricultural LSLAs in the past, such as Olam International Ltd., are also involved in one of the largest carbon offset deals in the Republic of the Congo, with about half a million ha (Deal #3795) via Congolaise Industrielle des Bois SA, a forestry company. Unsurprisingly, forestry companies are prominent in the offset sector since they already have ample expertise in forest management and hence hold

[11] In some cases, the landowners are also the final buyers of the carbon credits that are used to compensate for their global operations. See the cases of Novartis (Deal #11195) or Ritter Sport (Deal #5883).
[12] The term project proponents refers to entities that support the project in various capacities. Aside from landowners and project developers, this could also include third-party investors or other organisations supporting the project, such as a conservation NGO.
[13] Deal #10681 serves as an example where the project developer is also the operating company, while the concession rights are held by another local company. In Deal #10636, a France-based project developer has secured a 35-year lease from the state and is directly responsible for implementing the project.
[14] For example, Deal #4365 and Deal #7150.

a comparative advantage. This includes, for example, Asia Pacific Resources International Holdings Limited, a subsidiary of Royal Golden Eagle, based in Singapore, which is involved in multiple LSLAs related to forestry but has also established the Riau Ecosystem Restoration Carbon Project in Indonesia (Deal #10681).

As revealed in Figure 4, these different players are linked to a diverse set of international and domestic actors. In the figure, which depicts the distribution of land deals for carbon offsetting using the country of origin of the top parent companies of the operating companies—specifically, the countries where the parent companies are registered[15], Brazil ranks first with 32 deals, highlighting its role as a hotspot for carbon offset projects. Colombia and the UK follow, with 17 and 16 deals, respectively. Interestingly, Colombian companies are fairly unique in that they work mostly within their own country. The United States, Peru, and Paraguay also show notable activity, with 15, 9, and 8 deals, respectively. Contributing less but still significantly, Argentina, the DRC, Germany, Japan, Norway, Singapore, South Africa, Switzerland, and Uruguay have between 4 and 6 deals each. This distribution reflects a geographically diverse set of investor countries, with clear leadership from Global South nations like Brazil and Colombia due to the prominent role of carbon offset projects within these countries, as well as strong involvement from Europe and North America—underscoring that the supply of carbon credits from the Global South is far from a local endeavour; it is a global business involving multiple countries.

Figure 4: Country of origin of the investors and carbon offset project developers



Notes: Some deals can have more than one ultimate owner and can hence be listed more than once. Figure is based on all carbon offset-related land deals at different stages of implementation (n=217).

[15] We define the operating company as the entity responsible for the practical implementation of the project, including activities such as organising and funding forest conservation patrols or carrying out reforestation efforts. Given that company ownership structures are often complex, verifying the country of origin of investors is not straightforward. Where registration details are unavailable, we instead list the countries where the companies' headquarters are located as investor countries. While we endeavour to account for the complex (and often opaque) structures of investor chains—where multiple intermediary companies are typically registered in various locations—reliable information on these chains is extremely difficult to obtain. For this reason, we do not incorporate such information in this report. However, for selected deals, this information is available on our website: https://landmatrix.org/list/investors. A further issue arises when dealing with investments involving multiple investors. In such cases, the entire size of each deal is attributed to the country of origin of every international investor involved. This approach is used to reflect each country's total involvement in LSLAs. As a result, some double-counting may occur, leading to a higher number of reported deals and a larger total area than the number of unique deals would suggest.

Taking a step back, it is important to point out that while the vast majority of actors supplying carbon credits are from the private sector, this is not the case in every country. This is evident in an analysis in which we categorised the project proponents of land-based carbon offset projects regardless of the practice of LSLAs for both Indonesia and Madagascar.[16] Although, as Table 1 illustrates, the private sector does indeed play a dominant role in the implementation of land-based carbon offsetting initiatives in Indonesia, with about 90% of the total area of land-based carbon offsetting related to private sector activities, this pattern does not hold for Madagascar, where the private sector's role is more limited. Rather, carbon credits are a major income source to fund the management of conservation areas through large international NGOs (Brimont and Leroy 2018), a practice also common in other countries. Typically, these initiatives are implemented on state-owned land under long-term agreements with the international NGOs, such as the Makira Forest Protected Area project, which alone covers more than 350,000 ha and is listed in Verra's VCS registry (Bidaud 2012). In addition to these large-scale projects, NGOs have also begun implementing reforestation and wetland restoration initiatives designed not only to generate environmental co-benefits, but to produce tangible revenues through benefit-sharing mechanisms as well (Grislain and Kubitza 2025). The model of a farmer-based project that engages communities and uses farmers' land to implement a carbon offset project in Madagascar is described in detail in Box 6.

Table 1: Area of land-based offset projects by type of project proponent and LSLA status

Total area of land-based carbon offset projects (ha)	Indonesia	Madagascar
With private-sector involvement only	921,560	17,550
With NGO or state involvement	127,889	876,476
Based on LSLA (after 2000)	474,433	11,550
Not based on LSLA	575,016	882,476

Notes: Data include land-based offset projects established using leases, concessions, or purchases (LSLAs) and on projects established on state or community land without any land transfer.

The dominance of different actors also helps explain the distribution of LSLAs for carbon offsetting across countries, as cases where NGOs actually acquire land remain rare. For instance, similar to Madagascar, most forest carbon projects in Cambodia are led by international NGOs that do not purchase land but instead exercise de facto control over extensive tracts of state-owned forests. Through MoU with government ministries, these NGOs secure operational authority to enforce land-use restrictions, patrol protected areas, and regulate access—despite lacking formal land titles (see Box 4).

2.2 A handful of standards rule global carbon markets

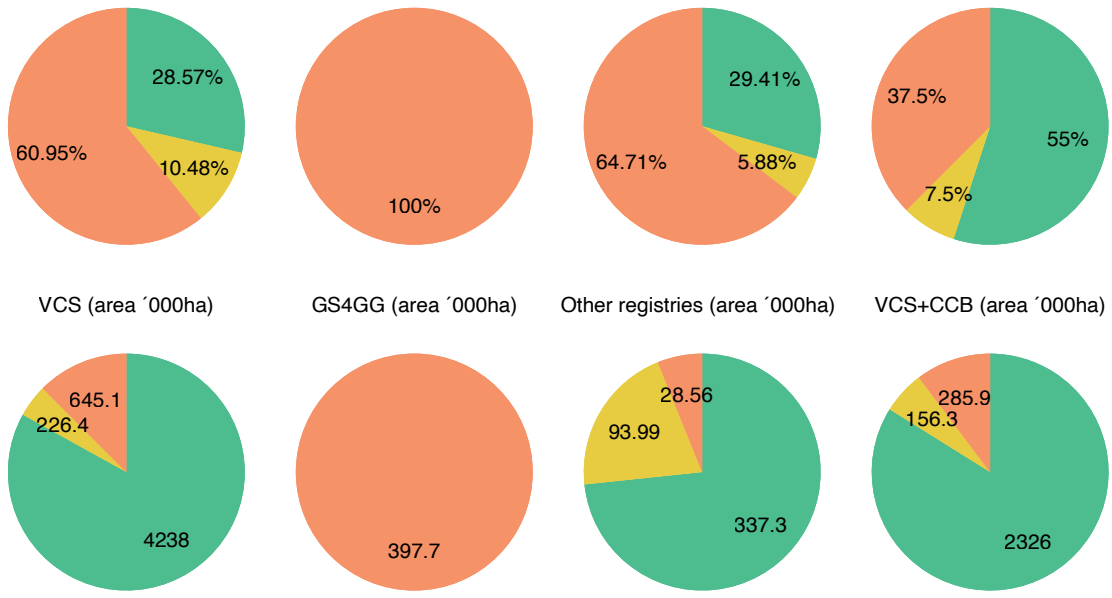
The LSLAs we documented for carbon offset projects operate under a small set of carbon standards that define methodologies for estimating emission reductions and establish social and environmental safeguards. As illustrated in Figure 5, which shows the number and land area of these projects grouped by certification standard, with nearly 8 million ha, the VCS accounts for more than 90% of the total project area. Of this, only 2.75 million ha are covered with the additional CCB standard. While reforestation constitutes the majority of VCS projects (61%), avoided deforestation represents the largest share of land area (over 4.2 million ha), as these projects tend to be larger in scale. By contrast, GS4GG projects exclusively involve reforestation or afforestation, covering 398,000 ha. Other registries represent only a small share of land area and project numbers, with a few large initiatives—primarily focused on improved forest management—dominating within this category.

[16] In case of involvement of both NGOs and private sector actors in one project, we coded the projects as NGO or state project.

Box 6: Carbon schemes with smallholders: Different routes to carbon credits?

Across the globe, offset projects with farmers and local communities are developed based on their existing land rights, in contrast to projects reliant on LSLAs. One example of such a project is the TERAKA initiative in Madagascar—a community reforestation programme certified under the VCS and CCB standards—where the Land Matrix team conducted in-depth field research. The project began its first activities in October 2023 and is funded by iTERAKA, a French mission-led company dedicated to developing environmental projects based on payments for environmental services (PES). The TERAKA programme is modelled on the International Small Group and Tree Planting Programme (TIST), an agroforestry PES scheme that has been operating for over twenty years in various other countries. The ambition of the TERAKA project is to replicate the TIST model in Madagascar, enabling small groups of farmers to derive multiple and sustainable benefits from planting trees while enhancing their agricultural skills and leadership capacities. Following the TIST model, the carbon captured and stored by trees planted by smallholder farmers on their land is quantified and traded on carbon markets. Unlike other carbon offset projects in the country that seek direct access to land, the TERAKA project does not aim to acquire land within its intervention areas. Farmers independently decide whether, where, and how to plant trees, adapt their farming methods, source their own seeds and seedlings, and retain full ownership of their trees (including the right to harvest timber, fuelwood, fruits, leaves, etc.) and land. The project does not aim to create jobs or provide supplementary services such as building schools or rehabilitating roads, but does emphasise knowledge-sharing and training. This includes training in planting techniques, in particular agroforestry, water management, improved stove use, and integrated agriculture-livestock systems. In addition, the project seeks to ensure the fair distribution of revenues from the sale of carbon credits and to foster positive environmental and landscape outcomes through community-led reforestation efforts (Grislain 2025). While these projects also face challenges, their emphasis on participation and benefit sharing places them in stark contrast to many of the offset projects documented in this report.

Figure 5: Relevance of certification standards for carbon offset projects based on LSLAs



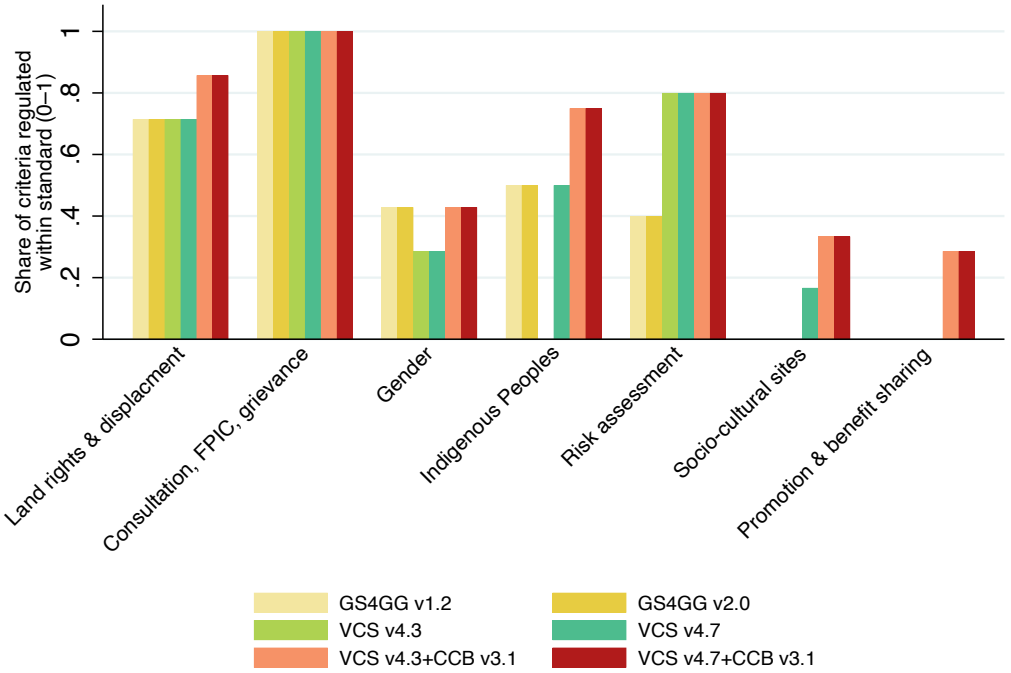
Notes: Avoided-deforestation projects encompass all those that report using REDD methodologies. However, it should be noted that many REDD projects also incorporate other approaches, such as reforestation or wetland restoration. "Other methods" refer to projects that do not use REDD or afforestation and reforestations (ARR) methodologies but are instead based on alternative practices—such as wetland restoration and conservation, improved forest management, or sustainable grassland management. Figure is based on concluded deals that are listed in carbon credit registries (n=183).

Moreover, these smaller registries only play a role for the practice of LSLAs in specific regions. In Colombia, for instance, most land-based carbon offset projects are not recorded in the prominent registries of Verra's VCS or the GS4GG, but rather in lesser-known registries such as Cercarbono and the BioCarbon Registry.[17] In addition, even though several other standards also exist, they are of limited relevance to the projects we reviewed. For example, despite Plan Vivo being active across the Global South, it has so far mainly focused on community-based initiatives. Other major registries, such as the ACR, CAR, and the Australian Carbon Credit Unit (ACCU) Scheme, have not played a significant role in land-based carbon offset projects in LMICs.[18] Furthermore, emerging standards such as Art Trees are applied at the jurisdictional scale, involving national governments and large subnational jurisdictions (ART TREES 2025).

2.3 The regulatory scope of carbon standards

Although only a few dominant standards define the safeguards for land-based carbon offsetting, they nevertheless have substantial potential to shape the socioeconomic impacts of land acquisitions for carbon offsetting. To examine this potential, we conducted a systematic review of the leading carbon standards, basing the data and methodology on Kubitza, Art, Bourgoin, et al. (2025). Box 7 summarises the methodological approach used to assess how these standards regulate community interactions, while Figure 6 presents the main findings. Our review focused on the VCS and GS4GG, covering both earlier versions relevant to many documented projects (VCS v4.3, GS4GG v1.2) and their most recent updates in 2024 (VCS v4.7, GS4GG v2.0), but also included the CCB standard (v3.1).

Figure 6: Regulatory scope of certification standards in carbon markets



Notes: Graph is based on data from Kubitza, Art, Bourgoin, et al. (2025).

[17] These niche registries often demonstrate issues concerning their integrity. This was particularly evident in the controversies surrounding fraudulent deals, where accusations were met with limited accountability (McCoy, Ledur, and Dias 2024). In addition, as at the beginning of 2025, many of these smaller carbon crediting programmes had not been deemed eligible for the Core Carbon Principles (ICVCM 2025) and it is questionable if these standards comply with many of the global frameworks that were developed to regulate land-based investments.
[18] Outside of North America, there are a few ACR projects, but all are inactive or cancelled. The CAR has several projects related to improved forest management in Mexico. A scoping exercise suggests that the majority of the 371 projects (regardless of land tenure category) are not LSLAs. Most projects are on Ejido lands, which were allocated by the government for peasants or on recognised Indigenous lands.

Box 7: Assessing the regulatory scope of carbon offset standards

To analyse the regulatory frameworks of the registered carbon offset projects, we used the Standard Map application of the International Trade Centre (International Trade Centre 2024). The Standard Map application encompasses standards across key areas such as environmental protection, labour and workers' rights, economic development, business ethics, and carbon offsetting. In addition, the application features a comprehensive set of regulatory criteria that may be covered by each standard. Drawing on this database, we developed a targeted framework of criteria specifically relevant to assessing the on-the-ground impacts of carbon offset standards on local communities.

We focused on criteria related to land rights, consultations, Indigenous People, socio-cultural sites, and benefit sharing, in total selecting 40 criteria. This included, for example, criteria such as if the standard included requirements relating to Indigenous Peoples as defined in ILO convention 169 or the general requirement on grievance mechanisms for affected communities. Although the Standard Map application indicates if a standard provides guidance on a given criterion, to verify and update this, we independently reviewed the latest versions of the VCS, GS4GG, and CCB (v3.1) standards, comparing their principles to Standard Map's criteria. We examined VCS v4.3 and GS4GG v1.2 (used in Standard Map data) alongside the 2024 updates (VCS v4.7, GS4GG v2.0), assessing revisions made in response to the credibility crisis and CCP (Gold Standard 2019, 2024; Verra 2017, 2022, 2024a). This was also crucial since many projects were registered under older versions. We then grouped the criteria within the different categories presented in Figure 6, such as community engagement and socio-cultural sites.

Figure 6 compares how carbon standards address local community-related criteria, grouped into seven categories: land rights and displacement; gender; consultation/Free, Prior, and Informed Consent (FPIC)/grievance; Indigenous Peoples; promotion and benefit sharing; socio-cultural sites; and risk assessment. As both the VCS and GS4GG require project developers to identify formal and customary access and usage rights to land and, where feasible, to implement measures to secure those rights, they perform reasonably well in the land rights category. However, neither provides concrete requirements on key issues, such as women's land ownership, which results in their incomplete coverage. In addition, since the identification and mapping of customary land rights cannot be verified via the project description and monitoring reports, the extent to which these procedures are put into practice remains questionable. Likewise, while the coverage for consultation/FPIC/grievance is also high, with the VCS, GS4GG, and the VCS combined with the CCB standard all providing provisions on consultation, FPIC, and grievance redress mechanisms, a closer examination of the VCS documents shows that its requirements for consultation and FPIC are relatively weak. For instance, the standard lacks provisions for regular consultations and broader and inclusive stakeholder participation in FPIC processes, and it does not grant affected communities meaningful procedural power.

Across all standards, gender-related criteria are limited. Some provisions are understandably outside the scope of carbon standards—such as measures to improve wages or status in traditionally female-dominated sectors—but even basic requirements, such as the inclusion of women in stakeholder engagement, are absent from the VCS. Beyond gender, earlier versions of the VCS (v4.3) also lacked explicit requirements for engaging with Indigenous Peoples, including any reference to the International Labour Organisation (ILO) Convention 169 on Indigenous and Tribal People. Although later versions have introduced modest improvements, critical gaps remain, such as the absence of requirements for establishing codes of conduct when working with local and Indigenous communities. In terms of risk assessments for potential adverse impacts on affected communities, the VCS contains a reasonable number of safeguards, while the GS4GG performs slightly worse. By contrast, requirements relating to the protection of socio-cultural sites are sparse across all standards, with the CCB standard offering the strongest provisions in this area.

The largest gap, however, can be seen in the community promotion and benefit sharing category, which has few requirements across all standards, despite its significance for local livelihoods. Despite the VCS promoting benefit sharing—framed under sustainable development contributions and net positive community impacts—its requirements are limited. For example, it specifies that project developers must implement benefit-sharing arrangements if the property rights of stakeholders are impacted, yet the review of project descriptions suggests that project developers mostly only consider statutory property rights—leaving communities with customary land rights excluded from benefit sharing. This mechanism also excludes and limits the potential for meaningful

benefit sharing in contexts where land is state-owned or leased to private companies under concession agreements, as is the case in most projects in countries with state-owned forest. In such cases, neighbouring communities who may live adjacent to or be directly impacted by the project are often excluded from formal benefit-sharing arrangements, despite bearing the social and environmental consequences. In addition, the provision offers little guidance on how these arrangements should be implemented in practice, leaving the contractual details such as the share of benefits at the discretion of the project developers. Similarly, the CCB standard requires a description of a benefit-sharing mechanism only as an optional criterion to showcase exceptional community benefits (Healy et al. 2023).

Overall, all standards remain vague on broader support for local economic development or community investments through benefit-sharing arrangements. Importantly, none of the standards applicable to the documented projects establish a minimum threshold for the benefits that must be shared. As a result, the extent of benefit sharing in many VCS projects is largely determined by the project developers' own policies and agreements with local stakeholders. In contrast, other more progressive standards such as the Plan Vivo standard requires that all income from the sale of Plan Vivo Certificates be distributed according to an agreed benefit sharing mechanism, developed in partnership with project participants. The standard document further notes that at least 60% of net income must directly benefit project participants and other local stakeholders.

Reflecting on past experiences with land acquisitions in the Global South, the question remains whether these standards make climate mitigation projects stand apart from other land-based investments. Examining a comprehensive review conducted by Sonderegger et al. (2022) of the requirements of 100 agricultural voluntary sustainability standards (VSS), with a focus on spillover effects of agricultural land use, it is apparent that socio-economic spillover processes are not comprehensively addressed in agricultural VSS either. In terms of specific impacts on local communities, including requirements regarding land rights and titles as well as socio-cultural sites, among others, 15% of agricultural VSS revealed no coverage of any of these topics and 56% had low coverage. In addition, agricultural VSS only regulate community engagement issues such as consultation and FPIC to a relatively limited extent, and 34% of VSS do not cover these topics at all. Nevertheless, the results in Figure 6 on carbon offset standards show a potentially different tendency, as community engagement is addressed in all of the reviewed standards. Since most large-scale agricultural projects do not adhere to any VSS and the ones that are certified by VSS are often subject to more limited regulatory oversight, carbon offset projects could, at least in theory, follow a different trajectory than the agricultural investments that emerged during the global land rush of the late 2000s. In addition, mission-driven project developers could go beyond the requirements of the dominant carbon standards. Still, carbon standards fail to set clear minimum requirements, falling short in supplying comprehensive provisions on consultations, FPIC, and benefit sharing.

3

Can land-based carbon offsets deliver on rural development?

Certification bodies, project developers, and, at times, national governments promote a narrative of a just climate transition, suggesting that climate mitigation investments can deliver environmental, economic, and social benefits (Valiergue & Ehrenstein 2023; Malkamäki et al. 2018). However, along with the regulatory framework for carbon offsets remaining ambiguous, the realities on the ground are also highly contested. Apart from the climate benefits being called into question (West et al. 2023), our data show that carbon offset projects have undoubtedly contributed to land concentration through the close to 9 million ha of large-scale purchases, concessions, and leases. This trend poses significant economic and social risks, given that land concentration is closely linked to broader inequalities in wealth, gender, and health—contradicting both global and national development goals (Anseeuw and Baldinelli 2020). The extensive land demand of carbon offset projects also raises potential trade-offs with other critical development priorities, including food, water, and energy security (Smith et al. 2016), and creates substantial risks for communities that depend on customary land tenure systems (Rincón Barajas, Kubitza, and Lay 2024).

While the history of carbon offsetting in the Global South already includes severe human rights violations and studies have highlighted the substantial risks of land conflicts (Carbon Market Watch 2023; Friess 2024; GRAIN 2024; Human Rights Watch 2024; Dooley et al. 2022), there is also evidence that well-designed carbon offset projects can deliver meaningful co-benefits to local communities, particularly when community engagement is prioritised. For instance, Robinson et al. (2016) highlight how Indigenous communities in Australia have experienced social and cultural gains when actively involved in carbon initiatives. Similarly, a long-term study of a project in an Indigenous Panamanian community documents increased income diversification and a lasting shift in attitudes toward reforestation, with benefits that persisted even after the project ended (Shinbrot et al. 2022). At the same time, evidence from Herr et al. (2019) shows that private sector-led projects can generate significant long-term benefits. Across both private-led and community-led initiatives in India, Indonesia, Kenya, and Madagascar, the study found improvements in various indicators on household and community well-being. However, Herr et al. (2019) also highlight that these benefits were not without challenges. Social tensions emerged in three of the four projects studied, including two private sector-led cases. These tensions were linked to the unequal distribution of opportunity costs, as well as increased land speculation and in-migration within project areas. A recent literature review further casts doubt on the promises of REDD+ projects, pointing to only modest average gains in material welfare (Wunder et al. 2024). Adding to this ambiguous evidence, we analyse the available evidence in our database on the local effects of LSLAs for carbon offsetting, focusing on land conflicts, job creation, and benefit sharing.

3.1 Still struggling for land: Different places, different scales

The strong presence of carbon offset deals in countries where weak land governance systems prevail (see Figure 3), combined with the historical experience of LSLAs, already raises serious concerns about the risk of escalating land conflicts, as substantiated by extensive case study evidence. In some instances, conflicts are only indirectly linked to rising land demand driven by carbon markets—for example, in the case of the Ogiek people in Kenya, where credible claims suggest that the government is evicting communities from their ancestral lands in anticipation of future carbon offsetting schemes (Hennings and Baquero 2024). In other cases, carbon offset projects can be directly tied to land-related disputes. One prominent example is TotalEnergies' investment in the Republic of Congo, where local communities lost access to land essential for their livelihoods (Deal #9769).[19] Similarly, in Malaysia, communities in Sarawak have protested against a project by Samling Global—a Malaysia-based multinational forestry company—due to encroachment on their territories and the inadequate implementation of FPIC procedures (Deal #10956).

The Land Matrix also recorded land deals in which despite logging concessions having been converted into carbon offset projects, longstanding land conflicts remained unresolved and consultation processes were limited. For instance, in the case of land held by Safbois/Jadora for logging in the DRC that was repurposed for carbon

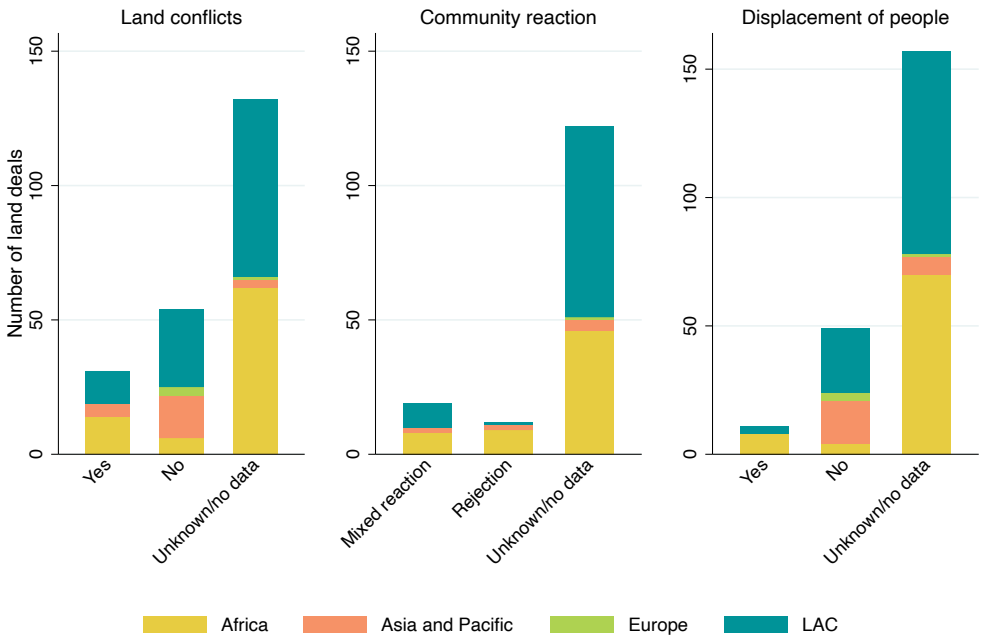
[19] The exact number of affected individuals remains unclear. A preliminary survey by the Congolese civil society organization Justice and Peace Commission identified 160 affected individuals, though other report estimates that the grabbed land was cultivated by over 400 people. There are, however, signs that TotalEnergies is quietly abandoning the project.

sequestration (Deal #3214), the concession still overlaps with customary territories, causing continuing disputes over benefit sharing and compensations. Likewise, NGO reports on a logging concession held by Somicongo in the DRC that was converted into a carbon project suggest that the consultation process was inadequate, even in this more recent case (Deal #8906). In Uganda, another land deal illustrates how an investor attained control of the property several years prior to the certification of carbon standard, yet neither the initial acquisition nor the subsequent certification process applied the principle of FPIC, leading to documented local opposition—facts that are absent from the official project description (Deal #3020). However, not all cases involve overt land conflicts. In Brazil, for example, private companies attempted to secure large tracts of tropical forest for carbon projects, but their claims were legally questionable and ultimately challenged by the state (Deal #11178 and Deal #11186).

Other projects, by contrast, show little sign of conflict with state entities or communities. This may reflect two dynamics: in some cases, carbon projects are implemented in remote areas where local communities face severe power asymmetries and lack the means to mobilise opposition; in others, the relative abundance of land in sparsely populated regions may reduce the risk of disputes. In Indonesia, for instance, local communities reported no land conflicts in two projects reviewed by Land Matrix partner organisations, despite their combined size exceeding 20,000 ha. Each project, however, had only one or two major villages nearby (Deal #10888 and Deal #10906).

Figure 7 presents conflict data across all offset projects included in our database, beyond the reported cases. It is important to note that, while the figure should be interpreted with caution, given the substantial number of deals for which no data are available, among the land deals with reported conflicts, Africa nevertheless accounts for the highest number. This is followed fairly closely by Latin America and the Caribbean (LAC), indicating that these regions experience comparatively more reported incidents. In terms of community reaction, we observe that outright rejections are rarely reported. Yet, they are again more frequently observed in Africa than in other regions. Reported cases of displacement are generally low, but some incidents are still documented in Africa, suggesting that while displacement is not widespread, it is not absent either. Across all three indicators—conflicts, rejections, and displacements—Europe and Asia report fewer cases, which reflects a lower incidence of adverse outcomes, but also fewer reported deals. Overall, Africa shows the highest involvement in land deals associated with negative social outcomes, followed by LAC. Notwithstanding that these regional patterns must be interpreted with care, the data clearly demonstrates that land conflicts do occur in carbon offset projects—and that neither the adoption of carbon standards nor the geographic location of projects appears sufficient to prevent such conflicts entirely.

Figure 7: Number of conflicts in offset projects based on Land Matrix data



Notes: Figure is based on all carbon offset related land deals at different stages of implementation (n=217).

To understand the effects of carbon offset deals on land conflicts, it is important to highlight their often remote locations compared to other rural investment projects. Table 2 compares the location of LSLAs for carbon offsetting to agricultural LSLAs based on population density (WorldPop 2025) and night lights (Chen et al. 2024). Examining the buffer zones around the deals using 1 km and 10 km thresholds, we can see that, overall, offset projects tend to be located in more sparsely and less developed areas with lower night light intensity compared to agricultural deals. Avoided deforestation projects, in particular, are concentrated in very remote areas, with notably low population density (mean of just 5 people/km² in the 1 km buffer) and minimal night light intensity—a clear marker of isolation. Reforestation/afforestation projects, by contrast, are found in more populated regions, though still less populated than agricultural deals in terms of the mean value, indicating they are slightly less embedded in human-dominated landscapes. Conversely, the median shows the opposite pattern for agricultural deals, suggesting more extreme and higher values. This is not unreasonable, however, given that some agricultural deals might be located near urban centres to ensure proximity to markets and infrastructure.

Still, carbon deals, especially avoided deforestation projects, tend to take place in more remote regions and could therefore disproportionately affect vulnerable population groups living in these areas of the target countries. Moreover, due to their geographic isolation, these communities could face significant challenges in raising awareness of their grievances at national or international levels, often compounded by the absence of local or regional platforms to amplify their concerns. Furthermore, secure land titles are typically even scarcer in remote regions than in peri-urban areas (Byamugisha and Dubosse 2023), potentially heightening the risk of land rights violations, even if fewer people are directly impacted. It should also be noted that land conflicts are not the only potential adverse impact of these projects. Studies have documented social conflicts in REDD+ projects due to elite capture and the unequal distribution of benefits, for example (Schmid and Castro Osorio 2025).

Table 2: Population density and night light intensity of deals' buffer zones

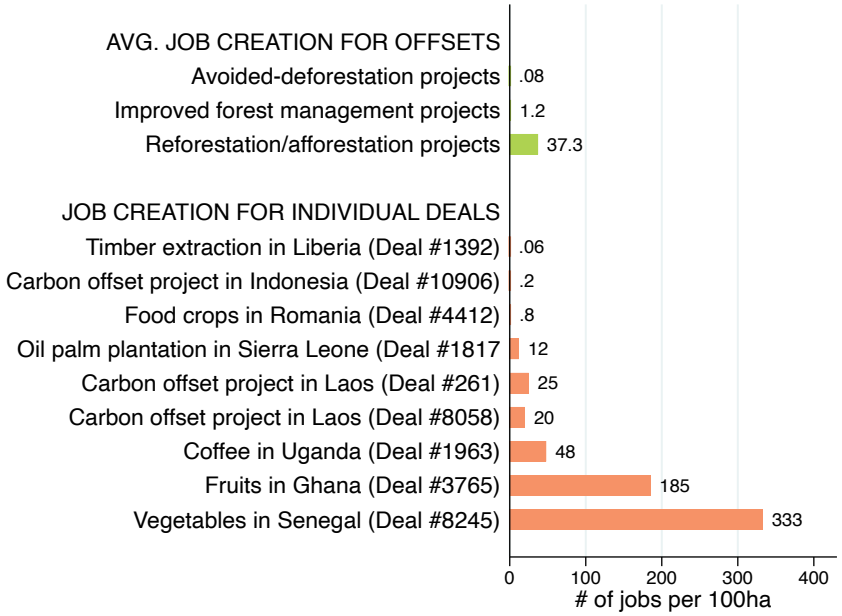
	Obs.	Mean	Median
Registered carbon deals			
Population density (1km buffer)	106	34.08	4.556
Population density (10km buffer)	106	45.332	8.122
Night light intensity (1km buffer)	106	0.422	0.35
Night light intensity (10km buffer)	106	0.421	0.364
Registered carbon deals: Avoided deforestation			
Population density (1km buffer)	44	5.376	1.382
Population density (10km buffer)	44	7.572	1.85
Night light intensity (1km buffer)	44	0.325	0.316
Night light intensity (10km buffer)	44	0.325	0.319
Registered carbon deals: Reforestation/afforestation			
Population density (1km buffer)	55	34.683	24.278
Population density (10km buffer)	55	55.26	28.507
Night light intensity (1km buffer)	55	0.422	0.396
Night light intensity (10km buffer)	55	0.46	0.42
Agricultural deals			
Population density (1km buffer)	317	51.873	17.945
Population density (10km buffer)	317	54.409	21.742
Night light intensity (1km buffer)	317	0.505	0.377
Night light intensity (10km buffer)	317	0.55	0.372

Notes: Only deals with polygons are included. For night light intensity, we use the global product "VNL_npp_2024_global_vcmslcfg_v2_c202502261200", which is part of the Visible Infrared Imaging Radiometer Suite (VIIRS) Nighttime Lights (VNL) datasets. For population density, we use the "ppp_2020_1km_Aggregated", which is a gridded population dataset that provides estimates of population density at a 1 km spatial resolution for the year 2020 from WorldPop.

3.2 Local employment in carbon offset projects is limited

While land conflicts are a concern for land-based carbon offset projects, they could also deliver important co-benefits.[20] For instance, nature-based solutions can result in environmental co-benefits such as biodiversity conservation, improved water quality, and climate resilience—benefits that are crucial for communities dependent on natural resources. In Kubitza et al. (2025), the Land Matrix team describes an offset project in Indonesia (Deal #10906), for example, where the project's co-benefits are primarily ecological, such as mangrove conservation to prevent coastal erosion and enhance biodiversity. This has also supported the livelihood of local fishers, who rely on healthy fish and mangrove crab populations. Aside from environmental co-benefits, the creation of jobs is the primary measurable economic co-benefit that is often mentioned in project design descriptions. In Figure 8, we present data extracted from project design descriptions and monitoring reports of 59 carbon projects in our database where labour data were available for actual and planned employment.

Figure 8: Labour intensities of different project types per 100 ha



Notes: Employment data for 8 avoided deforestation, 2 improved forest management, and 49 reforestation/afforestation projects.

The figure shows that employment generation per hectare in avoided-deforestation projects is minimal, averaging just 0.08 jobs per 100 ha. Many such projects involve only a handful of employees working often as forest patrols. Improved forest management projects likewise only provide few jobs. As anticipated, reforestation projects demonstrate more favourable employment outcomes, with 37.3 jobs per 100 ha. These findings fall between those of prior studies, such as German et al. (2016), which reported approximately 10 jobs per 100 ha for commercial tree plantations in Mozambique, while Brancalion et al. (2022) found that reforestation for ecosystem restoration in Brazil can generate up to 42 jobs per 100 ha. Notwithstanding the significant fluctuations in employment that are common across reforestation phases, including site preparation, planting, maintenance, and potential harvesting,[21] the higher employment potential of reforestation and plantation activities often fails to provide stable, long-

[20] Co-benefits, unlike benefit sharing, typically refer to positive outcomes directly resulting from project implementation—such as improved livelihoods, jobs, or alternative income streams through forest products (Healy et al. 2023).

[21] Moreover, average employment figures obscure substantial variation. For example, local wood processing significantly enhances job creation (Malkamäki et al. 2018). Additionally, labour intensity varies by plantation type—rubber plantations are considerably more labour-intensive than those oriented toward selective timber harvesting (Geissel et al. 2024).

term jobs. This is because employment tends to be seasonal and temporary, lacking the security and benefits of permanent contracts (Brancalion et al. 2022; German et al. 2016).

In fact, when compared to other land-intensive investments, carbon offset deals generally generate fewer employment opportunities. They are widely outperformed by agricultural investments focused on labour-intensive horticultural crops, for instance, which typically involve minimal mechanisation (see Figure 8). However, certain carbon offset projects exhibit higher labour intensity, particularly those involving the establishment of rubber plantations—which require substantial manual labour for tree tapping—or those that include local processing facilities. For example, Deals #261 and #8058 in Laos, investigated by Land Matrix members on the ground, showed labour intensities comparable to other tree crop plantations, such as oil palm, and exceeded those of highly mechanised production systems. In contrast, the fieldwork in Indonesian villages adjacent to a carbon offset project focused on avoided deforestation (covering approximately 25,000 ha) revealed minimal domestic job creation, with an estimated labour intensity of just 0.2 jobs per 100 ha, which is even lower than that of highly mechanised farms. It is therefore reasonable to conclude that employment levels of this scale are unlikely to generate meaningful welfare improvements for local communities through job creation.

3.3 Uneven gains: The wide variation in benefit sharing

In addition to economic and environmental co-benefits, benefit-sharing arrangements are often highlighted as a major potential advantage for adjacent communities. While there is no universally accepted definition of "benefit-sharing arrangements" in the VCM, they can be described as a framework that specifies how benefits—both monetary (such as revenues from the sale of carbon credits) and non-monetary—are allocated among project partners and beneficiaries. These arrangements detail the types of benefits, the proportions assigned, and the mechanisms through which they are distributed (Healy et al. 2023). This can involve financial benefits such as direct payments to individuals or village development funds, but also capacity building or in-kind benefits (Geissel et al. 2024; Healy et al. 2023).

Based on available data, Figure 9 illustrates the level of benefit sharing and discrepancies between the benefits that were pledged and those that were actually delivered in registered carbon offset projects. We used both project descriptions as well as media reports to track promised and materialised benefits. However, it should be noted that not all benefits are necessarily part of benefit-sharing arrangements since this cannot be derived from project reports due to the lack of transparency. Nevertheless, across all categories, the benefits promised consistently exceeded those that materialised. This pattern may reflect delays in delivery, gaps between intention and implementation, or a lack of adequate documentation of the benefits that were delivered. Indeed, many project descriptions and monitoring reports are vague regarding the outcomes achieved. The most striking shortfalls appear in areas such as capacity building and education—benefits that were frequently promised but for which we found little evidence of actual realisation. Financial support and community shares also exhibit notable delivery gaps, with only a small fraction of what was promised being delivered. Interestingly, while hard infrastructure such as roads is often seen as a primary example of benefit sharing, less than 5% of the reviewed projects promised or delivered on such infrastructure. Healy et al. (2023) also show, albeit for a more limited sample, that many projects—especially under the VCS—lack transparency in their benefit-sharing arrangements and often fail to quantify either monetary or non-monetary benefits. Even widely recognised and large projects such as the Maï-Ndombe carbon project in the DRC have largely failed on their promises (Box 8).

Box 8: The Maï-Ndombe Carbon Project in the DRC: Promised vs. materialised outcomes

The Maï-Ndombe Carbon Project (Deal #3785), initiated by Ecosystem Restoration Associates (ERA) and Wildlife Works Carbon (WWC), is the world's largest REDD+ project to be validated and verified. Located in the DRC, it covers 300,000 hectares of the Congo Basin, the second-largest rainforest on earth. This area is also recognised as an internationally important wetland and home to more than 50,000 people from the Bantu and Batwa ethnic groups. While it has been publicly celebrated as a model of conservation, closer analysis reveals significant challenges and a striking gap between its reported successes and the reality experienced on the ground.

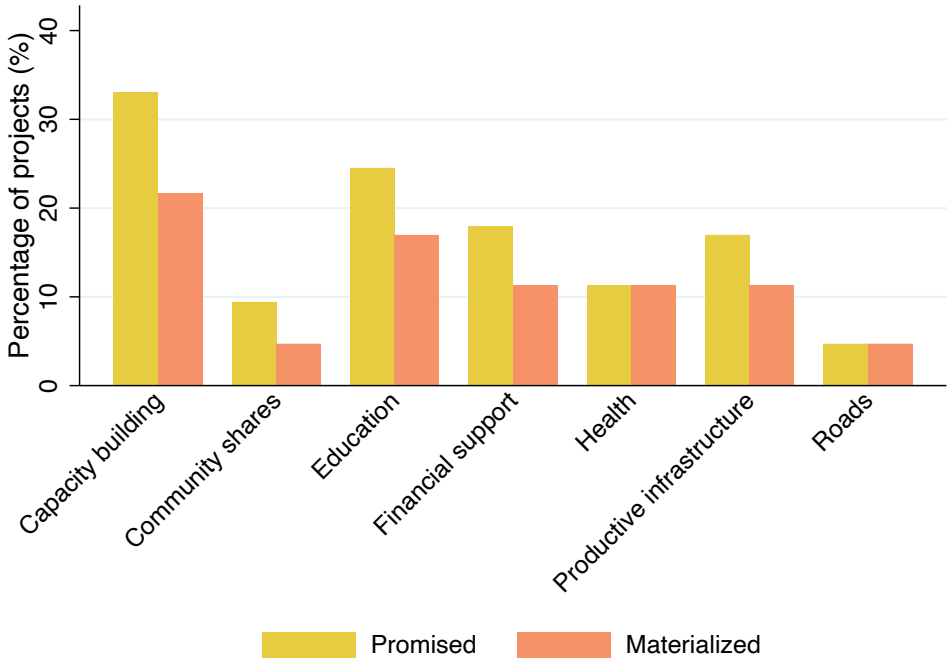
One of the most pressing concerns relates to exaggerated baselines and questionable emission reductions. The project's baseline deforestation scenario was developed using its own methodology (VM0009), and although it claims to have halted industrial logging, the concessions in question had already been suspended back in 2008, years before the project began. Despite claims of success, satellite imagery shows that deforestation has continued to rise within the project area, while villagers confirm that traditional forest activities such as tree cutting remain part of daily life. Critics argue that the inflated baseline enabled the over-issuance of carbon credits, resulting in more than 13 million tons of offsets being generated, even though actual emission reductions remain highly contested.

Another area of concern is the limited benefits for local communities and the lack of meaningful participation. Although the project promised significant development outcomes, its economic impact has been minimal. Out of a population exceeding 50,000 people, only about 400 permanent jobs have been created. Infrastructure development has also fallen short of expectations. For example, just 12 of the 28 planned schools have been built. Although some progress has been made through the construction of 11 solar-powered wells, 10 fishponds, 18 mobile health clinics, and one hospital, which has provided services to over 3,000 people, many community members nevertheless report they were not consulted in the planning process and remain largely unaware of the purpose of the carbon market or its implications for their livelihoods. Furthermore, local development committees, meant to represent community voices, are widely perceived as company-appointed rather than democratically chosen.

The project has also raised serious issues around land rights and use restrictions. Despite being home to tens of thousands of people for generations, the project has not formally recognised their customary land rights. Restrictions on traditional land-use practices have particularly affected women, many of whom are now forced to travel longer distances to farm or gather food. In addition, independent oversight of the project has proven weak. Verification and audit processes rely heavily on data supplied by the project developers themselves, with inadequate field-based validation. Safeguard mechanisms and grievance procedures have also been insufficient, with complaints frequently ignored, dismissed, or mishandled by officials. Despite these shortcomings, the project has reported some positive outcomes. Biodiversity monitoring in 2020 indicated an increase in biomass and species diversity, including the return of leopards and buffalos that had not been seen in the area since the 1970s. The project further reports encouraging signs in bonobo conservation and a growing population of forest elephants, which has expanded from one herd into three.

In these ways, the Maï-Ndombe REDD+ project highlights both the promise and pitfalls of using carbon finance as a tool for conservation and community development. On paper, it presents impressive achievements in climate mitigation, biodiversity protection, and socio-economic benefits. In reality, however, ongoing deforestation, questionable baselines, and limited community inclusion call its credibility into question. To ensure REDD+ projects deliver genuine outcomes rather than serving as instruments of greenwashing, several policy adjustments are critical: Independent verification must be strengthened with rigorous field validation, rather than reliance on developer-supplied data; genuine FPIC must be secured from all affected communities, with agreements that are transparent and culturally appropriate; projects should formally recognise and respect customary land rights to avoid undermining traditional livelihoods; and finally, robust benefit-sharing mechanisms must be put in place to guarantee that communities not only receive fair compensation, but also actively participate in deciding how project revenues are distributed and used.

Figure 9: Promised and materialised benefits from registered offset projects based on LSLAs



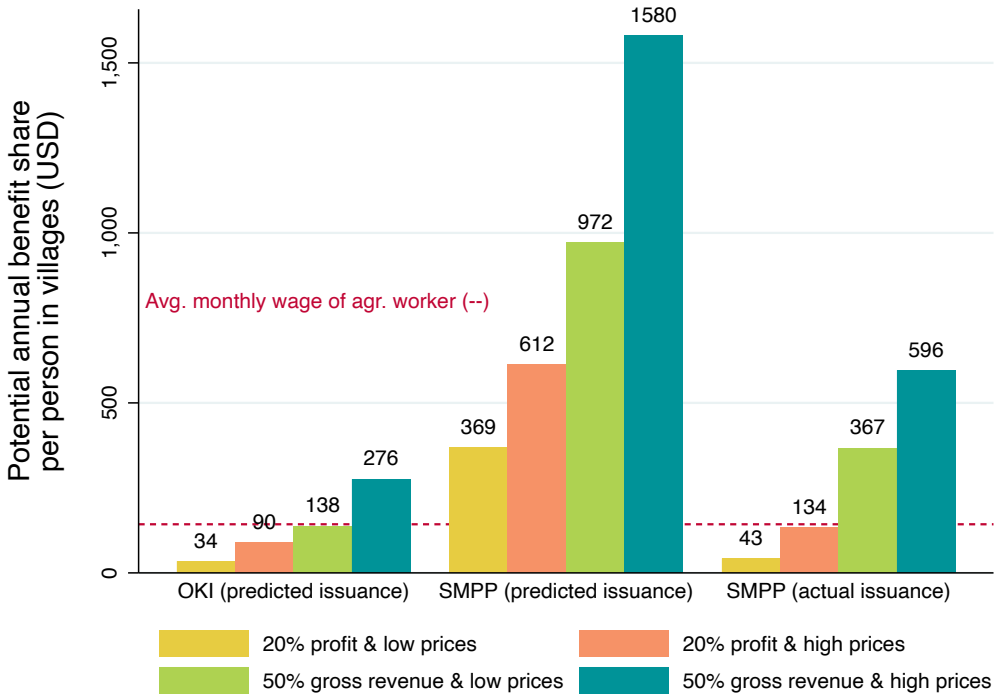
Notes: Figure is based on concluded carbon offset projects that received final registration (n=105).

The aggregated numbers of Figure 9 contain a wide variety of benefit-sharing practices, as field studies conducted by the Land Matrix have showcased (Kubitza, Art, Izzudin, et al. 2025). In Indonesia, for instance, one project, the Sumatra Merang Peatland Project (SMPP, Deal #10888) shared substantial benefits such as financing and building rainwater collection systems, educational support through scholarships, health and food assistance, and donations to support village events, whereas another, the Ogan Komering Ilir (OKI) REDD+ project (Deal #10906), while on paper similar, offered almost none. Yet, in both cases, we have no information on documented benefit-sharing agreements. The leverage of the neighbouring communities to obtain such an agreement was also likely limited due to the legislative framework in Indonesia.

Carbon rights derive either from ownership of the asset (such as land tenure) or from control over activities that reduce deforestation or enhance forest carbon stocks (Streck 2020). Further, ownership of carbon rights varies significantly by jurisdiction and is determined by national or regional regulations. For example, in high-income countries such as Australia, carbon rights are clearly defined and can be separated from land rights. Here, landowners or leaseholders may register carbon rights, which can then be traded or transferred independently of land ownership (Carbon Rights Act 2003). On the other hand, in Indonesia, there is currently no specific regulation defining carbon rights. Instead, carbon rights are inferred from concession-based regulations, which grant holders the right to manage land and benefit from environmental services (including carbon). In addition, as outlined in Chapter 2.2, customary use of land does not entitle communities to be part of benefit-sharing arrangements under the many dominant carbon standards. Accordingly, in the case of the SMPP and OKI REDD+ projects, carbon rights are understood to belong to the companies as the legal concession holders, while the four stakeholder villages are considered neighbouring communities situated outside the concession area, and therefore hold no formal property rights. As such, as highlighted in Chapter 2.2, they are not entitled to benefit-sharing arrangements under current carbon standards, which typically condition such benefits on statutory land tenure. This reinforces the regulatory gap in which, despite being affected by project activities (through changes in land use, access restrictions, or environmental impacts), these communities remain excluded from formal benefit-sharing frameworks.

To illustrate the potential financial gains for stakeholder villages under agreed benefit-sharing arrangements—assuming such mechanisms could become mandatory under carbon standards in the future—we estimate the potential size of direct cash transfers to individuals in each of the four villages related to these two projects, as shown in Figure 10, under two scenarios. In the first,

Figure 10: Potential profit and revenue share per person in stakeholder villages in Indonesian offset projects



Notes: Gross revenue is calculated by multiplying the number of VCUs with assumed carbon credit prices. We model two price scenarios: a low-price scenario at USD 5 per credit and a high-price scenario at USD 10 per credit. For the SMPP project, we also apply an additional USD 3 premium for credits certified under the CCB standard. To estimate net profits, we deduct all applicable fees and levies as reported by Verra (Verra 2024b), as well as one-time setup costs associated with implementing REDD+ activities of USD 30,000. For restoration-related expenditures, we assume rehabilitation/replanting costs of USD 1,500 per hectare for OKI REDD+ and USD 3,050 per hectare for SMPP, based on project-specific information and associated estimations from the literature. The total area to be restored or replanted is derived from the respective project descriptions. It is important to acknowledge that the assumed costs are based on estimates and provide a lower bar as the calculation omits several potential cost components, such as supervision costs or project administration. For estimating the number of affected stakeholders, we rely on population data from villages identified in the project documents. For SMPP, we include Muara Merang (population: 3,316) and Kepayang (population: 2,436). For OKI REDD+, we consider Sungai Batang (population: 1,100) and Sungai Sugihan (population: 1,200). While not all of these villages are currently listed as official stakeholders, they are mentioned as potential stakeholders in future project phase.

20% of project profit is distributed to all individuals in the stakeholder villages. In a more generous, best-case scenario, 50% of the projects' gross revenue from carbon credit sales is shared. For both cases, we also consider two carbon price scenarios: one with low prices and one with high. In the case of SMPP, which is already registered, we estimate benefit sharing based on both the project's predicted Verified Carbon Unit (VCU) issuance from the project description and the actual VCU issuance.[22] Of note, the two projects differ significantly in their projected emission reductions, despite being of similar geographic size: while OKI REDD+ reported projected reductions of 5.5 million tCO_2e, SMPP reported substantially higher expected reductions of approximately 62.9 million tCO_2e.

Beneficiaries are assumed to be those living in stakeholder villages with 3,300 for OKI REDD+ and 5,752 people for SMPP, either explicitly mentioned or identified as likely to be included in the future. Under the 20% profit-sharing, low-price scenario, the figure demonstrates that the OKI REDD+ project would generate around USD 34 per person. Assuming an average household size of four, this equates to roughly one month's wage for an agricultural worker in Indonesia.[23]

[22] Calculations based on actual carbon credit issuance between 2019 and 2023.
[23] Based on Indonesian national statistics, we assume an average monthly wage for an employee in agriculture at USD 143. Average of net wage/salary per month of employee in February 2024: 2,236,045 Indonesian rupiah (IDR). We assume an exchange rate of 15660 IDR/USD equalling USD 143.

A similar outcome is observed when using SMPP's actual issuance data. However, if SMPP's projected emissions reductions are realised, a household could receive an annual amount equivalent to nearly one year's wage of an average agricultural worker in Indonesia. In the high-price scenario, all cases yield substantially greater benefits, potentially enhancing living standards considerably, but in the most optimistic scenario for SMPP, if 50% of gross revenue were shared, communities in stakeholder villages could receive up to the equivalent of four years of wages per household. That said, this level of redistribution is highly unlikely.

Overall, this simulation suggests that, due to the low population density and limited number of stakeholder villages in these remote regions, considerable financial benefits to local communities are possible if projects commit to equitable benefit sharing. Under more conservative and realistic assumptions (such as the 20% profit sharing at low prices and actual issuance), the benefits are more modest but still substantial for rural households. The findings also underscore that potential benefits can differ widely between projects, and communities need better access to the respective financial information to negotiate fair shares (see Chapter 2.2).

4

Toward a just transition: Policy recommendations to prevent a business-as-usual scenario

For many regions in LMICs, earlier waves of LSLAs have been deeply challenging. In response, policymakers, the scientific community, and civil society organisations (CSOs) have proposed a range of measures to prevent rural investments turning into land grabs. These efforts have produced global frameworks such as the VGGT and the CFS-RAI, as well as numerous NGO reports and research papers over the last decade (see Anseeuw et al. 2012; Lay et al., 2021; Nolte et al., 2016). In this report, we examined whether land acquisitions for carbon offsetting mirror the dynamics of these earlier waves of large-scale land-based investments, which—while generating economic gains in some regions—have also triggered significant conflicts over the scarce land resources.

Our analysis shows that LSLAs for carbon offsetting face challenges comparable to those in other sectors, yet with important distinctions. First, reputational risks are especially high in carbon markets. The sector has increasingly adopted a "people and planet" narrative, making associations with human rights violations particularly damaging for both suppliers and buyers (see for example McCoy et al. 2024; Pallares 2022). Second, despite the decentralised nature of the VCM, a handful of dominant certification standards impose some degree of regulation (see Chapter 2.2), while initiatives such as the CCP seek to improve safeguards across the market (ICVCM 2025). Third, even when fully implemented, avoided-deforestation projects—still the dominant project type—result in limited land-use change. As such, their livelihood impacts, though not to be underestimated, occur on a smaller scale than many other land-based investments. The same applies, however, to positive effects such as employment generation (see Chapter 3.2). Fourth, for many reforestation and afforestation projects, carbon offsetting is often just one of several revenue streams (Chapter 1.1). These projects frequently generate a significant portion of their revenue from the sale of timber products, especially given the persistently low prices of carbon credits. Framing carbon offsetting as the sole driver of land acquisition for these projects would therefore be misleading.

Notwithstanding these differences, carbon offsetting projects share some significant issues that emerged with past waves of LSLAs. First, our data show that many projects are outsized (see Figure 2). In our database, 100 offset projects cover more than 10,000 ha, and 33 extend beyond 100,000 ha. While climate mitigation needs to work at scale, this contributes to a worrying trend of land concentration that is not desirable from an economic or social perspective (Anseeuw and Baldinelli 2020). Second, offset projects are being implemented across the globe irrespective of the quality of land tenure institutions and perceived tenure security (see Figure 3). Risks are compounded by the fact that many tropical and subtropical countries with high potential for nature-based solutions also score poorly on transparency, accountability, and rule-of-law enforcement (Rights and Resources Initiative and McGill University 2025). This mirrors the agricultural LSLA boom of the late 2000s, where large-scale deals frequently collided with fragmented and weakly documented land rights, often sparking conflict (see Chapter 3.1). These findings align with the recent IPCC Synthesis Report, which highlights the significant socioeconomic risks of large-scale mitigation projects in areas with insecure land tenure (Calvin et al. 2023). Third, while carbon offsetting is often promoted as benefiting both the climate and local communities, evidence shows that many of these promises have not materialised. Too often, communities were excluded from sharing in the economic gains of mitigation projects—let alone having a voice in their design and implementation (see Chapter 3.2 & 3.3).

While these issues are undoubtedly emblematic of LSLAs in many LMICs, surges of uncontrolled LSLAs need not be inevitable. The trajectory of land acquisitions for agricultural production illustrates that demand can subside when market conditions shift and when multilateral agencies withdraw institutional support. This lesson is especially relevant for carbon offsetting, where demand is heavily shaped by policy and political incentives. Key factors include carbon taxes that allow offsets to serve as tax avoidance mechanisms, UN frameworks such as CORSIA and the implementation of Article 6.2 and 6.4, and broader pressures on companies to achieve carbon neutrality, along with the range of acceptable strategies to do so. Raising awareness among policymakers can hence critically influence the future trajectories of carbon markets. In addition, beyond necessary reform, a deeper critique must be acknowledged: carbon offsetting is only one of many policy tools available for climate mitigation and for supporting rural livelihoods in the Global South. Crucially, carbon offsetting can be used to avoid more transformative climate actions, such as setting stricter sectoral emissions targets, phasing out fossil fuels, and shifting unsustainable consumption patterns. Similarly, when it comes to rural livelihoods, carbon offsetting can only be an addition to more systemic reforms of land tenure, nature conservation, and agri-food systems. If carbon offset projects are promoted as a "silver bullet", broader and potentially more impactful reforms risk being deprioritised. A just transition must therefore also recognise and integrate alternative approaches that support communities directly—approaches that do not reduce forests to entries in offset inventories and impose market-based approaches in settings with different local norms, rights, and development priorities. Below, we present four selected recommendations based on the findings of this report; while acknowledging that citing all necessary reforms for the VCM and climate mitigation practices extends beyond the scope of this analysis.

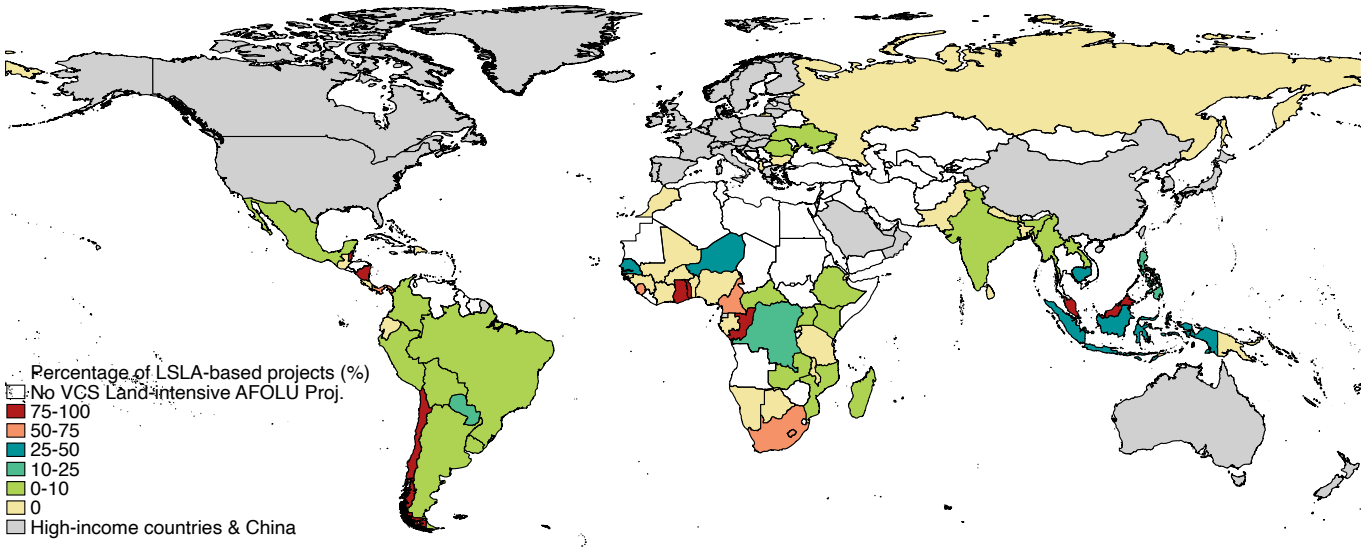
Recommendation 1:

Prioritising community schemes in land-based offsets over LSLAs

First, if land-based carbon offsetting remains a policy priority, carbon offset projects should at least strive to access land in an inclusive manner, promoting the participation and ownership of IPs & LCs. Carbon offset projects do not need to rely on LSLAs; instead, they can be developed in partnership with existing land rights holders, whether individual farmers, IPs, or LCs. While community- or farmer-based projects are not a cure-all, and many are also fraught with implementation challenges (see Box 6) or associated with elite capture (Schmid and Castro Osorio 2025), prioritising well-implemented projects with clear ownership by IPs & LCs or farmer groups could address the dearth of financial resources in many target regions—and prevent further land concentration.

Further, many countries do not follow a trajectory where LSLAs are the primary means to access land for climate mitigation projects. Figure 11 illustrates the proportion of land-based carbon offset projects registered under the VCS that are linked to LSLAs (see Box 2 for definition), expressed as a share of the total project area of land-based carbon offset projects in the VCS registry.[24] The figure shows that in many countries—such as Zambia and Madagascar in sub-Saharan Africa and Brazil, Argentina, and Colombia in South America—LSLAs are linked to a relatively small share of land-based carbon offset projects registered under the VCS, since projects based on existing land rights dominate. However, in countries like Indonesia and the Republic of Congo, LSLAs account for approximately 50% of the total project area. In South America, Chile and Paraguay also exhibit a significantly higher share of LSLA-based projects compared to their neighbours. This indicates a strong concentration of land-based carbon offset projects using LSLAs in certain countries, highlighting potential structural incentives shaping national trajectories. For instance, the patterns of Figure 11 likely reflect a more progressive approach to the land rights of IPs & LCs in many South American countries. Indeed, many projects in this region are based on the formally recognised land rights of these groups. It is important to note, however, that while the principle that IPs & LCs should have ownership over resources derived from their lands is commendable in theory, in practice, these projects are often highly contested due to the absence of strong social safeguards and the presence of unfair or exploitative arrangements.

Figure 11: Share of LSLAs in the VCS registry



Notes: Map is based on concluded offset projects listed under the VCS, either relying on LSLAs (n=145) or other modes to access land (community, farmer, or state land). See Box 2 for further information.

[24] This includes all AFOLU projects, except projects that were rejected or classified as "Solid Waste Separation", "Nitrogen Management", "Manure Methane Digester", "Improved Irrigation Management," "Feed Additives", "Bundled Compost Production and Soil Application" and "Rice Emission Reductions".

To balance the share between LSLAs and farmer- or community-based schemes, two measures have major importance. First, the legal recognition of collectively held land rights must remain a top priority. A recent report estimates that at least 1.4 million ha of Indigenous, Afro-descendant, and local communities' lands have not yet been recognised under national laws and regulations in 49 countries with available data (Rights and Resources Initiative 2023). In the past, IPs & LCs living in remote regions—often characterised by undocumented land claims—were partly shielded from external investment due to their inaccessibility and limited infrastructure, reducing the risk of displacement and land appropriation. However, the rise in value of these lands for carbon offsetting could have changed this dynamic. Unlike farms or other large-scale agricultural ventures that require roads, labour, and residential infrastructure, carbon offset projects focusing on avoiding deforestation can operate with minimal infrastructure development, which increases their geographic scope to formerly remote areas.

Second, beyond accelerating the legal recognition of community land, current community-based tenure regimes must be improved. A recent analysis of carbon policies in 33 countries shows that most governments have not adopted the legal and policy reforms needed to recognise and safeguard the carbon rights of IPs & LCs. Of the 33 countries reviewed, 12 offer no legal protection for the collective land, forest, and resource rights of IPs & LCs, and although all reviewed countries do have laws enabling communities to secure community-based tenure rights (CBTRs), over half of the 99 CBTRs analysed fail to grant a full bundle of rights (Rights and Resources Initiative and McGill University 2025). This poses a significant barrier for communities seeking to claim carbon rights and may redirect investment toward other tenure regimes—such as concessions—that more readily allow investors to claim carbon rights. If carbon markets are to foster local economic development, countries aiming to participate must revise and strengthen their policy frameworks—especially where LSLAs remain the primary means of accessing land for carbon offsetting.

The rationale for prioritising community-based models must, however, go beyond their instrumental value in reducing conflict or cost. Community-managed territories, including Indigenous Peoples' and Local Communities' conserved areas (ICCAs), ancestral domains, and other customary land systems, should not be framed as lower-risk project sites. On the contrary, they often embody distinct worldviews, ecological knowledge systems, and governance structures rooted in justice, autonomy, and stewardship. These systems are rights-based by nature—not merely vehicles for co-benefits—and treating them as efficient delivery mechanisms without centring self-determination risks perpetuating the same extractive dynamics these LSLAs represent. Fostering community ownership and self-determination therefore remains a key activity.

Recommendation 2:

More comprehensive carbon standards are needed for land-based offsets

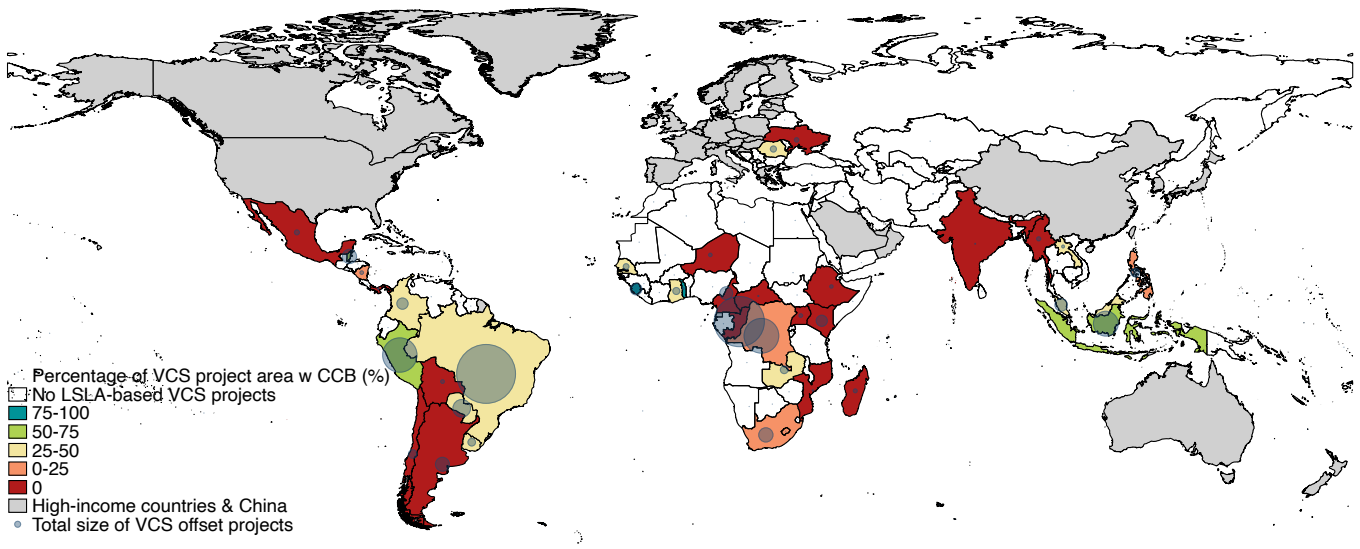
Unlike agricultural or mining investments, carbon offset projects in the VCM are regulated by just a few dominant standards. In theory, these standards could ensure that carbon markets improve the track record of large-scale land-based investments in LMICs. However, as revealed in Chapter 2.2, in reality, carbon standards like the VCS have limited regulatory scope in key areas (Kubitza, Art, Bourgoin, et al. 2025). While most standards include requirements on community engagement and dealing with customary tenure—an improvement over most agricultural VSS—they lack comprehensive provisions on benefit sharing and the protection of socio-cultural sites. In addition, provisions on consultation, FPIC procedures, and grievance redress mechanisms provide only very limited guidance for project developers. These gaps are also evident in contrasting project outcomes that we documented throughout the report.

To ensure an equal playing field, robust and detailed benefit-sharing arrangements, inclusive and continuous consultations, and rigorous FPIC procedures must be binding obligations—not discretionary practices. Mandatory and clearer provisions in standards, reflecting on both the large size of projects and the significant involvement of private sector actors with limited experience in investing in LMICs, are urgently needed. Without stringent rules, competition among project developers for cheap climate mitigation solutions may trigger a "race to the bottom", where cost-cutting undermines the potential socioeconomic benefits of carbon projects. Further, integrity initiatives such as ICVCM should, while focusing on environmental integrity, also promote the social integrity of future carbon schemes (Sarmiento Barletti et al. 2025).

It is concerning that many large-scale projects in countries with weak land governance choose to rely solely on VCS certification, foregoing standards that provide more comprehensive social safeguards. As illustrated in Figure 12, only a small number of VCS projects that are linked to LSLAs are additionally certified under the more rigorous CCB standard, which is also administered by Verra. The figure shows, by country, the share of LSLA-based offset projects under the VCS that also comply with the CCB standard (see Figure 6). Particularly in core target areas, such as the DRC and Republic of Congo, only a limited

fraction of VCS projects also meet CCB requirements. In South America, Brazil, Colombia, and Peru host multiple CCB-certified projects, while Argentina and Chile lag significantly behind. Expanding the application of more comprehensive safeguards to all land-based offset projects should therefore be a priority in the years ahead.

Figure 12: Share of Agriculture, Forestry, and Other Land Use (AFOLU) VCS projects based on LSLAs with additional CCB standard



Notes: Map is based on concluded carbon offset projects listed under the VCS (n=145) - with and without the CCB standard. Total size of VCS offset projects ranges from 0 to 2,453,296 ha.

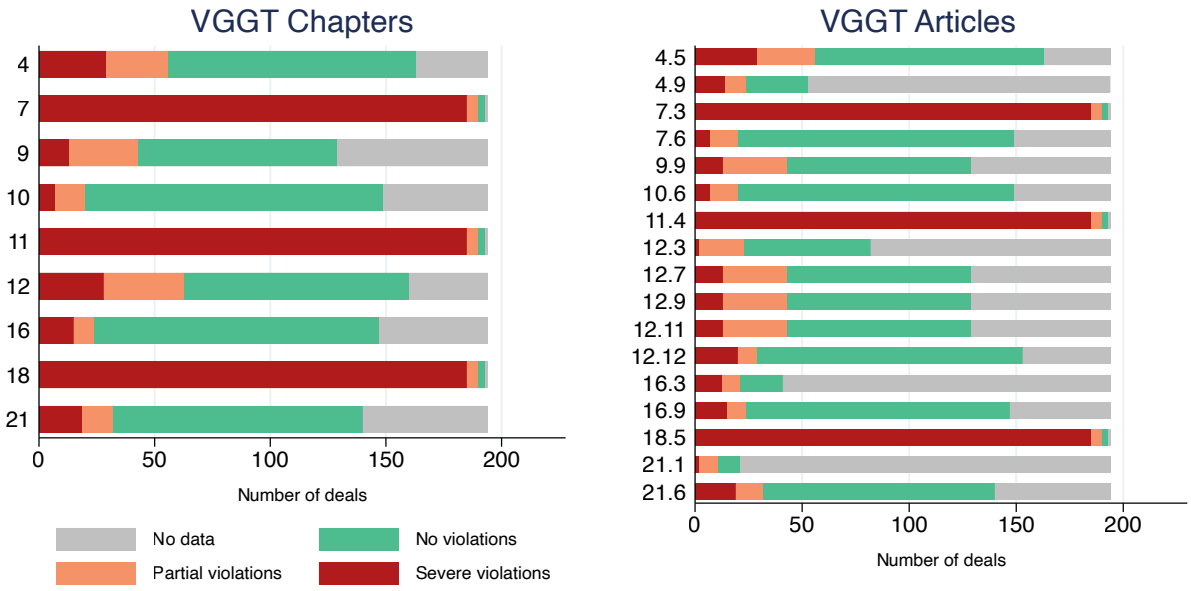
Recommendation 3:

Compliance with global and regional frameworks remains key

Following the surge in LSLAs in the Global South during the 2000s, concerns over land rights and food security led to the mainstreaming of global governance frameworks, such as the VGGT, endorsed by the CFS in 2012, which set up clear principles to guide investments in land. Our report shows that various case studies suggest poor compliance with the VGGT. To quantify the gap, we utilised the VGGT accountability application of the Land Matrix database, which allows our RFPs to assess carbon projects with respect to their compliance with the guidelines (Anseeuw, Bourgoin, and Harding 2022).

Looking at Figure 13, which presents the results of the rating for selected VGGT Articles and Chapters, we see widespread non-compliance with VGGT principles in carbon offsetting deals, especially in areas of transparency, land rights, community consultation, and conflict resolution. Articles 7.3, 11.4, and 18.5, which are linked to the transparency of purchasing prices and leasing fees, show the worst performance, as do their respective chapters, since project developers rarely openly publish any information on the land deals. Apart from the lack of transparency, Article 4.5 and its respective chapter, which contains guidance on the recognition and protection of legitimate land tenure rights, displays the highest number of deals with severe violations. Conversely, Article 10.6, which mandates that forced evictions should be avoided, is associated with few severe violations in the data. This suggests that, rather than leading to direct evictions from homesteads, the remoteness of land deals more often results in restricted access to land and natural resources for communities, thereby violating legitimate land claims to, for example, grassland or forests (see Chapter 3.1). As a result of limiting communities' access to land and resources, several carbon offset projects are also potentially in conflict with Article 12.12, which mandates that investments should not contribute to food insecurity. Although many projects show no violations in key VGGT chapters, these findings underscore the urgent need to strengthen oversight and compliance mechanisms in carbon-offsetting LSLAs. Transparency must be improved across the board, and several deals should be substantially revised—or halted altogether—because of their adverse impacts on customary land rights and access to resources.

Figure 13: Compliance of carbon offset projects with the VGGT



Chapter - 4: Rights and responsibilities related to tenure (Article 4.5, 4.9)
Chapter - 7: Safeguards (Articles 7.3, 7.6)
Chapter - 9: Indigenous peoples and other communities with customary tenure systems (Article 9.9)
Chapter - 10: Informal tenure (Article 10.6)
Chapter - 11: Markets (Article 11.4)
Chapter - 12: Investments (Articles 12.3, 12.7, 12.9, 12.11, 12.12)
Chapter - 16: Expropriation and compensation (Articles 16.3, 16.9)
Chapter - 18: Valuation (Article 18.5)
Chapter - 21: Resolution of disputes over tenure rights (Articles 21.1, 21.6)

The documented carbon deals are also at odds with other global and regional frameworks. The current revision of the Association of Southeast Asian Nations (ASEAN) Regional FPIC Handbook, for example, upholds FPIC as a full, collective right, requiring actual consent—not just consultation—prior to project approval. It affirms communities' rights to withdraw consent at any stage, particularly if agreements are breached or cultural impacts arise. It also grants them control over timelines, formats, and decision-making processes. In contrast, the VCS, while referencing FPIC principles, tends to treat IPs & LCs more as consultees than rights-holders. Although it includes stakeholder mapping and tenure identification, it does not mandate that these stakeholders have decision-making power or procedural control. Moreover, while the VCS encourages benefit sharing under broader goals like sustainable development and positive community impact, it does not require negotiated benefit-sharing agreements. The ASEAN Handbook, by contrast, makes such agreements a mandatory part of the FPIC process.

The example of the VGGT and the ASEAN Regional FPIC Handbook shows that many regional and global frameworks have been shaped by the lessons of past land-based investments. However, these insights appear to not yet be sufficiently reflected in the development of safeguards within carbon markets. The VGGT, for example, play a limited role in carbon markets (Cordes, Cotula, and Polack 2025). While this disconnect may stem from the siloed nature of climate, food security, and investment policies, which often operate with limited interaction, it is nevertheless essential that the lessons learned from previous land-based investments—particularly in contexts with weak land governance—inform the design of robust safeguards for carbon market initiatives and play a more prominent guiding role in the revision of relevant carbon offset standards.

There are also signs that UN mechanisms have integrated at least parts of the lessons of the past. The Sustainable Development Tool under Article 6.4, for instance, ensures activities follow the 'do no harm' principle. The article requires that project proponents must apply the tool and comply with environmental and social safeguards, including Principle 8 on land acquisition and involuntary resettlement (UNFCCC 2024). The principle mandates that involuntary resettlement shall be avoided and demands additional information and measures from proponents if the proposed Article 6.4 activity involves or supports involuntary land acquisition or restrictions on land use.

Recommendation 4:

Improved transparency and accountability are essential to ensure a just climate transition

This report highlights that the VCM in many Global South countries remains an emerging sector. It is characterised by a diverse set of players with varying objectives, numerous projects still in the start-up phase, and evolving national carbon regulatory framework and global climate governance. This situation calls for more oversight on the part of political decision-makers, researchers, and CSOs in tracking development on the ground. To ensure transparency and accountability in offsetting, it should be mandatory that all projects disclose detailed information related to locations and land contracts, in particular wherever public actors are engaged through multinational funding mechanisms or through national governments providing land via concessions or leases. Currently, although project locations can be easily identified through carbon credit registries, information regarding land ownership is often incomplete or lacks public disclosure. Key details—such as the date of purchase or lease, the type of land title, and, in the case of grouped projects, the exact distribution of the land among entities—are frequently unavailable or unclear.

Beyond land ownership, the extent and nature of benefit-sharing arrangements remain poorly documented in many projects. Greater transparency is needed—both in detailing the specific mechanisms and intended benefits, as well as in clearly quantifying the benefits that are ultimately distributed. Lastly, current major carbon standards do not require public disclosure of the actors that retired the carbon credits to offset their emissions. While voluntary disclosure is often possible, transparency across all projects and buyers would heighten the reputational risks associated with purchasing credits from poorly implemented projects. To foster transparency in the VCM, more stringent requirements by global frameworks could serve as guidance. In particular, the global UN mechanisms under Article 6 of the Paris Agreement and CORSIA should mandate that all eligible projects from the VCM integrate high levels of transparency.

In addition, governments should promote independent monitoring of LSLAs, ensuring that project- and company-level data—covering both processes and impacts—are made publicly available on open data platforms like the Land Matrix and OpenLandContracts. This transparency enables stakeholders to track land concentration and assess if projects contribute to sustainable development. In addition, stakeholders can hold project developers accountable to global frameworks and carbon standards using open-access data. Accessible data also allow civil society actors to assess and react to land deals in their region. Such steps are highly necessary, since third-party auditors, which are selected and paid by audited organisations, face strong financial incentives to let projects pass, irrespective of the risks (Coglianese and Giles 2025).

Transparent project data are equally crucial, but captures only part of the reality: this information can be biased or omit critical livelihood impacts. To bridge this gap, strong local civil society oversight must accompany improved reporting standards. Without independent scrutiny, vague compliance claims can mask poor on-the-ground implementation. Building the capacity of community-based organisations is essential to translate complex carbon-finance concepts for local stakeholders, maintain effective grievance-redress mechanisms, and ensure more equitable negotiations on benefit sharing. These measures are vital for redressing the uneven impacts of climate action, particularly where the lands of IPs & LCs have been folded into global business models and policy frameworks. As this report demonstrates, land-based carbon-offset projects that rely on LSLAs are no longer peripheral; they have become a significant driver of carbon-credit supply. To secure a truly just climate transition, accountability and transparency must become the core of future carbon-market development.

References

Ahonen, Hanna-Mari, Juliana Kessler, Axel Michaelowa, Aglaja Espelage, and Stephan Hoch. 2022. "Governance of Fragmented Compliance and Voluntary Carbon Markets Under the Paris Agreement." *Politics and Governance* 10(1): 235–45. doi:10.17645/pag.v10i1.4759.

AlliedOffsets. 2025. *2024 End of Year Report: VCM 2024 Review and Emerging Trends for 2025*. https://alliedoffsets.com/wp-content/uploads/2025/01/VCM-2024-Recap-Emerging-Trends-for-2025.pdf (March 5, 2025).

Anseeuw, Ward, and Giulia Maria Baldinelli. 2020. *Uneven Ground: Land Inequality at the Heart of Unequal Societies*. Rome: International Land Coalition & Oxfam.

Anseeuw, Ward, Mathieu Boche, Thomas Breu, Markus Giger, Jann Lay, Peter Messerli, and Kerstin Nolte. 2012. *Transnational Land Deals for Agriculture in the Global South: Analytical Report Based on the Land Matrix Database*. Bern/Montpellier/Hamburg: Centre for Development and Environment, University of Bern; Centre de coopération internationale en recherche agronomique pour le développement; German Institute of Global and Area Studies.

Anseeuw, Ward, Jeremy Bourgoin, and Angela Harding. 2022. *Little Progress in Practice: Assessing Transparency, Inclusiveness and Sustainability in Large-Scale Land Acquisitions in Africa.* Pretoria: University of Pretoria.

ART TREES. 2025. "ART TREES." https://www.artredd.org/ (February 28, 2025).

Bidaud, Cécile. 2012. "REDD+, Un Mécanisme Novateur?: Le Cas de La Forêt de Makira à Madagascar." *Revue Tiers Monde* 211(3): 111–30. doi:10.3917/rtm.211.0111.

Blanc, Guillaume. 2020. *L'invention Du Colonialisme Vert: Pour En Finir Avec Le Mythe de l'éden Africain*. Paris: Flammarion.

Blanton, Austin, Midhun Mohan, G.A. Pabodha Galgamuwa, Michael S. Watt, Jorge F. Montenegro, Freddie Mills, Sheena Camilla Hirose Carlsen, et al. 2024. "The Status of Forest Carbon Markets in Latin America." *Journal of Environmental Management* 352: 119921. doi:10.1016/j.jenvman.2023.119921.

Borras Jr., Saturnino M., Ruth Hall, Ian Scoones, Ben White, and Wendy Wolford. 2011. "Towards a Better Understanding of Global Land Grabbing: An Editorial Introduction." *The Journal of Peasant Studies* 38(2): 209–16. doi:10.1080/03066150.2011.559005.

Borras Jr., Saturnino M., Ian Scoones, Amita Baviskar, Marc Edelman, Nancy Lee Peluso, and Wendy Wolford. 2022. "Climate Change and Agrarian Struggles: An Invitation to Contribute to a *JPS* Forum." *The Journal of Peasant Studies* 49(1): 1–28. doi:10.1080/03066150.2021.1956473.

Bourgoin, Jeremy, Roberto Interdonato, Quentin Grislain, Matteo Zignani, and Sabrina Gaito. 2024. "Mining Resources, the Inconvenient Truth of the 'Ecological' Transition." *World Development Perspectives* 35: 100615. doi:10.1016/j.wdp.2024.100615.

Brancalion, Pedro H. S., Ludmila Pugliese De Siqueira, Nino T. Amazonas, Mayte B. Rizek, Alex F. Mendes, Edson L. Santiami, Ricardo Ribeiro Rodrigues, et al. 2022. "Ecosystem Restoration Job Creation Potential in Brazil." *People and Nature* 4(6): 1426–34. doi:10.1002/pan3.10370.

Brimont, Laura, and Maya Leroy. 2018. "Le Mécanisme REDD+ et Les Projets Pilotes à Madagascar : D'un Idéal Incitatif à La Réalité Des Dispositifs de Gestion." *Natures Sciences Sociétés* 26(3): 308–19. doi:10.1051/nss/2018043.

Broekhoff, Derik, Michael Gillenwater, Tani Colbert-Sangree, and Patrick Cage. 2019. *Securing Climate Benefit: A Guide to Using Carbon Offsets*. Stockholm Environment Institute & Greenhouse Gas Management Institute. www.offsetguide.org/pdf-download/ (January 21, 2025).

Buergin, Reiner. 2016. "Ecosystem Restoration Concessions in Indonesia: Conflicts and Discourses." *Critical Asian Studies* 48(2): 278–301. doi:10.1080/14672715.2016.1164017.

Byamugisha, Frank F.K., and Nancy Dubosse. 2023. "The Investment Case for Land Tenure Security in Sub-Saharan Africa: A Cost–Benefit Analysis." *Journal of Benefit-Cost Analysis* 14(S1): 272–300. doi:10.1017/bca.2023.14.

Calvin, Katherine, Dipak Dasgupta, Gerhard Krinner, Aditi Mukherji, Peter W. Thorne, Christopher Trisos, José Romero, et al. 2023. *IPCC, 2023: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (Eds.)].* First. Intergovernmental Panel on Climate Change (IPCC). doi:10.59327/IPCC/AR6-9789291691647.

Carbon Market Watch. 2023. *A Fair Share of the Voluntary Carbon Market?* https://carbonmarketwatch.org/wp-content/uploads/2023/11/CMW_policy_briefing_benefit_sharing_2023_11.pdf (January 24, 2025).

Carbon Market Watch. 2025. "Watered Down 2040 Target Risks Blowing EU Climate Action Out of the Water." https://carbonmarketwatch.org/2025/07/02/watered-down-2040-target-risks-blowing-eu-climate-action-out-of-the-water/ (August 27, 2025).

Carvalho, Maria, Mireille Meneses, Aryanie Amellina, Carmen Álvarez Campo, and Nicolas Kreibich. 2022. *Offset Approaches in Existing Compliance Mechanisms – Adding Value and Upholding Environmental Integrity?* Umweltbundesamt. https://www.umweltbundesamt.de/publikationen/offset-approaches-in-existing-compliance-mechanisms (February 20, 2025).

Cercarbono. 2025. "Cercarbono – Certified Carbon Standard." https://www.cercarbono.com/ (February 20, 2025).

Chen, Xiuxiu, Zeyu Wang, Feng Zhang, Guoqiang Shen, and Qiuxiao Chen. 2024. "A Global Annual Simulated VIIRS Nighttime Light Dataset from 1992 to 2023." *Scientific Data* 11(1): 1380. doi:10.1038/s41597-024-04228-6.

Coglianese, Cary, and Cynthia Giles. 2025. "Third-Party Auditing Cannot Guarantee Carbon Offset Credibility." *University of Pennsylvania Law School, Public Law Research Paper* (25–28). doi:10.2139/ssrn.5345783.

Cordes, Kaitlin, Lorenzo Cotula, and Emily Polack. 2025. *Tackling the Complexities of Carbon Rights.* London: International Institute for Environment and Development. https://www.iied.org/22597iied (April 2, 2025).

Development Bank of Latin America and the Caribbean. 2025. "Boletín Nº7 - Observatorio de La Iniciativa Latinoamericana y Del Caribe Para El Mercado Del Carbono - ILACC." https://scioteca.caf.com/handle/123456789/2451 (July 11, 2025).

Dooley, Kate, Heather Keith, Anne Larson, Georgina Catacoras-Vargas, Wim Carton, Kirstine Lund Christiansen, Ojong Enokenwa Baa, et al. 2022. *The Land Gap Report*. https://www.landgap.org/ (May 2, 2025).

Ecosystem Marketplace. 2024. *State of the Voluntary Carbon Market 2024.* Washington DC: Forest Trends Association. https://3298623.fs1.hubspotusercontent-na1.net/hubfs/3298623/SOVCM%202024/State_of_the_Voluntary_Carbon_Markets_20240529%201.pdf (May 26, 2025).

ERS - Ecosystem Restoration Standard. 2025. "ERS - Ecosystem Restoration Standard." https://www.eq-earth.com (May 19, 2025).

Fairhead, James, Melissa Leach, and Ian Scoones. 2012. "Green Grabbing: A New Appropriation of Nature?" *The Journal of Peasant Studies* 39(2): 237–61. doi:10.1080/03066150.2012.671770.

Favretto, Nicola, Stavros Afionis, Lindsay C. Stringer, Andrew J. Dougill, Claire H. Quinn, and Hery Lisy Tiana Ranarijaona. 2020. "Delivering Climate-Development Co-Benefits through Multi-Stakeholder Forestry Projects in Madagascar: Opportunities and Challenges." *Land* 9(5): 157. doi:10.3390/land9050157.

Forest Carbon Partnership Facility. 2025. "Congo (Democratic Republic Of)." https://www.forestcarbonpartnership.org/country/congo-democratic-republic (May 26, 2025).

Friess, Susanne. 2024. *Land and Climate: Rights at Risk.* Berlin: Brot für die Welt Evangelisches Werk für Diakonie und Entwicklung e. V. https://www.brot-fuer-die-welt.de/fileadmin/mediapool/downloads/fachpublikationen/analyse/Analysis_111_Land_and_Climate.pdf (May 26, 2025).

Garcia, Beatriz, Lawrence Rimmer, Leticia Canal Vieira, and Brendan Mackey. 2021. "REDD+ and Forest Protection on Indigenous Lands in the Amazon." *Review of European, Comparative & International Environmental Law* 30(2): 207–19. doi:10.1111/reel.12389.

Geissel, Daniel, Chintanaphone Keovichith, Nikka Rivera, Danya-Zee Pedra, and Christoph Kubitza. 2024. *Who Benefits From Tree-Planting in the Global South?: The Case of Two Carbon Offset Projects in Laos.* https://landmatrix.org/documents/174/Land_Matrix_DN1_Offsetting_Carbon_digital_v3.pdf (September 11, 2024).

German, Laura, Eunice Cavane, Almeida Sitoe, and Carla Braga. 2016. "Private Investment as an Engine of Rural Development: A Confrontation of Theory and Practice for the Case of Mozambique." *Land Use Policy* 52: 1–14. doi:10.1016/j.landusepol.2015.11.012.

Glennerster, Rachel, and Seema Jayachandran. 2023. "Think Globally, Act Globally: Opportunities to Mitigate Greenhouse Gas Emissions in Low- and Middle-Income Countries." *Journal of Economic Perspectives* 37(3): 111–35. doi:10.1257/jep.37.3.111.

Global CarbonTrace. 2025. "Global CarbonTrace Registry." https://globalcarbontrace.io/projects (May 20, 2025).

Gold Standard. 2019. "Gold Standard for the Global Goals 1.2." https://globalgoals.goldstandard.org/standards/101_V1.2_PAR_Principles-Requirements.pdf (May 15, 2025).

Gold Standard. 2024. "Gold Standard for the Global Goals 2.0." https://globalgoals.goldstandard.org/standards/101_V2.0_PAR_Principles-Requirements.pdf (May 12, 2025).

Government of Western Australia. 2003. *Carbon Rights Act 2003*. https://www.legislation.wa.gov.au/legislation/prod/filestore.nsf/FileURL/mrdoc_220.pdf/$FILE/Carbon%20Rights%20Act%202003%20-%20%5B00-b0-09%5D.pdf (May 5, 2025).

GRAIN. 2024. *From Land Grabbers to Carbon Cowboys: A New Scramble for Community Lands Takes Off.* https://grain.org/en/article/7190-from-land-grabbers-to-carbon-cowboys-a-new-scramble-for-community-lands-takes-off (April 11, 2025).

Grislain, Quentin. 2025. "Madagascar : Le Marché de Compensation Carbone En Pleine Émergence." *The Conversation.* https://theconversation.com/madagascar-le-marche-de-compensation-carbone-en-pleine-emergence-261480 (July 30, 2025).

Grislain, Quentin, and Christoph Kubitza. 2025. "Global Carbon Markets and Rural Development in Madagascar." *GIGA Focus Africa* 3. doi:10.57671/GFAF-25032.

Haya, Barbara K, Tyler Bernard, Aline Abayo, Xinyun Rong, So Ivy S., and Micah Elias. 2024. *Voluntary Registry Offsets Database V2024-12.* Berkeley: Berkeley Carbon Trading Project, University of California. https://gspp.berkeley.edu/research-and-impact/centers/cepp/projects/berkeley-carbon-trading-project/offsets-database (December 18, 2024).

He, Jun, and Jiping Wang. 2023. "Certificated Exclusion: Forest Carbon Sequestration Project in Southwest China." *The Journal of Peasant Studies* 50(6): 2165–86. doi:10.1080/03066150.2022.2163163.

Healy, Sienna, Melanie Pietschmann, Lambert Schneider, and Ankita Karki. 2023. *Assessing the Transparency and Integrity of Benefit Sharing Arrangements Related to Voluntary Carbon Market Projects.* Öko-Institut. https://www.oeko.de/en/publications/assessing-the-transparency-and-integrity-of-benefit-sharing-arrangements-related-to-voluntary-carbon-market-projects/ (May 19, 2025).

Hennings, Anne, and Luis Baquero. 2024. *Africa's Carbon Deals and the Hidden Tenure Challenge.* Land Portal. https://landportal.org/data-story/carbon-deals-africa (May 16, 2025).

Herr, Dorothée, Juliet Blum, Amber Himes-Cornell, and Ariana Sutton-Grier. 2019. "An Analysis of the Potential Positive and Negative Livelihood Impacts of Coastal Carbon Offset Projects." *Journal of Environmental Management* 235: 463–79. doi:10.1016/j.jenvman.2019.01.067.

Hultman, Nate, Jiehong Lou, and Stephen Hutton. 2020. "A Review of Community Co-Benefits of the Clean Development Mechanism (CDM)." *Environmental Research Letters* 15(5): 053002. doi:10.1088/1748-9326/ab6396.

Human Rights Watch. 2024. *Carbon Offsetting's Casualties Violations of Chong Indigenous People's Rights in Cambodia's Southern Cardamom REDD+ Project.* https://www.hrw.org/sites/default/files/media_2024/02/cambodia0224web_1.pdf (January 24, 2025).

Hunsberger, Carol, Esteve Corbera, Saturnino M. Borras, Jennifer C. Franco, Kevin Woods, Courtney Work, Romulo De La Rosa, et al. 2017. "Climate Change Mitigation, Land Grabbing and Conflict: Towards a Landscape-Based and Collaborative Action Research Agenda." *Canadian Journal of Development Studies / Revue canadienne d'études du développement* 38(3): 305–24. doi:10.1080/02255189.2016.1250617.

ICVCM. 2025. "Assessment Status." https://icvcm.org/assessment-status/ (March 27, 2025).

ID-RECCO. 2025. "International Database on REDD+ Projects and Programs." *ID-RECCO.* https://www.reddprojectsdatabase.org/ (February 18, 2025).

International Trade Centre. 2024. *Standards Map*. Geneva, Switzerland. https://standardsmap.org/en/home (September 11, 2024).

IPES-Food. 2022. *Smoke and Mirrors: Examining Competing Framings of Food System Sustainability: Agroecology, Regenerative Agriculture, and Nature-Based Solutions.* https://ipes-food.org/report/smoke-mirrors/ (February 12, 2025).

IPES-Food. 2024. *Land Squeeze: What Is Driving Unprecedented Pressures on Global Farmland and What Can Be Done to Achieve Equitable Access to Land?* https://ipes-food.org/wp-content/uploads/2024/05/LandSqueeze.pdf (August 27, 2025).

Kainou, Kazunari. 2022. "Collapse of the Clean Development Mechanism Scheme Under the Kyoto Protocol and Its Spillover: Consequences of 'Carbon Panic.'" https://cepr.org/voxeu/columns/collapse-clean-development-mechanism-scheme-under-kyoto-protocol-and-its-spillover (February 18, 2025).

Kubitza, Christoph, Grace Art, Jeremy Bourgoin, Quentin Grislain, Nikka Rivera, and Gabi Sonderegger. 2025. *Between Promise and Practice: The Role of Carbon Standards in Community Engagement in Land-Based Offset Projects in Indonesia and Madagascar.* Cambridge, Massachusetts: Lincoln Institute of Land Policy.

Kubitza, Christoph, Grace Art, Mohammad Izzudin, Sofyan Ubaidi Anom, M. Asrori, and Nikka Rivera. 2025. *Implementing Carbon Offset Projects in Indonesia's Rainforests – A Win-Win for Climate and Local Communities?* Land Matrix. https://landmatrix.org/media/documents/Land_Matrix_DN5_Indonesia_Carbon_offsetting_June_2025.pdf (June 20, 2025).

Lang, Chris. 2025. "Papua New Guinea Has Lifted Its Moratorium on REDD Voluntary Carbon Market Projects." https://reddmonitor.substack.com/p/papua-new-guinea-has-lifted-its-moratorium (April 22, 2025).

Lay, Jann, Ward Anseeuw, Sandra Eckert, Insa Flachsbarth, Christoph Kubitza, Kerstin Nolte, and Markus Giger. 2021. *Taking Stock of the Global Land Rush: Few Development Benefits, Many Human and Environmental Risks. Analytical Report III*. Centre for Development and Environment, University of Bern; Centre de coopération internationale en recherche agronomique pour le développement; German Institute of Global and Area Studies; University of Pretoria; Bern Open Publishing. doi:10.48350/156861.

Malkamäki, Arttu, Dalia D'Amato, Nicholas J. Hogarth, Markku Kanninen, Romain Pirard, Anne Toppinen, and Wen Zhou. 2018. "A Systematic Review of the Socio-Economic Impacts of Large-Scale Tree Plantations, Worldwide." *Global Environmental Change* 53: 90–103. doi:10.1016/j.gloenvcha.2018.09.001.

Manda, Simon, and Nyambe Mukanda. 2023. "Can REDD+ Projects Deliver Livelihood Benefits in Private Tenure Arrangements? Experiences from Rural Zambia." *Forest Policy and Economics* 150: 102952. doi:10.1016/j.forpol.2023.102952.

McCoy, Terrence, Julia Ledur, and Marina Dias. 2024. "How 'Carbon Cowboys' Are Cashing in on Protected Amazon Forest." *The Washington Post.* https://www.washingtonpost.com/world/interactive/2024/brazil-amazon-carbon-credit-offsets/ (June 1, 2025).

Meitner, Leonhard. 2024. *Voluntary Carbon Markets: A Critical Assessment.* Institute for International Political Economy Berlin. https://www.ipe-berlin.org/fileadmin/institut-ipe/Dokumente/Working_Papers/Meitner_WP_246.pdf (June 1, 2025).

Mercandalli, Sara, Roberto Hadrien, and Girad Pierre. 2025. "Changement Climatique, (Im)Mobilités et Foncier: Quels Enjeux Pour Les Agricultures Familiales Aux Suds?" In *L'agriculture et Les Systèmes Alimentaires Du Monde Face Au Changement Climatique. Enjeux Pour Les Suds,* Versailles: éditions Quæ, 143–54.

Nhantumbo, I., and R.A. Samndong. 2013. *REDD+ and Rights: Extending Carbon Rights in the DRC to Climate-Regulating Services.* London: International Institute for Environment and Development. https://www.iied.org/sites/default/files/pdfs/migrate/17182IIED.pdf (June 1, 2025).

Nolte, Kerstin, Wytske Chamberlain, and Markus Giger. 2016. *International Land Deals for Agriculture. Fresh Insights from the Land Matrix: Analytical Report II.* Bern/Montpellier/Hamburg/Pretoria: Centre for Development and Environment, University of Bern; Centre de coopération internationale en recherche agronomique pour le développement; German Institute of Global and Area Studies; University of Pretoria; Bern Open Publishing.

Pallares, Gloria. 2022. "Revealed: Timber Giant Quietly Converts Congo Logging Sites to Carbon Schemes." *Mongabay Environmental News.* https://news.mongabay.com/2022/03/revealed-timber-giant-quietly-converts-congo-logging-sites-to-carbon-schemes/ (February 25, 2025).

Rights and Resources Initiative. 2023. *Who Owns the World's Land? Global State of Indigenous, Afro-Descendant, and Local Community Land Rights Recognition from 2015–2020.* Rights and Resources Initiative. https://rightsandresources.org/publication/who-owns-the-worlds-land-2nd-ed/ (September 11, 2024).

Rights and Resources Initiative and McGill University. 2025. *The Carbon Rights of Indigenous Peoples, Afro-Descendant Peoples, and Local Communities in Tropical and Subtropical Lands and Forests: A Systemic Analysis of 33 Countries.* Rights and Resources Initiative. doi:10.53892/CQLY7821.

Rincón Barajas, Jorge A., Christoph Kubitza, and Jann Lay. 2024. "Large-Scale Acquisitions of Communal Land in the Global South: Assessing the Risks and Formulating Policy Recommendations." *Land Use Policy* 139: 107054. doi:10.1016/j.landusepol.2024.107054.

Robinson, Catherine J., Anna R. Renwick, Tracey May, Emily Gerrard, Rowan Foley, Michael Battaglia, Hugh Possingham, David Griggs, and Daniel Walker. 2016. "Indigenous Benefits and Carbon Offset Schemes: An Australian Case Study." *Environmental Science & Policy* 56: 129–34. doi:10.1016/j.envsci.2015.11.007.

Salta Gobierno. 2024. "Con Gran Éxito Se Llevó a Cabo El Primer Foro Provincial de Carbono." https://www.salta.gob.ar/prensa/noticias/con-gran-exito-se-llevo-a-cabo-el-primer-foro-provincial-de-carbono-97648 (July 11, 2025).

Sarmiento Barletti, Juan Pablo, Anne M. Larson, Julia Naime, and Tamara Lasheras de La Riva. 2025. "Not All Forest Carbon Credits Are Created Equal: High Integrity Programmes and Conditions for Success." *Occasional Paper* (20). doi:10.17528/cifor-icraf/009378.

Schmid, Dominique, and Carolina Castro Osorio. 2025. "New Scenarios of Non-Violent Conflict in Indigenous Communities: The Case of REDD+ in the Colombian Amazon." *Environment and Security.* Advance online publication. doi:10.1177/27538796251330357.

Seddon, Nathalie, Alison Smith, Pete Smith, Isabel Key, Alexandre Chausson, Cécile Girardin, Jo House, Shilpi Srivastava, and Beth Turner. 2021. "Getting the Message Right on Nature-Based Solutions to Climate Change." *Global Change Biology* 27(8): 1518–46. doi:10.1111/gcb.15513.

Shinbrot, Xoco A., Ignacia Holmes, Madeleine Gauthier, Petra Tschakert, Zoë Wilkins, Lydia Baragón, Berta Opúa, and Catherine Potvin. 2022. "Natural and Financial Impacts of Payments for Forest Carbon Offset: A 14 Year-Long Case Study in an Indigenous Community in Panama." *Land Use Policy* 115: 106047. doi:10.1016/j.landusepol.2022.106047.

Smith, Pete, Steven J. Davis, Felix Creutzig, Sabine Fuss, Jan Minx, Benoit Gabrielle, Etsushi Kato, et al. 2016. "Biophysical and Economic Limits to Negative CO2 Emissions." *Nature Climate Change* 6(1): 42–50. doi:10.1038/nclimate2870.

Social Carbon. 2025. "Social Carbon." https://www.socialcarbon.org/ (May 18, 2025).

Sonderegger, Gabi, Andreas Heinimann, Vasco Diogo, and Christoph Oberlack. 2022. "Governing Spillovers of Agricultural Land Use through Voluntary Sustainability Standards: A Coverage Analysis of Sustainability Requirements." *Earth System Governance* 14: 100158. doi:10.1016/j.esg.2022.100158.

S&P Global. 2025. "S&P Global Registry - Public Reports." https://mer.markit.com/br-reg/public/index.jsp (February 18, 2025).

Streck, Charlotte. 2020. "Who Owns REDD+? Carbon Markets, Carbon Rights and Entitlements to REDD+ Finance." *Forests* 11(9): 959. doi:10.3390/f11090959.

UN Human Rights Special Procedures. 2024. *COP29: Unexpected Adoption of Carbon Market Standards in Baku Raises Concerns.* https://www.ohchr.org/sites/default/files/documents/issues/climatechange/statements/2024-11-19-mandate-holders-stm-carbon-markets-st.pdf (August 19, 2025).

UNFCCC. 2024. *Draft Tool: Article 6.4 Sustainable Development Tool.* https://unfccc.int/sites/default/files/resource/a64-sbm013-aa-a10.pdf (August 29, 2025).

UNFCCC. 2025. "CDM: Project Activities." https://cdm.unfccc.int/Projects/projsearch.html (February 18, 2025).

Valiergue, Alice, and Véra Ehrenstein. 2023. "Quality Offsets? A Commentary on the Voluntary Carbon Markets." *Consumption Markets & Culture* 26(4): 298–310. doi:10.1080/10253866.2022.2147162.

Verra. 2017. "CCB Standards 3.1." https://verra.org/wp-content/uploads/2024/07/CCB-Standards-v3.1_ENG.pdf (May 15, 2025).

Verra. 2022. "VCS Standard 4.3." https://verra.org/wp-content/uploads/2022/06/VCS-Standard_v4.3.pdf (May 15, 2025).

Verra. 2024a. "VCS Standard 4.7." https://verra.org/wp-content/uploads/2024/04/VCS-Standard-v4.7-FINAL-4.15.24.pdf (May 15, 2025).

Verra. 2024b. *Verra Program Fee Schedule.* https://verra.org/wp-content/uploads/2024/10/Verra-Program-Fee-Schedule-v1.0.pdf (June 25, 2025).

West, Thales A. P., Sven Wunder, Erin O. Sills, Jan Börner, Sami W. Rifai, Alexandra N. Neidermeier, Gabriel P. Frey, and Andreas Kontoleon. 2023. "Action Needed to Make Carbon Offsets from Forest Conservation Work for Climate Change Mitigation." *Science* 381(6660): 873–77. doi:10.1126/science.ade3535.

World Bank. 2024. *State and Trends of Carbon Pricing 2024.* Washington, DC: World Bank. http://hdl.handle.net/10986/41544 (February 20, 2025).

WorldPop. 2025. "Open Spatial Demographic Data and Research." https://www.worldpop.org/ (May 27, 2025).

Wunder, Sven, Dario Schulz, Javier G. Montoya-Zumaeta, Jan Börner, Gabriel Ponzoni Frey, and Bibiana Betancur-Corredor. 2024. "Modest Forest and Welfare Gains from Initiatives for Reduced Emissions from Deforestation and Forest Degradation." *Communications Earth & Environment* 5(1): 394. doi:10.1038/s43247-024-01541-1.

Data appendix

The data were downloaded on 7 July 2024. The dataset was manually filtered in statistical software to include only land deals larger than 200 hectares, concluded after the year 2000, with the stated investment intention of carbon sequestration and the "carbon offset" variable selected. In addition to these filters, deals were manually reviewed to exclude those involving only the transfer of carbon rights or community-based projects. Furthermore, deals with unclear links to the VCM were also excluded. This report includes the following deal IDs recorded on the Land Matrix website (www.landmatrix.org):

1422, 1440, 1454, 1570, 1757, 1791, 1794, 1810, 1811, 1812, 2375, 3017, 3023, 3156, 3214, 3389, 3404, 3736, 3738, 3775, 3785, 3795, 3852, 4161, 4717, 5024, 5116, 5119, 5120, 5122, 5193, 5214, 5296, 5585, 5883, 5906, 5908, 7621, 7625, 8063, 8082, 8906, 9402, 9759, 9769, 10036, 10178, 10233, 10246, 10295, 10316, 10317, 10320, 10349, 10350, 10354, 10356, 10362, 10363, 10364, 10370, 10373, 10376, 10378, 10380, 10387, 10393, 10399, 10400, 10407, 10416, 10417, 10418, 10419, 10437, 10439, 10440, 10441, 10515, 10523, 10530, 10534, 10537, 10540, 10545, 10550, 10551, 10552, 10559, 10566, 10567, 10568, 10570, 10587, 10588, 10595, 10599, 10602, 10604, 10606, 10613, 10616, 10636, 10644, 10659, 10674, 10675, 10681, 10687, 10717, 10718, 10728, 10732, 10733, 10742, 10751, 10755, 10773, 10814, 10819, 10827, 10829, 10831, 10833, 10835, 10855, 10858, 10860, 10888, 10891, 10893, 10905, 10906, 10956, 11000, 11009, 11015, 11029, 11061, 11062, 11063, 11064, 11073, 11076, 11079, 11081, 11091, 11102, 11104, 11107, 11117, 11138, 11139, 11141, 11143, 11144, 11145, 11146, 11147, 11149, 11150, 11152, 11153, 11160, 11161, 11162, 11163, 11166, 11167, 11169, 11170, 11171, 11173, 11174, 11175, 11177, 11178, 11181, 11183, 11186, 11195, 11197, 11198, 11199, 11200, 11202, 11203, 11204, 11211, 11212, 11214, 11215, 11217, 11218, 11220, 11222, 11223, 11225, 11226, 11227, 11232, 11244, 11245, 11247, 11251, 11253, 11254, 11257, 11269, 11272, 11273, 11301, 11303, 11304, 11355, 11356, 11368.

LAND MATRIX

Visit and contribute at www.landmatrix.org

This research forms part of the Land Matrix Initiative Phase 4, which focuses on enhancing transparency and accountability in land acquisitions, particularly concerning Indigenous Peoples and local communities, biodiversity hotspots, and emerging pressures on land in the context of climate change and sustainable supply chains. Funds from the German Federal Ministry of Economic Cooperation and Development (BMZ) (Grant No. 2023.0124.0), the European Commission (Grant No. FOOD/2022/434 – 707) and the Swiss Agency for Development and Cooperation (SDC) (concerning a contribution signed on 29.07.2022 and valid until 31.12.2024), are greatly appreciated.

European Commission

Federal Ministry for Economic Cooperation and Development

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development and Cooperation SDC

The Land Matrix Initiative's parters are:

UNIVERSITÄT BERN
CDE CENTRE FOR DEVELOPMENT AND ENVIRONMENT

cirad AGRICULTURAL RESEARCH FOR DEVELOPMENT

GIGA German Institute for Global and Area Studies Leibniz-Institut für Globale und Regionale Studien

RECONCILE

INTERNATIONAL LAND COALITION

Asian Farmers' Association for Sustainable Rural Development

екодія ecoaction.org.ua

FUNDAPAZ FUNDACIÓN PARA EL DESARROLLO EN JUSTICIA Y PAZ