In collaboration
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WORLD ECONOMIC FORUM

The Untapped Potential of Great Green Wall Voluntary Carbon Market Projects: Unlocking Opportunities for Sahelian Communities

WHITE PAPER

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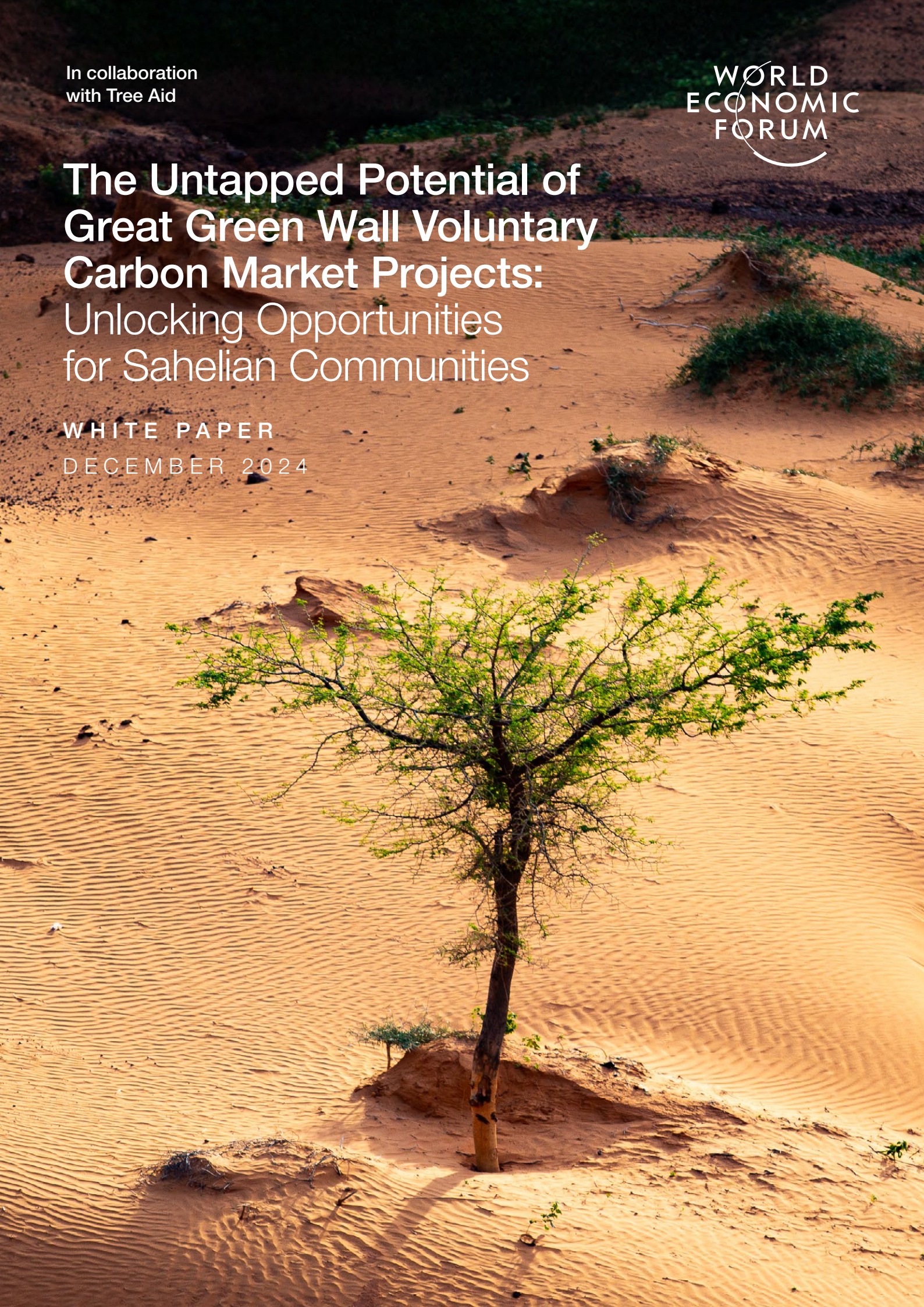

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Foreword

Voluntary carbon markets can help channel finance to communities facing escalating impacts of climate change in the Sahel.

Nicole Schwab
Co-Head, Nature Positive Pillar; Member of the Executive Committee; World Economic Forum

The impacts of climate change are increasingly being felt across the globe, but these impacts are not distributed equally. This year, 2024, is predicted to have been hotter than 2023 – the hottest year on record at the time of writing.

On the frontline of climate change and desertification, Sahelian communities are facing escalating challenges, having to adapt to peak temperatures of 45°C during 2024 and with limited access to water and energy.

Within this context, the ambition of the Great Green Wall initiative is critical. However, a financing gap remains and progress is delayed under challenging conditions. 1t.org and Tree Aid have prepared this white paper as a complement to the World Economic Forum's 2022 insight report *The Untapped Potential of Great Green Wall Value Chains: An Action Agenda to Scale Restoration in the Sahel*.[1]

This new report highlights the potential of voluntary carbon markets to facilitate the flow of additional private sector finance, both to help address the financing gap and to accelerate impact on-the-ground for the communities who need it most.

Tom Skirrow
Chief Executive Officer, Tree Aid

The Great Green Wall is an iconic effort to collaboratively tackle regional landscape degradation across 11 Sahelian countries. In order for it to reach the vision of 100 million hectares of restored land and create 10 million green jobs, private sector investment into those landscapes is key.

This paper highlights the growing opportunity to invest in nature-based solutions within the region and achieve valuable commercial, environmental and social returns. Through effective, high-integrity, large-scale voluntary carbon market programming, the degraded lands of the region can be seen as an opportunity rather than a hindrance to that investment.

Central to this opportunity is leveraging the capacities of local land custodians – the Indigenous Peoples and local communities who manage this landscape – to harness and drive forward the potential for restoration. High-quality voluntary carbon market programmes must ensure communities play a central role in the delivery and long-term success of landscape restoration efforts, and foster the potential to drive up local employment and prosperity as envisaged by the goals of the Great Green Wall.

Executive summary

The Great Green Wall initiative to restore 100 million hectares of the Sahara and Sahel is falling behind its 2030 target. Public money has proved insufficient, but the voluntary carbon market could deliver much needed funding.

The Sahel is one of the regions most affected by the climate crisis globally. Extreme heat, land degradation and disrupted weather patterns have inflicted severe damage on a fragile ecosystem and its communities. The African Union-led Great Green Wall for the Sahara and Sahel initiative (GGW), founded in 2007, has set out a grand vision of restoration. The aim is to restore over 100 million hectares of degraded landscapes, through a mosaic of activities focused on forest restoration, regenerative agricultural practices and green job creation.

However, the GGW is falling behind its 2030 target. A reliance on inadequate public funding has failed to deliver the scale of restoration initiatives needed across the region and a new impetus is required to maximize existing opportunities. The extensive land and forest degradation across GGW countries not only provides a major challenge to the region but also a significant opportunity for investment and restoration at scale.

Building on the World Economic Forum's 2022 insight report *The Untapped Potential of Great Green Wall Value Chains: An Action Agenda to Scale Restoration in the Sahel*,[2] this white paper looks at the potential for the GGW to encourage corporate investment through the voluntary carbon market (VCM). It explores VCMs as a viable source of restoration funding and demonstrates the significant investment opportunity which, if handled correctly, could be a "win-win-win" scenario for nature, community and private sector investors. Analysis by Tree Aid suggests an untapped VCM potential of 1.8 billion tonnes of carbon dioxide-equivalent (tCO_2e) across the region, equivalent to a potential carbon asset value of $28 billion at 2023's market price of $15.74, which is predicted to increase significantly.[3]

This report also addresses some of the misconceptions about investment in the region, showcasing examples of existing carbon projects and looking at ways to manage risk. It demonstrates how many of the actual and perceived risks of investing in the region can be mitigated through the innovation and capacity building already underway and shows that investor-ready initiatives do exist across GGW countries.

The report concludes with five key recommendations to develop and support the investment environment:

1. **Strengthen the regulatory framework for voluntary carbon markets in the Sahel**: Regulation gaps at national policy level lead to uncertainty, which inhibits expansion of the carbon market in the Sahel. Governments and international institutions must develop a fully robust policy framework in order to create a thriving market environment.
2. **Mobilize ongoing public funding to strengthen the enabling environment for future carbon investments**: There has already been a great deal of investment in building the capacity of communities to manage their landscapes effectively. New carbon investments can take advantage of this past and ongoing work to align and maximize returns for communities.
3. **Generate new VCM public-private partnerships to de-risk private sector investment**: Given the higher risk profile of the Sahel, additional incentives must be created to encourage private investment. Donor governments and multilateral development banks should look to co-invest in carbon-sequestering restoration work, given the substantial social, economic and environmental benefits created from building a thriving carbon market.
4. **Focus on community-centred approaches to create green jobs**: To ensure the best possible quality, price point and long-term viability of projects and the voluntary carbon market as a whole, VCM stakeholders must ensure that local communities are empowered to lead and implement projects, and benefit from the available returns.
5. **Improve transparency, information-sharing and learning across all stakeholders**: Information gaps remain across the sector. The market can only thrive if these gaps are closed. Investors, community members, national governments and project proponents must maintain a high level of transparency and information-sharing to develop a successful market.

Acronyms

ARR	Afforestation, reforestation and revegetation
AU	African Union
CCP	Core carbon principles
FAO	Food and Agriculture Organization of the United Nations
FPIC	Free, prior and informed consent
GGW	Great Green Wall for the Sahara and Sahel initiative
ICVCM	Integrity Council for the Voluntary Carbon Market
MRV	Monitoring, reporting and verification
NTFPs	Non-timber forest products
REDD+	Reducing Emissions from Deforestation and forest Degradation
UNCCD	United Nations Convention to Combat Desertification
VCM	Voluntary carbon market
VCMI	Voluntary Carbon Markets Integrity Initiative

Introduction: on the frontline of climate change in the Sahel

Progress in achieving sustainable Great Green Wall impacts has been slow since its launch in 2007, but greater carbon project investment in the Sahel could change this.

> **“ The [Great Green Wall] initiative aims to restore 100 million hectares of degraded land and create 10 million green jobs by 2030.**

In the Sahel, communities are on the frontline of the climate crisis. The dryland ecosystems surrounding the Sahel are some of the most vulnerable to climate change in the world, with temperatures rising 1.5 times faster than global averages.[4] Approximately 80% of people in the region depend on agriculture.[5] In 2023, the combined effects of climate change and conflict left 6.3 million people food insecure,[6] with over 150 million people across Africa struggling to meet basic food needs.[7] By 2050, climate shocks could send an additional 13.5 million people into poverty.[8]

The Sahel’s Great Green Wall initiative (GGW) is an ambitious movement. Led by the African Union and launched in 2007, it spans 8,000 kilometres across the Sahel and involves 11 countries: Burkina Faso, Chad, Djibouti, Eritrea, Ethiopia, Mali, Mauritania, Niger, Nigeria, Senegal and Sudan.

The initiative aims to restore 100 million hectares of degraded land and create 10 million green jobs by 2030. In an area where desertification poses one of the most severe risks for population displacement, the GGW is an essential initiative for restoring forests, vegetation, biodiversity and land fertility, while improving food security and climate resilience.[9] However, progress has been slow, with only around 18% of the GGW’s restoration activities completed by the end of 2020, 13 years after its launch.[10]

Carbon finance, driven by private sector investment, could provide a crucial tool to overcome the GGW funding gap by delivering resources directly to local communities at the frontline of the climate crisis. In its 2024 report,[11] the African Carbon Market Initiative stated: “With voluntary carbon credits valued at roughly $2 billion globally and potentially growing 5-50x by 2030, high-integrity carbon markets could provide significant benefits to African people and be a critical source of climate finance for the continent.” However, carbon project investment in the Sahel has been slow to date, partially due to a challenging environmental and political context.

A key recommendation from the World Economic Forum’s *The Untapped Potential of Great Green Wall Value Chains* report[12] was to gain a clearer understanding of the region’s carbon potential. To help unlock investment for GGW countries, this white paper responds to the opportunities and requirements in the region, by providing an analysis of the voluntary carbon market potential of these countries and offering solutions to some of the investment challenges.

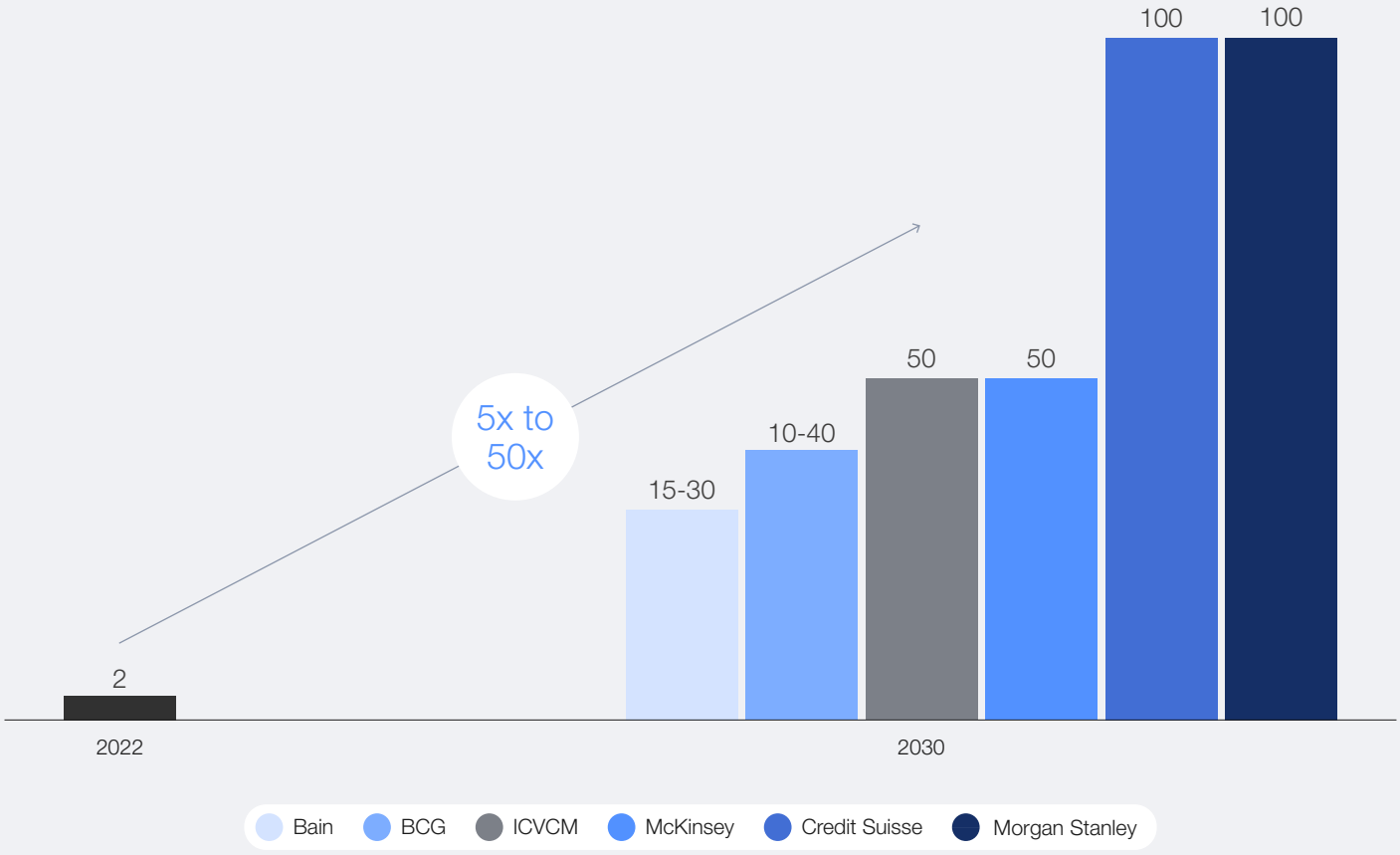
1 Untapped investment opportunities in GGW

Untapped investment opportunities in the Great Green Wall could bring positive impacts for people, biodiversity and the climate.

1.1 Sahel voluntary carbon market opportunity

Carbon finance is an essential pathway to unlock private sector investment in GGW countries. However, it is currently under-utilized. Recent years have seen strong global growth in demand and prices for VCM credits, in particular nature-based carbon removal credits,[13] with market demand expected to continue growing strongly (see Figure 1). Globally, while year-on-year prices for overall carbon credits fell in 2023 in response to market criticisms,[14] prices for more highly regarded afforestation, reforestation and revegetation[15] (ARR) projects increased from $12.05 to $15.74.[16] This upward trend speaks to a growing recognition of the importance of high-integrity removal credits.[17] These prices are expected to continue rising, with BloombergNEF predicting that prices for removals-based carbon credits could reach $146 per tonne by 2030 and $172 per tonne by 2050.[18]

FIGURE 1 **Global carbon credit market size projections under different scenarios ($ billions)**



Notes: Projections may differ significantly depending on a number of varied future pathways to decarbonization. BCG = Boston Consulting Group, ICVCM = Integrity Council for the Voluntary Carbon Market

Source: Africa Carbon Markets Initiative.[19]

Image credit: Tree Aid

Only 74 of the 1,395 VCM projects registered in Africa are attributed to nature-based solutions.

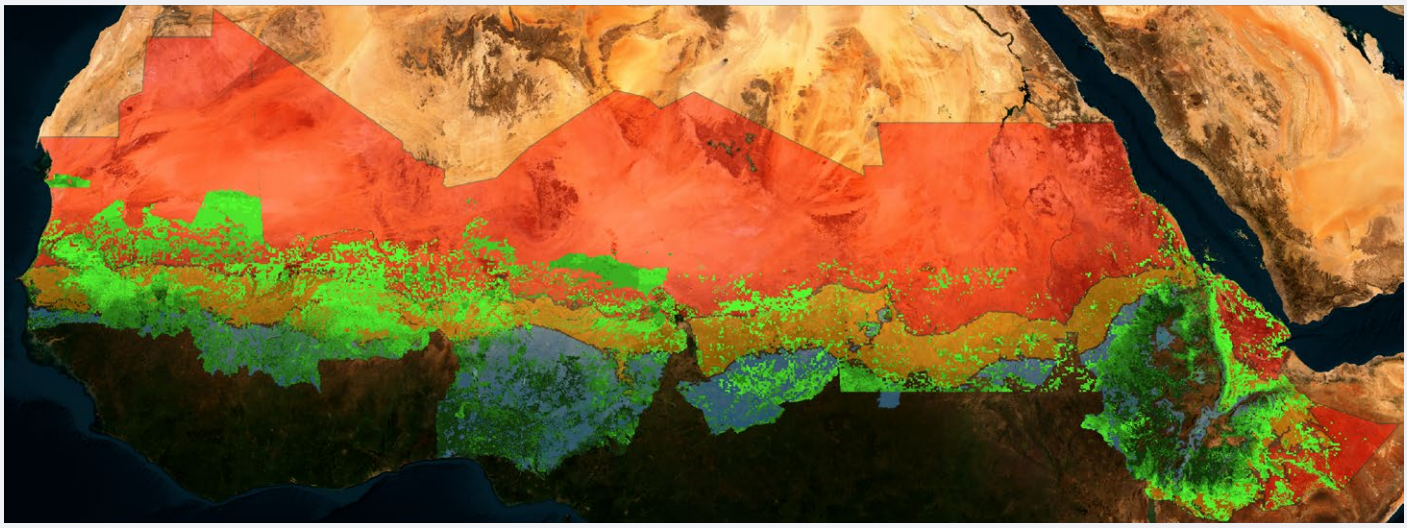
In 2022, Ecosystem Market Place estimated the global transaction value for forestry and land carbon credits at $1.1 billion.[20] There are currently 1,395 registered VCM projects in Africa, but despite the growing demand and price for carbon removal projects, only 74 of these are attributed to nature-based solutions, in particular afforestation, reforestation and revegetation projects, with just 11 of these in GGW countries.[21] Nevertheless, with the growing demand for high-integrity ARR removals credits, there is an opportunity for further voluntary carbon market investment in GGW countries.

1.2 Carbon sequestration potential

Between 2018 and 2020, the Food and Agriculture Organization of the United Nations (FAO) led a major land-use data collection and analysis study, known as the Africa Open D.E.A.L (data for environment, agriculture and land).[22] Working in collaboration with the African Union Commission, the Pan African Agency of the GGW and national stakeholders, the aim was to identify the carbon sequestration potential of GGW intervention zones, as identified by the United Nations Convention to Combat Desertification (UNCCD), and provide a consistent basis for the Nationally Determined Contributions of countries in the region. The FAO study's analysis of the Sahel zones, comprising 241.3 million hectares (Mha) found the potential net carbon gain[23] to be 0.799 billion tonnes of carbon dioxide-equivalent (tCO_2e) – net of 1.18 billion tonnes lost from soil organic carbon stocks.[24]

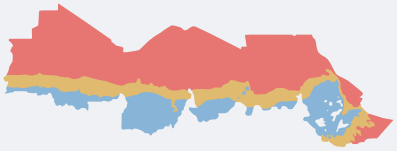
In its own analysis of the potential unrealized carbon across the Great Green Wall,[25] conducted specially for this report, Tree Aid began by looking within the total administrative boundaries of the 11 GGW countries, excluding non-dryland locations as defined by Köppen-Geiger climatic zones[26] (see Figure 2). The analysis identified potential areas of carbon sequestration eligible for the voluntary carbon market (i.e. investible carbon from the private sector perspective). Tree Aid's analysis was restricted to those areas under stable land uses over the past 10 years. This is a key VCM eligibility criterion, as it helps to avoid a perverse incentive that could drive reforestation of land that was deliberately cleared in advance to take advantage of carbon payments.

FIGURE 2 | **Carbon sequestration potential across GGW countries**



Koppen Geiger Climate Zones

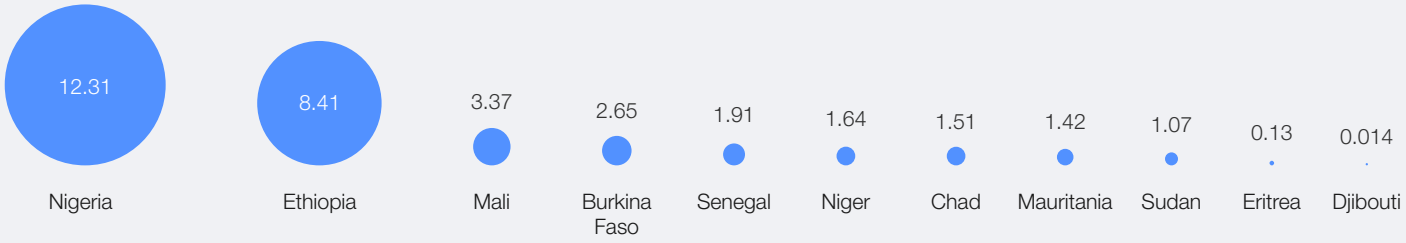
Tropical savannah | Hot arid desert | Hot arid steppe



Unrealised potential carbon storage (t carbon per hectare)

0.1 - 5 | 5 - 15 | 15 - 25 | 25 - 35 | 35 - 45 | 45 - 65 | 65 - 75 | 75 - 85 | 85 - 95 | >95

Carbon sequestration potential across countries of the Great Green Wall (billion tonnes CO_2e)



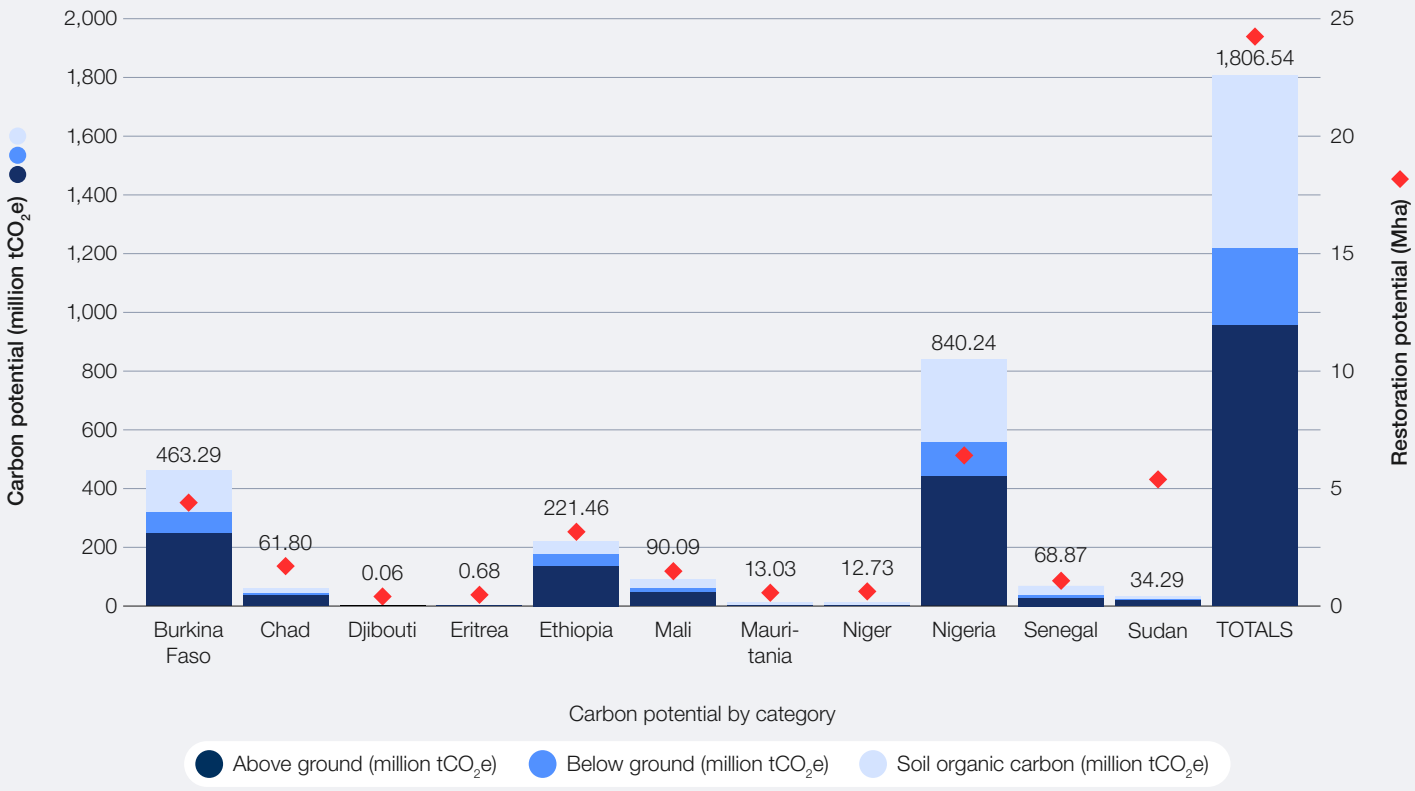
Source: Tree Aid.[28]

24.31 Mha are available in desert, arid and tropical savannah zones of GGW countries for VCM projects - offering an estimated 1.81 billion additional tonnes of CO2e storage.

Based on this analysis, Tree Aid estimates that 24.31 Mha are available in desert, arid and tropical savannah zones of GGW countries for VCM projects such as afforestation, reforestation and revegetation – offering an estimated 1.81 billion additional tonnes of CO_2e storage in forests, cropland and grasslands and by reclaiming bare land. The estimate was further verified through a hectare-by-hectare comparison with potential growth rate data from Tree Aid's voluntary carbon projects, indicating that this figure is a well-supported, conservative estimate. This could result in a carbon asset valued at $28 billion at the 2023 market price of $15.74 for ARR carbon credits, a figure that is predicted to increase significantly over the coming decade.[27]

The potential carbon removal highlighted by Tree Aid encompasses a diverse range of restoration interventions that should be based on current land uses to avoid land conversion. Areas which have high potential in above-ground biomass would benefit from reforestation in community-led voluntary carbon market projects, whereas areas with high potential for soil organic carbon[29] would be better suited to agricultural land management and improved grassland management[30] (see Figure 3).

FIGURE 3 | **GGW enabling environment for VCM projects – ranked by country and improvement (2023-2024)**



Source: Tree Aid analysis, see Annex 1.

Image credit: Tree Aid

1.3 Enabling environment

A key consideration in project investment is the enabling environment, in both political and policy terms, as well as the direct relationships between project developers, government and community leaders from the national to community level. While direct relationships must be assessed on a case-by-case basis, some broad conclusions can be drawn on the wider environment. Table 1 summarizes the enabling environment for VCM projects in all 11 GGW countries, ranked by country against three criteria: carbon market readiness; investment landscape; and climate, environment and people.

TABLE 1 **GGW countries' VCM potential (in millions of hectares & millions of tonnes of CO_2-equivalent)**

Voluntary Carbon market:	Burkina Faso	Chad	Dji-bouti	Eritrea	Ethiopia	Mali	Mauri-tania	Niger	Nigeria	Senegal	Sudan
Attractiveness index	***	***	***	***	****	***	***	**	****	****	**
Pillar 1: Carbon market readiness	****	**	*	***	*****	***	**	**	*****	***	*
Pillar 2: Investment landscape	**	***	***	***	***	*	***	***	***	****	**
Pillar 3: Climate, environment and people	***	***	***	***	****	***	***	***	*****	****	****
Improvement in attractiveness ranking (2023 to 2024)	***	****	>	>	>	***	**	*	***	>	*

Notes: 1) The table converts Abatable's *VCM Investment Attractiveness Index* rankings of each country out of 100 into a five-star rating. Countries with rankings from 0-19 receive one star; 20-39 receive two stars; 40-59 three stars; 60-79 four stars; and 80-100 five stars. 2) The bottom row refers to progress in national ranking of investment attractiveness over the past year, using the same star system. The > symbol refers to a lack of progress, which could include a backwards movement as other countries become more attractive.

Source: Abatable. (2024). *VCM Investment Attractiveness Index*.[31]

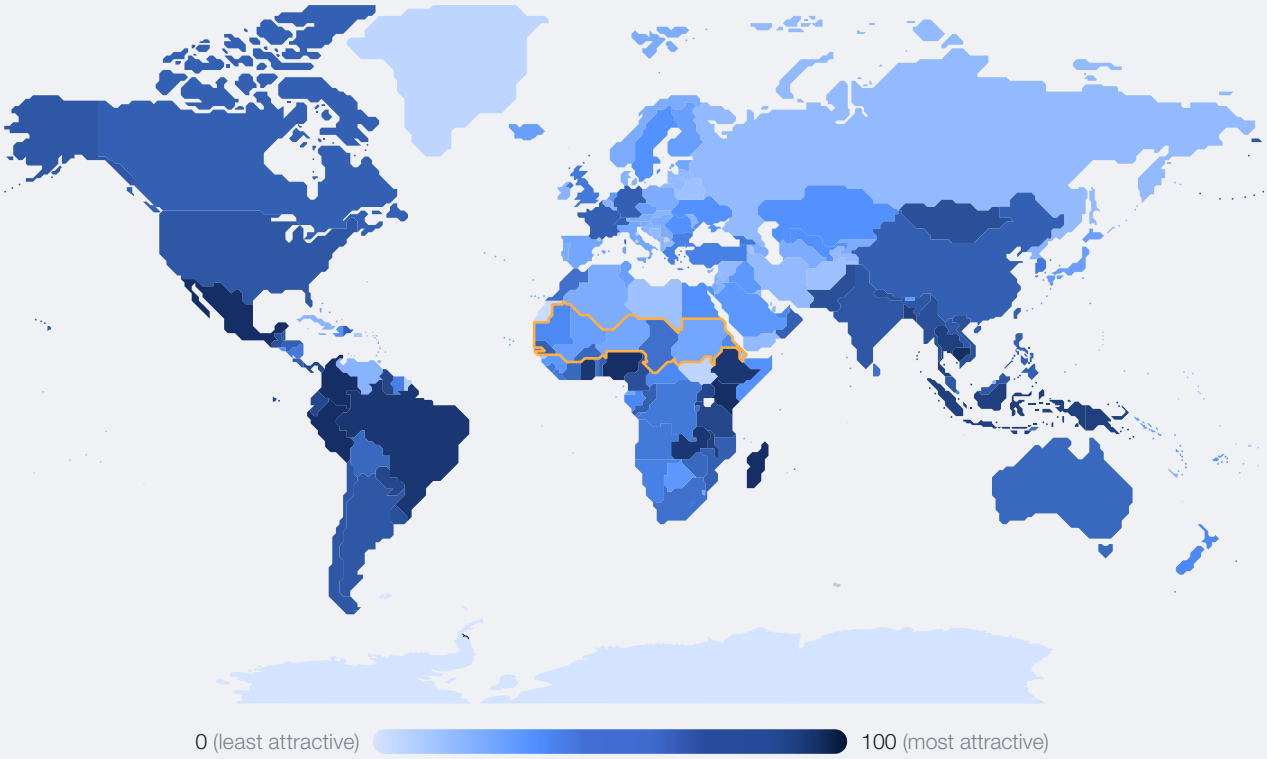
Nigeria and Ethiopia are rated respectively the 7th and 13th most attractive countries globally for VCM investment.

Figure 4 gives an overview of worldwide VCM attractiveness ratings. It is notable that a number of middle-income GGW countries are among the most attractive globally for VCM investment, with Nigeria rated 7th and Ethiopia 13th. Many GGW countries are also among those showing most improvement in terms of attractiveness.

However, it should be noted that a strong project-enabling environment does not automatically result in best practice or high-integrity carbon projects. For example, strong government policies may enable project development on public land while reducing access to carbon finance on community land. Carbon projects on public land may also be favoured by some investors, as they avoid some of the risks related to changing individual or community land-use practices and potentially long or expensive free, prior and informed consent (FPIC) processes. As a result, such an approach may prevent local communities directly benefiting from carbon funding.

FIGURE 4 | **Global rating of VCM attractiveness, by country (2024)**

VCM Index score (Global Review)



Source: Abatable

BOX 1 | **Community voices from Burkina Faso**

Ensuring a community-led and community-centred approach will always be essential to maintain high integrity and reduce overall risks, such as those relating to permanence. Engaging with communities, gaining their free, prior and informed consent (FPIC) and ensuring that project benefits are equally shared are principles highlighted by the Integrity Council for the Voluntary Carbon Market as well as the United Nations.[32]

Tree Aid interviewed community members on its project sites in Burkina Faso to discuss their views of carbon:

Awa Convolbo, 37, leads a women's cooperative union producing and selling high-quality, organic shea butter. For Awa, the work goes beyond business; it's about securing a healthier, more sustainable future for her family and for her community. She believes understanding the power of trees in carbon sequestration is key to this vision:

"With carbon, the understanding that we have is that trees capture the air that is not good and release the air that is good," she said. "And when you look at that, it helps human beings, it makes them feel better...If the trees take the bad air and give us the good air, our life expectancy is going to get longer; we will be able to live a little longer."

Saidou Zoungrana, 40, a farmer and president of the Vohoko East Forest cooperative, plays a key role in uniting his community around Tree Aid's Tond Tenga project, recognizing its vital impact on their livelihoods and survival:

"Our standard of living has improved significantly thanks to Tond Tenga, especially the money we earn from tree planting and seedling protection activities," he said. "This money is reinvested in income-generating activities such as raising small ruminants, producing seedlings, growing legumes in our nutritious gardens and processing our forest products."

Saidou welcomes the wider environmental benefits that the project is trying to deliver:

"Our forest areas will produce more, degraded lands will be restored, we will see more diverse trees on our land, the forest will regain its former glory. More trees, more carbon, more income."

Mahamdi Nikiema, 40, has been a farmer in Burkina Faso for most of his life. For Mahamdi, the impact of the Tond Tenga project is already noticeable:

"The activities we carry out in the forest have brought in money that has been used to buy animals, food, pay school fees, pay for health care and other family expenses."

Mahamdi is also planning for the future income that the community will receive from carbon credits:

"The money that will come from looking after our trees will be used to finance income-generating activities that can benefit many."

2 Mitigating the challenges facing investment in VCM projects in the Sahel

Challenges range from drought, land-use change and political instability to perceptions around return on investment, market scepticism and community participation. But experience shows these risks can be mitigated with creativity and collaboration.

2.1 Scepticism of carbon offsetting and avoided deforestation

Considerable criticism and scepticism of carbon reduction and removal claims contributed to a decline in the VCM during 2023. Media outlets called out greenwashing, restrictions on community access to land and forced evictions in a number of carbon offsetting projects.[33] In addition, concerns have been raised over the additionality of avoided deforestation[34] projects[35] and the inclusion in some carbon projects of monoculture plantations, which have been criticized for reducing biodiversity, depleting soil nutrients and increasing vulnerability to pests and diseases.

This malpractice in an unregulated market has increased scrutiny of corporations, resulting in companies halting or reducing investment in the VCM. While this scrutiny is driving the development of high-integrity standards for carbon projects, it has also led to widespread avoidance of carbon markets, reducing investment in communities and the environment in the Global South. This trend highlights the need to address concerns and restore market confidence.

Risk mitigation: High-integrity carbon removal projects in GGW countries address and avoid many of these criticisms. The GGW initiative focuses on ecosystem restoration through reforestation and sustainable agriculture, including the promotion of agroforestry systems, providing measurable, long-term benefits such as improved soil health, water retention and biodiversity.[36] Unlike carbon avoidance projects, carbon removal projects in GGW countries benefit from well-documented data on biomass changes.

High-integrity VCM initiatives in the Sahel should prioritize diverse, native species to restore landscapes, enhance biodiversity and improve water cycles. By planting a mix of native trees, these projects can promote long-term sustainability and resilience to climate change. Growing native species that produce non-timber forest products (NTFPs) can also contribute to resilient value chains, offering economic opportunities for local communities, particularly women and youth. Their involvement in collecting, processing and marketing NTFPs boosts household incomes, strengthens local economies and fosters resilience. The empowerment of women and youth in projects promotes social inclusion, gender equality and the preservation of traditional ecological knowledge – key factors for the long-term success of carbon projects.

Such projects offer co-benefits including enhanced food security, better livelihoods and greater transparency and verification.[37] As a result, projects employing nature-based solutions in the Sahel deliver

“ High-integrity VCM initiatives in the Sahel should prioritize diverse, native species to restore landscapes, enhance biodiversity and improve water cycles.

> Engaging communities from the beginning creates ownership and promotes behavioural change through collaborative decision-making around implementation.

verifiable carbon sequestration alongside socio-economic improvements. Engaging communities from the beginning creates ownership and promotes behavioural change through collaborative decision-making around implementation. The socio-economic benefits generated by these projects can further incentivize communities to sustain project practices independently, without relying on ongoing external funding. Meanwhile, the adaptation measures introduced can help mitigate the impacts of extreme weather events caused by the climate crisis, lessening their severity and impact on communities and further reducing the risk of communities reverting to unsustainable practices.

In addition, progress on standards – such as the guidelines of the Integrity Council for the Voluntary Carbon Market (ICVCM) and the claims code of the Voluntary Carbon Markets Integrity Initiative (VCMI) – enables companies to manage reputational risk and provides buyers with greater confidence in high-integrity credits. High-quality VCM credits that adhere to these standards ensure credibility and command higher market prices under ICVCM's Core Carbon Principles (CCP) label.[38] Projects following these standards can deliver quality carbon removals and drive lasting socio-economic and biodiversity impacts.

2.2 Land conversion risk

Carbon projects may lead to unwanted land-use changes, such as converting agricultural land or natural habitats into forest plantations. This can create conflicts over land priorities, potentially harming food security and disrupting traditional land practices.

Risk mitigation: In the Sahel, reforestation and restoration efforts in VCM target areas aim to restore lost agricultural productivity and biodiversity, while maintaining land-use classifications in locations impacted by desertification and degradation. By focusing on such lands, these projects can improve ecosystem services without affecting local agriculture.

BOX 2 Carbon finance boosts community livelihoods in Uganda

In Uganda, 1.7 million households rely on coffee for income. In 2023, OCP Foundation and the African Plant Nutrition Institute (APNI) initiated the Uganda Coffee, Green Carbon and Diversification Project (UCCP), with the aim of supporting the Ankole Coffee Producers Cooperative Union with revenues from green carbon finance. OCP Foundation is the philanthropic arm of Morocco-based OCP Group, the world's largest fertilizer manufacturer and a major phosphorous mining company.

The UCCP initiative aims to help 3,000 farmers plant 900,000 trees, while training those farmers in improving coffee yield and quality, as well as training 20 local youth in supply chain management, product sourcing and sales. The project will unlock carbon finance to enhance coffee system management, effectively rewarding farmers for the valuable environmental services they provide. By the end of the project timeline, the OCP Foundation expects to see outcomes delivered by both restoration and carbon sequestration.

Source: African Plant Nutrition Institute.[39]

UCCP project goal

Improve livelihoods and climate resilience of smallholder coffee systems in Uganda.

UCCP project components

1. Activating carbon finance for improved management of coffee systems.
2. Enabling farmers to improve coffee systems productivity and quality through diversification.
3. Inspiring youth and farmers to link diversification outcomes with markets.
4. Assessing the impact of improved agronomy on soil carbon and coffee performance.
5. Although not in a GGW country, the project illustrates how carbon projects in Africa can be developed to harness the power of carbon finance in supporting community priorities, livelihoods and productivity.

2.3 Disputed land tenure

Unclear or disputed land ownership often creates barriers to the success of carbon projects, with the risk of projects becoming entangled in legal disputes that hinder development, reduce investor confidence and ultimately compromise long-term sustainability.

Risk mitigation: Governments in GGW countries are making progress in recognizing and strengthening community land rights. Recent legal reforms across the region are increasingly recognizing customary user rights, traditionally held under customary law, in relation to land no longer held under state ownership.[40]

Legal reforms are essential in reducing land-tenure conflicts and promoting long-term environmental initiatives such as the GGW and VCM projects, which rely on clear and secure land rights to succeed. Customary tenure and user rights, when managed effectively, can also increase the participation and inclusion of women and young people.

BOX 3 Community-based land-tenure agreements help restore 12,000 hectares

For more than 20 years, Tree Aid has been working with communities across Burkina Faso. One of the key pillars of its work has been in forest governance – establishing long-term, community-based tenure systems for the protection, restoration and sustainable use of community-held forest resources. This work has laid a strong foundation for the development of fair and equitable livelihoods from non-timber forest products.

Established long-term land-tenure agreements and community buy-in have allowed for advanced planning of planting areas, planting density, tree selection and protection. Representative community groups were established and trained in advance of the programme to ensure fully informed and organized village communities could take active decisions in the programme's design. The programme identified 12,000 hectares of severely degraded forest land as requiring restoration and allocated surrounding farmland for agroforestry interventions by participating farmers. Two years into programme implementation, approximately 4 million trees have been grown in degraded forest sites.

The programme was designed with a restoration budget, including initial community benefit payments, financed by a private wealth management company aiming to make a commitment to advanced, large-scale carbon credit purchasing. This "pre-sale" was sufficient to cover the full programme of restoration – with 70% of the funds going to local communities implementing the programme.

Furthermore, the community retains an equity share of the credits produced in each carbon credit issuance. This ensures the long-term commitment of the community, which directly benefits from the success of forest restoration.

Instead of simply benefitting from the initial pre-sale of carbon credits, the advantage to the community of holding a long-term equity share (worth an estimated 1 million credits) is that the community can benefit from the potential upside of appreciating market prices for high-quality carbon credits sold in future on the open market.

Image credit: Tree Aid

2.4 Exclusion of Indigenous Peoples and local communities

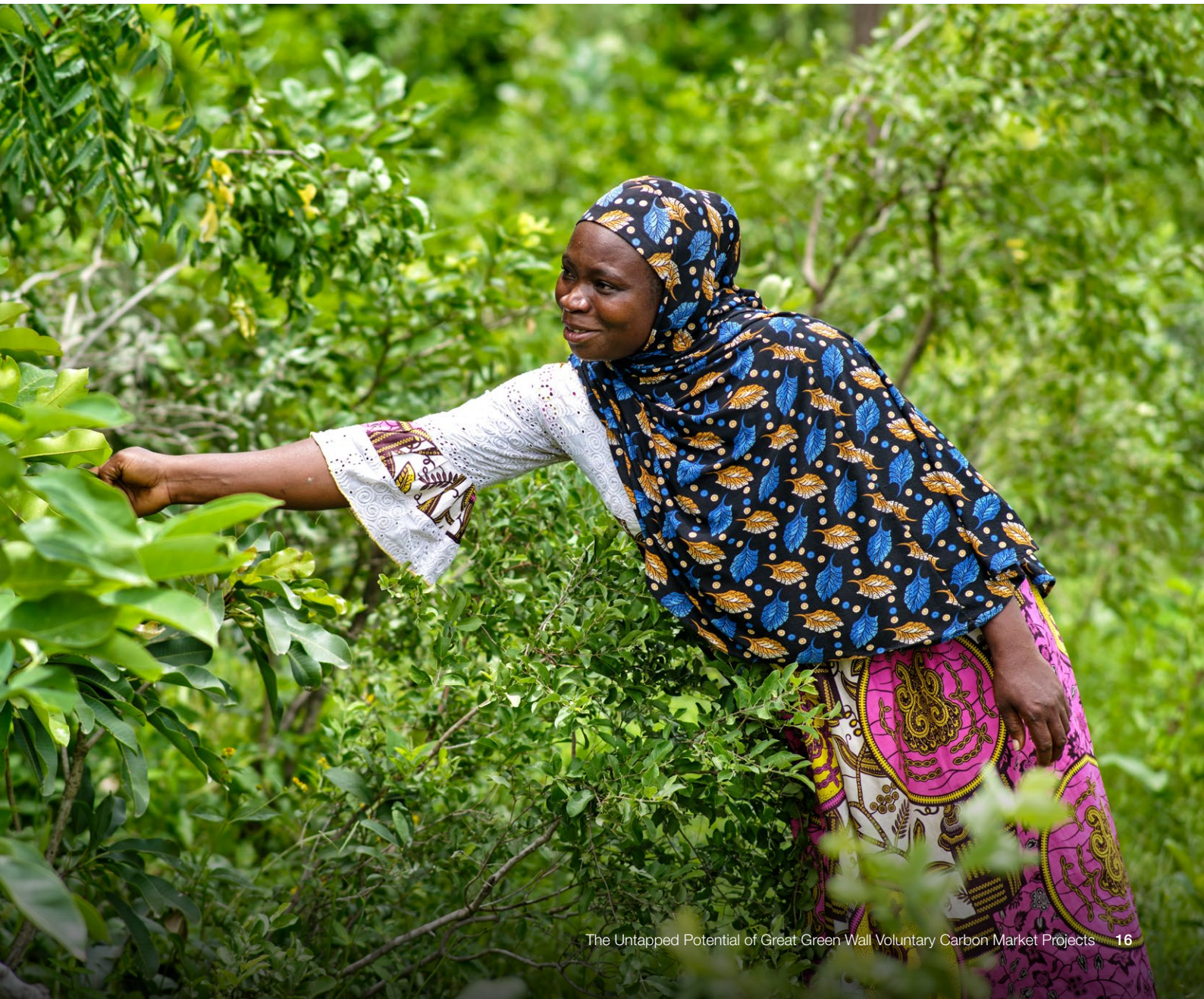
High-integrity projects incorporate "free, prior and informed consent," ensuring communities are consulted and involved in project design and implementation.

Historically, some Indigenous Peoples and local communities (IPLCs) have been excluded from decision-making and from sharing the benefits of carbon projects. Projects have often lacked meaningful engagement or fair benefit-sharing, with communities side-lined and in some cases even evicted from the lands they had farmed or accessed for natural resources for generations.[41]

Risk mitigation: High-integrity projects incorporate "free, prior and informed consent," ensuring communities are consulted and involved in project design and implementation. Benefit-sharing mechanisms provide direct financial returns, employment and capacity-building, making local communities primary beneficiaries and ensuring sustained benefits over time (for example through an equity share in the credits generated). This not only ensures inclusion but improves the likely permanence of voluntary carbon market activities.

Various civil society groups are dedicated to empowering IPLCs. One such group, Namati, based in the US and operating in Sierre Leone, has convened the Grassroots Justice Network to empower communities through greater knowledge of law and justice, including the rights of communities in relation to carbon credits. This knowledge can help ensure that carbon projects are implemented with integrity, where communities are empowered as decision-makers over their land and equipped to negotiate fair pricing, while maintaining access to resources and sustainable land practices. This people-centred approach protects communal lands and access while delivering significant co-benefits. The network now numbers more than 2,400 groups from 160 countries – with 1,115 members belonging to countries in the Sahel.[42]

↓ **Image credit:** Tree Aid



BOX 4 | **Paralegals equip communities in Sierra Leone with legal knowledge to negotiate carbon justice**

In August 2024, Germany's Deutsche Welle broadcaster released a documentary on Sierra Leone's paralegals – professionals trained in the law who travel to remote rural communities across the country.[43] Supported by civil society organization Namati and equipped with an innate understanding of local culture, traditions and dialects, they provide people with a legal education on basic land-tenure rights.

Legislation is an essential reinforcing component to community centred-approaches. In Sierra Leone, laws took effect in 2022 that require any land agreement to first pass review by village communities. The paralegals ask these communities to suggest bylaws that can support their own priorities before negotiating an agreement with a company. The objective is to secure fair pricing and uphold community rights and access.

Namati's carbon justice work also proposes pooled funds for the provision of legal and technical support for project-affected communities, based on six carbon justice principles championed by the Grassroots Justice Network:[44]

- No pay to pollute
- Respect community rights to land and water
- Free, prior and informed consent
- Fair compensation
- Fair participation
- Enforcement

2.5 Risk of non-viable projects due to slow growth and high mortality

Through community engagement and low-tech land management techniques, Tree Aid has achieved a survival rate of 70% averaged from 32 million trees grown over 37 years.

Harsh environmental conditions, including poor soil quality, low rainfall and extreme temperatures, mean that restoration projects in the Sahel can experience slower tree growth than in other parts of Africa or the world, with potentially high mortality rates. Concerns about slow growth rates and low tree survival in restoration projects in the GGW region make these efforts appear less viable compared to tropical regions, raising doubts about their long-term effectiveness. These challenges, along with other factors outlined in this section, can potentially increase the likelihood of low returns, particularly for ARR projects where high upfront costs are needed to restore land.

Risk mitigation: Despite these concerns, project designs are adapting to these challenges. The use of drought-resistant, native tree species thatare better suited to local conditions is helping to improve survival rates.[45] For example, through community engagement and low-tech land management techniques, Tree Aid has achieved a survival rate of 70% (averaged from 32 million trees grown over 37 years). Innovative technologies and sustainable land management techniques, such as water harvesting and soil conservation, can also enhance soil moisture and fertility, combating low rainfall and poor soil. Combined with practices such as assisted natural regeneration, these strategies are making reforestation and restoration in the Sahel both effective and sustainable.

Low returns are therefore by no means inevitable in GGW countries. Carbon projects, particularly those developed at scale, can achieve potentially high returns on investment (see Box 5). Additionally, having a presence on the ground, supported by knowledge of the local context regarding the environment and national policy, can reduce risks and increase investor confidence. Potential high returns underscore the financial viability for GGW voluntary carbon market projects, which can also deliver significant environmental and social benefits, making them a promising option for investors.

BOX 5 | Example of the voluntary carbon market potential in GGW countries

Tree Aid carbon projects in GGW countries, registered under Verra, have the potential to achieve competitive internal rates of return (IRR) for high-quality removals credits, especially when programmes are run at scale.

Figure 5 provides a detailed breakdown of an illustrative project based on one of Tree Aid's VCM projects under development. The project is for potential afforestation, reforestation and revegetation in a semi-arid zone of the GGW, focused on the restoration of 14,000 hectares of degraded wooded savannah and the planting of 1,500 hectares of farmland using agroforestry systems.

Developed through extensive on-the-ground feasibility assessments, community discussions and comprehensive tree-growth and financial modelling, the project identifies an anticipated carbon sequestration of 4.5 million tCO_2e and a 19.1% return for investors over a 40-year period. At the same time, 45% of credits go to the community to extend the benefits they receive throughout the lifetime of the project by selling on the spot market.

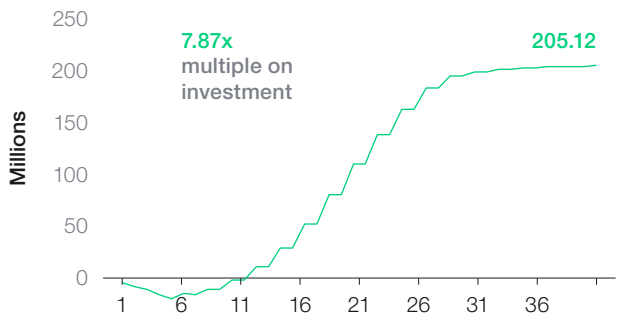
Based on an investment over seven years of $26.1 million for development and operations, this project could yield a 19.1% internal rate of return (IRR) for investors, with a 55% credit share to investors at an investor indicative price of $10.50 per credit, while providing communities with a 45% credit share that yields $90-120 million in direct benefits.

FIGURE 5 Illustrative carbon removal project for semi-arid region with high potential IRR

Methodology	Verra VM0047 (TBC)
Estimated number of credits issued	4,5M tCO_2e
Total trees planted	8M diverse native trees
Total hectares planted (ha)	
– Reforestration	14,000
– Agroforestry	1,500

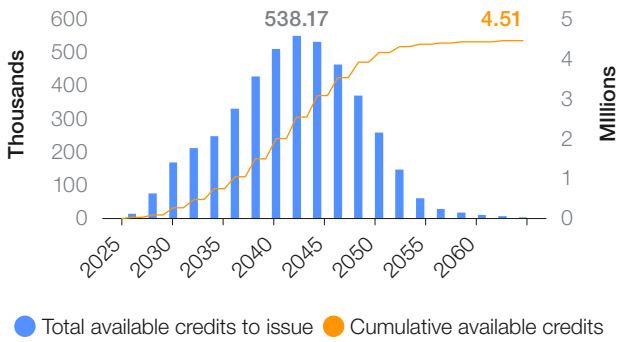
Investor profit and investment need

Cumulative investor profit ($)

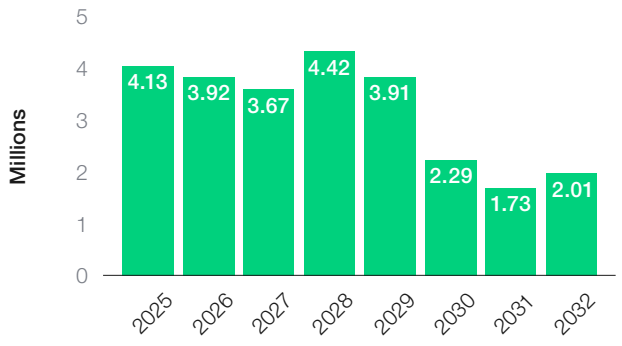


Carbon credit generation and pricing curves

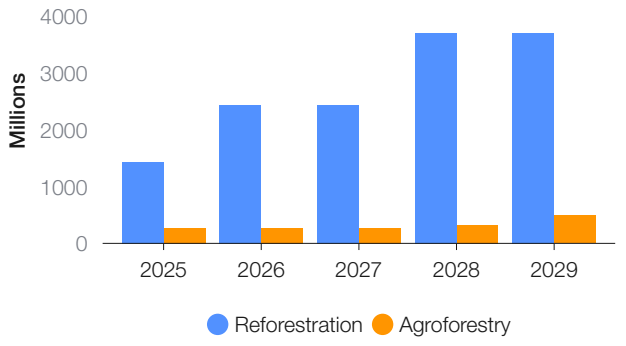
Credits issued (tCO_2e)



Investment needed and tranches ($)



Hectares planted



Source: Tree Aid.

Image credit: Tree Aid

2.6 Risk of deforestation from drought and desertification

Given the arid conditions of the Sahel, the region is susceptible to drought and desertification caused by extreme temperatures, which can lead to wildfires and soil erosion. Adapting to changing climatic conditions is necessary for the resilience of GGW efforts.

Risk mitigation: Inclusive forest-governance models improve sustainable forest management by defining and enforcing the modalities of access and control of forest resources.[46] Through creating sustainable land-use practices, promoting behavioural change and implementing environmental safeguards such as forest guards, firebreaks and artificial ponds, project implementors can reduce the risks, occurrences and spread of incidences like wildfires. Restoring soil quality through forests also improves water retention and reduces the risk of run-off and flooding in areas affected by desertification.[47]

BOX 6 Ensuring community ownership and adaptation through strong local governance and direct livelihood benefits

One of the critical elements in the longevity of quality reforestation and restoration projects is the integration of capacity building and knowledge exchange efforts to promote sustainable land management, livelihoods and governance development.

During the EU-funded Regreening Africa programme (2017-2023), implementing partners worked with communities to develop governance capacity through village land commissions, rural resource centres and capacity building for youth.

The programme was also careful to align its biophysical characteristics (e.g. planting the right tree in the right place at the right time, along with managed natural regeneration) with a clear focus on improving livelihoods by incorporating species that contribute to food security and income generation. This approach helped strengthen the links between restoration and local benefits for communities.

Meanwhile, the selection of quality and improved plants and seeds ensured that value chain development did not compromise regeneration of the perennial species that delivered the restoration and sequestration benefits.

The Regreening Africa programme supported 607,088 households to undertake restoration activities on 954,440 hectares across eight countries, including Ethiopia, Mali, Niger, Senegal and Burkina Faso.

Source: World Agroforestry.[48]

2.7 Political instability

> Maintaining reputable practices and relationships with local actors for project implementation is key to the continuation of operations.

The Sahel is one of the most politically challenging regions in the world, with significant instability, including conflicts, insurgencies and violence. This situation, which has left 94 million people in need of humanitarian assistance,[49] has been exacerbated by the climate crisis. Instability can disrupt project activities, deter investment and pose safety risks for project staff and local communities.

Risk mitigation: The risk of political instability has no immediate solution, but it is important not to let this be an absolute determining factor for investing in these areas through carbon finance. Organizations such as Tree Aid, the International Centre for Research in Agroforestry (ICRAF), SOS Sahel, World Vision and others have demonstrated it is possible to continue successfully operating in these areas, despite the contextual challenges, and deliver for communities on the ground. Maintaining reputable practices and relationships with local actors for project implementation is key to the continuation of operations. For countries, engagement in the carbon market can connect local to global with the sale of credits helping to mitigate some of the socio-economic challenges caused by conflict.

Furthermore, improvements in monitoring, reporting and verification (MRV) tools can help to reduce the need for extensive physical data collection, as previously required by existing standards.

2.8 Policy environment

A lack of coherent and consistent policy on carbon markets within many GGW countries provides a challenge for investor confidence. As highlighted by Abatable's *Voluntary Carbon Market Investment Attractiveness Index*,[50] a strong national carbon policy framework is a major factor in investment decision-making.

Risk mitigation: Good progress has been made over the past year in the development of carbon market regulations in Africa.[51] Organizations such as the Africa Carbon Markets Initiative and the West African Alliance are leading work in this space for establishing supportive policy environments in the region through government collaboration via capacity building and technical assistance.[52] Countries including Ethiopia, Nigeria and Senegal are working to roll out fully transparent and coherent policy frameworks.

While many countries in the GGW do not currently have formal policies, this is down to a lack of capacity rather than an unwillingness to welcome carbon investments. Despite the lack of policy framework in countries such as Mali and Burkina Faso, investment has been possible and bespoke agreements with government have been made.

BOX 7 Capacity building and access to finance critical to a just climate transition

The United Nations Economic Commission for Africa (UNECA) is working to empower and transform African and GGW countries. Its work includes helping to support policy and capacity development in relation to climate change, climate finance, carbon markets and a just transition. UNECA also supports access to innovative financing mechanisms for adaptation and resilience, with a strong emphasis on community engagement and equitable outcomes that reach women and youth.[53]

Through its work in the region, UNECA has highlighted the Sahel's unique potential. In fact, despite perceptions to the contrary, economic growth in the Sahel region has been among the highest in Africa, itself the continent with the second highest growth rate in the world.[54]

3 Recommendations to consolidate progress and harness the potential of the VCM

Priorities include stronger regulation, building on past efforts, partnerships to de-risk investment, community-centred approaches and greater transparency.

Recommendation 1

Strengthen the regulatory framework for voluntary carbon markets in the Sahel

There remain regulatory gaps at national policy levels and this uncertainty can challenge market expansion. To develop a fully robust policy framework, governments, the UN and international institutions such as the World Bank, the International Monetary Fund and others must provide support to create an enabling environment for carbon markets. Clear and consistent regulations are essential for attracting investors, ensuring transparency and maintaining credibility within the market.

↓ **Image credit:** Tree Aid

Recommendation 2

Mobilize ongoing public funding to strengthen the enabling environment for future carbon investments

Organizations like the Center for International Forestry Research and World Agroforestry (CIFOR-ICRAF), Farm Africa, Tree Aid and others[55] have invested a great deal in building the capacity of communities to manage their landscapes effectively. New carbon investments should seek to build upon, and potentially partner with, these past and ongoing efforts in landscape restoration to align objectives and maximize returns. Where large restoration projects funded through grant funding are planned, integrating carbon investment into their design should be considered.

Recommendation 3

Generate new VCM public-private partnerships to de-risk private sector investment

Given the substantial social, economic and environmental benefits that a thriving carbon market can bring, donor governments and multilateral development banks should co-invest in carbon-sequestering restoration work. By establishing public-private partnerships, governments and international donors can help to de-risk investments by funding feasibility assessments, initial registration, free, prior and informed consent processes and even restoration efforts. Since grant funding focuses on impact returns rather than financial returns, this approach would reduce the upfront costs for private investors and significantly reduce risks while boosting the overall return on investment.

Such blended finance approaches represent an opportunity to de-risk, mature and strengthen the integrity of the voluntary carbon market, although the use of public funding to augment private investment in carbon markets carries a risk that the VCM structure becomes fixed around the need for public funding. Design of blended finance models needs to be strategic and follow an approach that aligns with the principle of maturing the VCM with the ultimate goal of ensuring the costs of such de-risking are efficiently accounted for within private capital investment in landscape-level VCM projects. This requires a degree of collaboration and coordination between supply-side market actors including project developers, implementing partners, business and communities.

Recommendation 4

Focus on community-centred approaches to create green jobs

> “Local communities hold the key to delivering effective programming in GGW countries, as their land and custodianship are crucial for creating efficient and permanent solutions to the challenges outlined above.

Local communities hold the key to delivering effective programming in GGW countries, as their land and custodianship are crucial for creating efficient and permanent solutions to the challenges outlined above. By ensuring fully informed decision-making processes and developing robust governance structures, Indigenous Peoples and local communities within the GGW are uniquely positioned to be a major partner in the VCM value chain. Programmes designed to seize VCM opportunities must do so fully cognizant of the role Indigenous Peoples and local communities should play and co-design interventions which create the long-term foundations for success, including sustained benefit-sharing mechanisms.

Recommendation 5

Improve transparency, information sharing and learning across all stakeholders

Information gaps remain across the carbon market sector. The VCM can thrive if these gaps are addressed. Investors, community members, national governments and project proponents must maintain a high level of transparency and information sharing to strengthen market conditions.

There is room for a more structured approach to information-sharing among supply-side and regulatory actors to build capacity, knowledge, strategy and generally mitigate asymmetrical information and power between investors and supply-side actors, including local communities. The risks associated with this imbalance include investors disproportionately benefiting due to insufficient scrutiny of how government and donor funding is applied to private sector investment opportunities. This could hinder the establishment of price expectations that accurately reflect the costs of risk mitigation and the full functionality of high-quality, integrity-driven carbon projects.

Investors require clear visibility of the opportunities, risks, costs and potential returns of working within the region. All stakeholders along the value chain need better visibility into viable financial structures and current per-tonne carbon investment prices.

↓ **Image credit:** Tree Aid

Conclusion

High-integrity carbon projects can deliver a return to both companies and communities.

Investing in voluntary carbon market projects in the Sahel and GGW countries could provide multiple benefits for companies aiming to reach net zero while supporting high-integrity carbon projects. By prioritizing community-led initiatives, these projects enhance reputational and market value for investors while supporting longer-term adaptation efforts. Carbon projects in the Sahel can deliver more than financial returns by integrating social and environmental benefits, creating a full spectrum of positive impacts that extend far beyond carbon sequestration.

For local communities, carbon credits provide an opportunity to support long-term sustainable land management practices. Nevertheless, given the residual risks of voluntary carbon project development, it is important that high-integrity projects are designed to focus on livelihoods and food security benefits to ensure value to communities that goes beyond carbon payments alone.

For the private sector, investing in GGW-related carbon credits is more than a climate commitment; it is a strategic opportunity. By investing in socially and environmentally responsible projects, companies can generate high-quality carbon credits that align with their net-zero targets and enhance their reputation. These investments support sustainable development and a sustainable future while delivering a return to both companies and communities.

Annex: Methodological approach

Analyses are based on the published methodology from Walker et al (2022).[56] We utilized the insights, data and methodologies presented in their work to understand the unrealized carbon sequestration potential across various land-use types, including forests, savannah, grasslands and agricultural areas.

Specifically, the analysis combines global forest inventories with satellite and spaceborne Light Detection and Ranging (LiDAR) data from the Global Ecosystem Dynamics Investigation (GEDI). This approach predicts potential biomass using bioclimatic variables in future climate scenarios, applying a random forest machine learning algorithm. The model accounts for known pixel-level uncertainty at a 500m grid resolution.

Our research then refines this global survey to assess the carbon stock potential of the 11 countries in the GGW region, accounting for the specific climatic conditions present. Using the Köppen-Geiger classification system to focus on arid and semi-arid regions, we estimate a total carrying capacity of over 34 billion tonnes of CO_2 equivalent. Full methodological note here: Our Carbon Finance Methodology | Tree aid.[57]

The literature review was conducted through a systematic approach for identifying, assessing and synthesizing the relevant research on the voluntary carbon market, carbon projects, forestry, reforestation and restoration in the Sahel region and the African continent. Literature published between 2020-2024 was prioritized for ensuring up to date information. Reports and case studies from organizations carrying out operations in the region were selected for their relevance and rigorous methodologies.

Using a qualitative approach, interviews were conducted with three project community members ensuring participation of different genders and roles and responsibilities. The interviews were conducted by a Tree Aid consultant with extensive local knowledge of the area, language and community dynamics. The questionnaire was designed to assess the community's understanding of carbon projects and gather feedback on the benefits they have received and expect in the future. Interviews were conducted in person to build trust and maintain rapport with participants.

Validation of the approach and findings was provided by the 1t.org Sahel/GGW Stakeholder Council and Carbon Working Group members (see Acknowledgements).

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Endnotes

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23. Potential net carbon gain means the difference between the existing carbon stocks of a given ecosystem and the potential stocks that the ecosystem could support. This is a function of environmental and physical conditions that limit a location's capacity to support living biomass.

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29. A challenge for early carbon projects in GGW countries was the limited availability of methodologies that accounted for carbon beneath the ground, which accounts for almost half of the carbon potential in the region (27.8% belowground biomass and 32.4% soil organic carbon). However, in recent years, voluntary carbon market standards, such as Plan and Verra (the Verified Carbon Standard) have introduced methodologies to account for soil carbon.

30. Project developers using this paper as an introductory analysis should research which project type has the highest potential within pools, and which interventions would best benefit communities. Additional examples of land uses and interventions can be found in the supporting case studies in the following document: Food and Agriculture Organization of the United Nations (FAO). (2022). *Africa Open Data for Environment, Agriculture and Land (DEAL) and Africa's Great Green Wall: Technical land use report*. https://openknowledge.fao.org/server/api/core/bitstreams/257e955a-e522-4f0b-96bc-2c55775b52ba/content.

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