WORKING PAPER

A Green Future for All

How Financial Services Can Build More Inclusive Carbon Markets

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CGAP

CGAP

1818 H Street, NW, MSN F3K-306
Washington, DC 20433
Website: www.cgap.org
Email: cgap@worldbank.org
Telephone: +1 202 473 9594

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Executive Summary

CARBON MARKETS HAVE EMERGED AS an opportunity to fund the global transition to a sustainable economy. Emerging markets and developing economies (EMDEs) are well positioned to generate large amounts of carbon credits (UNDP 2023), with the potential to leverage revenues from the sale of these credits to support a green transition. This is especially important given that experts project a substantial rise in demand for these credits over the next decade. The value of carbon credit sales on voluntary carbon markets reached USD 2 billion in 2021 and is expected to rise to USD 10–40 billion by 2030 (Porsborg-Smith et al. 2023), while the value of trading on compliance markets grew to USD 949 billion in 2023 (Twidale 2024). Furthermore, across the developing world, revenues from the sale of carbon credits are increasingly being used to finance a green transition (Leapfrog, CGAP, and Temasek 2023).

As carbon markets channel critical climate financing to EMDEs, there is an opportunity to ensure these funds support a transition that is not only green but also just. Evidence suggests that a green transition can yield important development impacts, helping to improve health outcomes, create new economic opportunities, contribute to women's empowerment, and enable those most vulnerable to climate change to adapt and become more resilient. However, for people living in poverty, and women in particular, availability, affordability, and the risks involved in adapting longstanding behaviors can put a green transition out of reach. Carbon markets can help to address these barriers, leveraging global demand for carbon credits to fund access to sustainable green technologies, tools, and practices for people who would otherwise be excluded from a green transition.

> Inclusive financial services can support efforts to build more inclusive carbon markets and maximize their contributions to the Sustainable Development Goals (SDGs).

However, this potential can only be realized if carbon markets are truly inclusive of and impactful for people living in poverty. Although CGAP's research identified several emerging examples of inclusive carbon projects, many projects nevertheless fail to include or meaningfully benefit communities in EMDEs. Without explicit and credible plans to include and benefit underserved communities, carbon markets run the risk of exploiting vulnerable populations to benefit wealthy investors. Additionally, evidence suggests that women face challenges to participating in and benefiting from carbon projects, thus threatening to further jeopardize their access to the benefits of a green transition.

Inclusive financial services can support efforts to build more inclusive carbon markets and maximize their contributions to the Sustainable Development Goals (SDGs). From Sub-Saharan Africa to South Asia and beyond, there are emerging examples of carbon projects that leverage credit, savings, and payment products to reach excluded communities and deliver concrete improvements to the lives and livelihoods of the people most vulnerable to the accelerating climate crisis, including women. Evidence on the role of financial services presents an opportunity for financial service providers (FSPs) to deepen their engagement in the climate space and for carbon project developers and other climate stakeholders to leverage the power

of inclusive financial services to advance climate resilience, adaptation, and a just transition.

Fostering greater collaboration between FSPs and carbon project developers will be key to building more inclusive carbon markets. Carbon markets are complex, and CGAP's research suggests that many FSPs will require capacity building and partnerships with project developers to meaningfully engage in this emerging space. At the same time, FSPs are well-positioned to support the success of inclusive carbon projects, pointing to an opportunity for project developers to leverage partnerships with FSPs to build higher value, more sustainable, and more impactful carbon projects.

Additionally, more innovation will be required to maximize the impact of financial services. This includes designing and testing new financial services use cases that better meet the needs of carbon project participants. Furthermore, there is a need to develop new products, services, and approaches that enable women to equitably participate in and benefit from carbon projects.

Finally, it is critical to address the funding barriers that prevent inclusive, financial services-enabled carbon projects from achieving scale. Faced with high costs, volatile prices, and a lack of access to affordable capital, inclusive carbon projects often struggle to prove their models and scale. This is where development funders and investors have an important role to play: technical assistance and grant capital can support early-stage innovation and the development of new models that unlock opportunities for people living in poverty to participate in and benefit from carbon projects. Impact investors can deploy patient capital that provides promising projects with the runway they need to prove their models. At the same time, donors and development finance institutions can help unlock project financing through de-risking and blended finance facilities to enable proven projects to scale.

This paper highlights both the challenges to and opportunities for developing inclusive carbon markets, emphasizing the opportunity for financial services to play a role in overcoming barriers to inclusion and driving impact at scale. It underscores the potential for a diverse range of stakeholders—including carbon project developers, financial service providers, investors, and development partners—to contribute to a just, green transition. By leveraging financial services and collaborative approaches, these stakeholders can promote carbon markets that not only support a just, green transition, but also improve the lives and livelihoods of underserved communities.

Low-Income Households and Small Businesses Face Barriers to Participating in a Green Transition

EMERGING EVIDENCE DEMONSTRATES how a green transition can improve development outcomes for people living in poverty. Specifically, studies show that green technologies, tools, and practices are associated with better health outcomes, increased agricultural productivity, new economic opportunities, and women's empowerment (Leapfrog, CGAP, and Temasek 2023). For example, more than one in three women globally has no choice but to cook over smoky, toxic wood or charcoal fires to prepare meals for themselves and their families. The time and effort required to gather these fuels further undermines participation in other community activities (Warlick and van der Lans 2024). The costs associated with negative health impacts and losses in productivity are estimated at USD 1.4 trillion annually (Warlick and van der Lans 2024), on top of the negative environmental and climate impacts. Switching to cleaner cooking technology could save both money and lives while also reducing gender inequality.

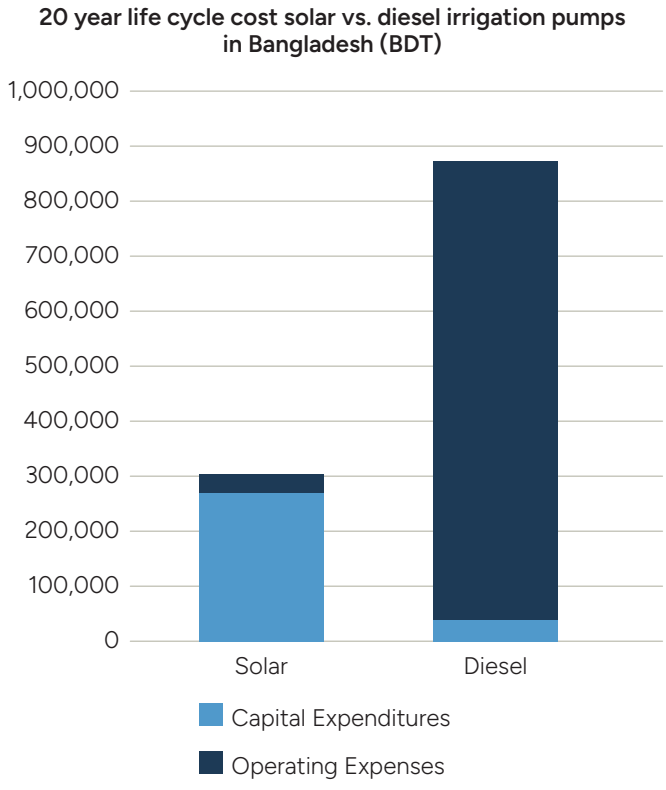
However, despite the benefits of a green transition, people living in poverty continue to face persistent barriers to adopting green technologies, tools, and practices, including:

- **Availability:** Ensuring the availability of green technologies, tools, and practices for low-income consumers in hard-to-reach areas can prove challenging. Many rural communities, for example, lack population density and adequate infrastructure, including roads, electricity, and internet connectivity. Urban communities, too, may face availability challenges, especially in underserved areas. Businesses operating in many parts of Africa and Asia face high distribution, marketing, and sales costs, leading them to pass these costs on to their customers in the form of higher prices (Gomes and Shah 2018). Faced with high costs and the inability of customers to pay, many companies may choose to focus on higher-income customers and urban areas (see Box 1).
- **Affordability:** While many green technologies, tools, and practices offer significant cost savings and benefits over time, they are often more expensive up-front than incumbent alternatives. A study in Bangladesh comparing the cost of solar- and diesel-powered irrigation pumps illustrates this dilemma: while the lifetime costs associated with owning and operating solar pumps are just over one-third that of more conventional diesel alternatives, their purchase price is nearly seven times higher (see Figure 1). For households already struggling to afford food, school fees, and other critical expenses, the high cost of participating in a green transition can stand in the way of adoption—

especially when lower up-front cost alternatives are readily available.

- **Behavior Change:** Many communities rely on fossil fuels and high-emission inputs for cooking, farming, and daily life. Over generations, these practices have created deeply ingrained habits and social norms. Even when green technologies offer clear economic and environmental benefits, shifting behaviors can be complex and resource-intensive. The inertia is not merely a matter of preference but often reflects a complex interplay of factors, including risk aversion, lack of familiarity with new technologies, concerns about reliability or performance, and gendered labor roles. For example, demand for clean cooking technologies can be hindered by deeply ingrained cultural and social influences, as well as a low level of trust in both products and their promoters due to inadequate after-sales support and repair services, insufficient community engagement, and concerns about reliability and durability (USAID 2021).

FIGURE 1. **Green assets save money over time but have a high upfront cost**



Source: Islam, Hossain, and Abdullah-Al-Baki (2022).

Women face additional barriers to participating in a green transition. Women can be critical leaders and participants in the green transition, which in turn can provide them with various benefits, including improved health and access to income-generating opportunities (Leapfrog et al. 2023). However, gender-specific constraints, deeply rooted in traditional roles and norms, present significant obstacles to women's participation in the green transition. The burden of unpaid household labor limits women's engagement in the green economy, while restricted access to resources like knowledge, land, and finance further hinders their involvement. Educational and skill mismatches often favor male-dominated professions in emerging green sectors. Discriminatory laws and bureaucratic hurdles impede women's economic participation, particularly in formalizing businesses. Structural barriers, including limited decision-making power and underrepresentation in leadership roles, result in women's perspectives being overlooked. These challenges are compounded for marginalized women, those in rural areas, or those working in informal sectors, who face multiple forms of discrimination and limited access to digital technologies (Deininger et al. 2023). Addressing these intersectional barriers is crucial for ensuring an inclusive and equitable green transition that benefits all.

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BOX 1. **High costs undermine access to solar home systems**

The economics of selling green products and services in low-income, rural communities presents a significant challenge. When customers cannot afford to pay, even businesses offering high-quality products will struggle to cover their costs, and life-changing technologies and services will remain out of reach for those who most need them (Price 2016).

The recent struggles of off-grid solar home system companies illustrate the barriers facing green business models and their customers. Globally, an estimated 685 million people continue to lack access to reliable electricity (IEA et. al. 2024). As the cost of solar technology began to decline at the beginning of the last decade, off-grid solar solutions such as solar home systems were touted as an innovative and climate-friendly solution to the energy access gap. However, despite rapid initial growth in regions such as Sub-Saharan Africa, the high cost of these green assets continues to leave many households and businesses in the dark. According to former solar company CFO Joshua Romisher, "The industry struggles with an existential problem: those most in need of modern energy are often those least able to pay for it" (Romisher 2019).

In recent years, customer defaults on solar loans and high-profile bankruptcies have raised questions about the viability of serving low-income and rural communities. Faced with high costs, low revenues, and difficulties accessing capital, leading solar company Mobisol declared bankruptcy. Other companies that had made ambitious investments in expanding to excluded communities, like refugee camps, have withdrawn (Kocieniewski and Finch 2022).

BOX 2. **More than mitigation: The role of a green transition in climate adaptation and resilience**

Achieving a just, green transition requires a dual focus on mitigating future carbon emissions, while also supporting vulnerable communities to adapt and become more resilient to climate change. While the Intergovernmental Panel on Climate Change emphasizes the need to reach net-zero CO_2 emissions globally by 2050 to limit global warming to 1.5°C (IPCC 2022), evidence suggests that if a green transition is truly just, it can address both mitigation and adaptation needs.

Decoupling development from carbon-intensive approaches is "important to help build capability, prosperity and resilience," according to a joint report by Leapfrog, CGAP, and Temasek (2023). The report highlights evidence pointing to the potential for green technologies and practices to support climate adaptation and resilience among low-income households. For example, regenerative agriculture practices can sequester carbon while improving both soil quality and crop drought resistance. Off-grid solar energy can help households unlock new economic activities and diversify income sources. And clean cooking technologies can reduce the time women spend on collecting firewood and cooking, enabling them to participate in new income-generating activities that make their households more resilient to climate shocks.

Inclusive Carbon Markets Can Support a Just, Green Transition

CONSIDERING THE BARRIERS THAT people living in poverty face to adopting green technologies, tools, and practices, it is critical to ensure that the transition to low-carbon economies is not only green but also just. A just transition implies that everyone, regardless of income or location, can participate in and benefit equitably from a greener future. Despite recent controversies surrounding carbon markets, including questions around the integrity of mitigation claims and allegations of exploitation, they also present an opportunity. Indeed, evidence and experience suggest that when carbon projects prioritize the inclusion of low-income communities, they can contribute to making a just, green transition a reality for millions in emerging markets and developing economies (EMDEs) (Africa Carbon Markets Initiative 2024).

Understanding Carbon Markets

At the most basic level, carbon markets enable the buying and selling of carbon credits, with each credit representing one ton of carbon dioxide (tCO_2) or its equivalent (tCO_2e) that is either avoided or removed from the atmosphere.

- **Carbon avoidance** encompasses activities designed to reduce or avoid greenhouse gas emissions. These include reducing deforestation, minimizing food waste, adopting more efficient household devices (such as clean cooking technologies), or shifting to renewable energy sources.
- **Carbon removal** activities are designed to capture and sequester carbon from the atmosphere. These activities include reforestation, agroforestry, regenerative agriculture, and direct air capture (mechanically removing carbon from the atmosphere using technology).

Historically, there have been two types of carbon markets on which credits can be sold:

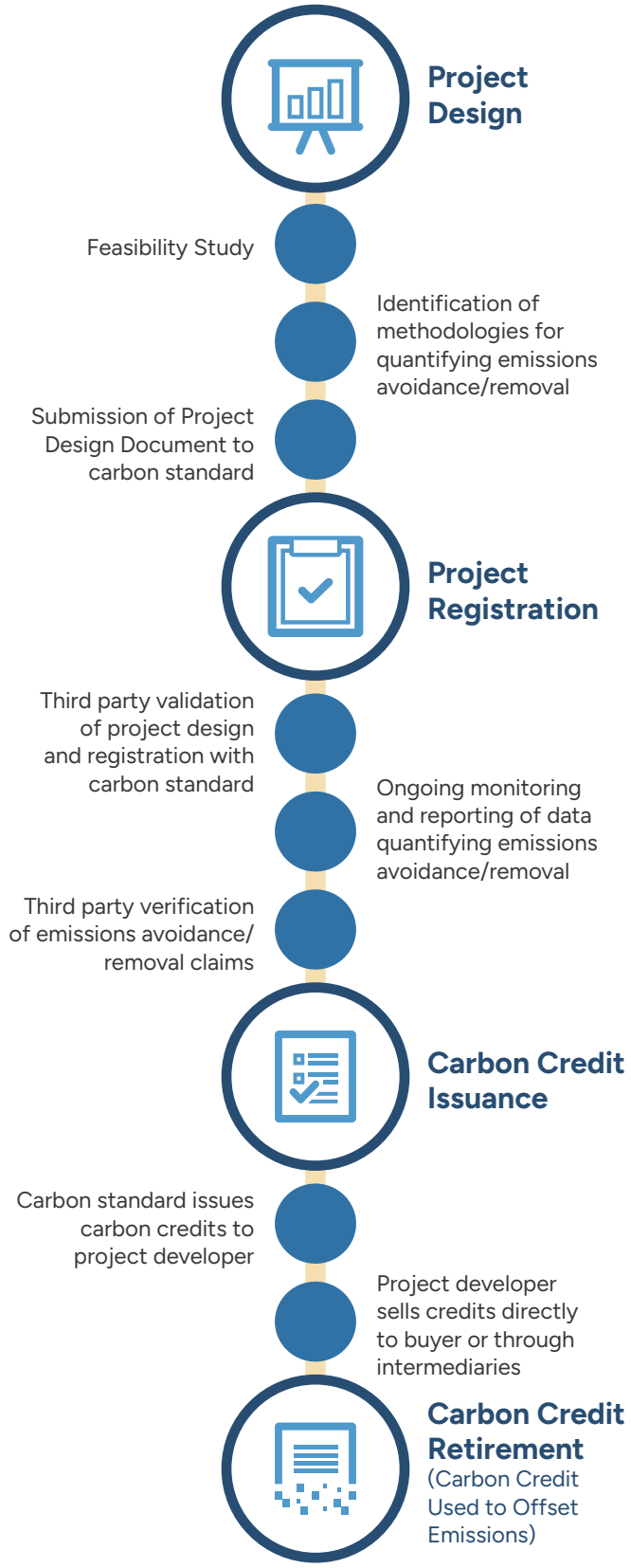
- **Voluntary Carbon Markets:** Voluntary carbon markets (VCMs) allow companies and individuals to choose to offset their carbon emissions through the purchase of carbon credits. Some USD 723 million was transacted in these markets in 2023 (Donofrio et al. 2023). Independent standard bodies (for example, Verified Carbon Standard and Gold Standard) establish methodologies for calculating emissions. The carbon credits traded on VCMs are produced by carbon projects, with mitigation outcomes certified by standard bodies before credits can be issued and sold.
- **Compliance Markets:** In contrast to VCMs, compliance markets are mandatory, regulated emissions trading schemes implemented at the subnational, national, regional, or international level. Regulators place limits on the emissions of entities in participating jurisdictions, with companies obligated to purchase carbon credits to compensate for any emissions that exceed those limits (otherwise known as cap-and-trade schemes). An estimated USD 949 billion in value was traded over these markets in 2023, with the European Union's Emissions Trading Scheme accounting for the majority (Twidale 2024).

These markets continue to evolve, and the lines between voluntary and compliance markets are beginning to blur. International carbon markets such as those outlined in the Paris Agreement (Articles 6.2 and 6.4), in addition to industry-specific markets like the aviation industry's Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), are creating new carbon pricing and trading mechanisms that continue to reshape market dynamics.

Currently, VCMs offer the most immediate opportunities in EMDEs, but the growing convergence between voluntary and compliance markets will increasingly open new opportunities for these countries. For example, voluntary carbon market standards are beginning to align their methodologies with compliance market requirements, enabling some voluntary carbon projects in developing economies to sell their credits on compliance markets. Therefore, CGAP chooses to define carbon markets as covering both voluntary and compliance markets. While many of the examples covered in this paper are most relevant to voluntary carbon markets, its findings and guidance can also be applied to emerging opportunities in compliance markets.

Although specific processes may vary between different projects and markets, Figure 2 illustrates a typical operation and credit delivery cycle in VCMs.

FIGURE 2. **Development of a carbon project in the voluntary carbon market**



Source: Authors.

How Carbon Markets Can Address Barriers to a Green Transition

In some cases, revenues generated by the sale of carbon credits are being used to address the barriers that prevent low-income households and micro- and small enterprises from participating in a green transition. Carbon projects and green businesses can deploy these revenues to overcome key pain points that stand in the way of the distribution, adoption, and use of new technologies and practices (see Figure 3).

Carbon projects and green businesses are leveraging revenues from the sale of carbon credits to overcome the barriers to a just, green transition in three ways:

- **Increasing Availability:** For companies that struggle to sustainably expand access and serve customers at a price point they can afford, carbon markets can provide a critical revenue stream that allows them to invest in operations at the last mile (Waldron 2023). This is the case in Rwanda, where the World Bank's Carbon Initiative for Development (Ci-Dev) has helped private cookstove companies access carbon markets, in turn using the revenues to invest in expanding access to rural customers (Ci-Dev 2024).
- **Improving Affordability:** In many cases, companies are using carbon revenues to subsidize the price of their green products and services, allowing them to serve customers at an affordable price. For example, solar irrigation company SunCulture has turned to carbon markets to help improve the affordability of its solar water pumps. With funding from British International Investment and the Shell Foundation, SunCulture is piloting a carbon project that will use carbon revenues to partially offset the cost of its pumps in Kenya, reducing prices by a projected 25 to 40 percent and enabling the company to reach an estimated 9,000 farmers who would otherwise be unable to afford their products. The company claims its pumps help farmers achieve a five-fold increase in incomes, 17 hours per week in time saved versus manual irrigation, and improved resilience to climate shocks such as droughts (Walji 2023).
- **Incentivizing Behavior Change:** Even when new technologies or practices are both available and affordable to consumers, shifting longstanding behaviors can prove challenging. To overcome entrenched practices, companies and carbon project developers are using carbon revenues to incentivize consumers to participate in a green transition. For example, project developer Boomitra helps farmers in Africa, Asia, and Latin America adopt regenerative agriculture practices, allowing them to sequester carbon in their soil. In addition to providing technology, training, and extension services to its farmers and ranchers, Boomitra ensures that farmers are fairly compensated for their efforts, with around 70 percent of carbon revenues shared directly with project participants (Morrison 2024). This is particularly important, given that some climate-smart agriculture practices may take years to provide benefits or even result in short-term yield losses (Ishtiaque et al. 2024).

FIGURE 3. **How carbon markets can address barriers to a just, green transition**

Source: Authors.

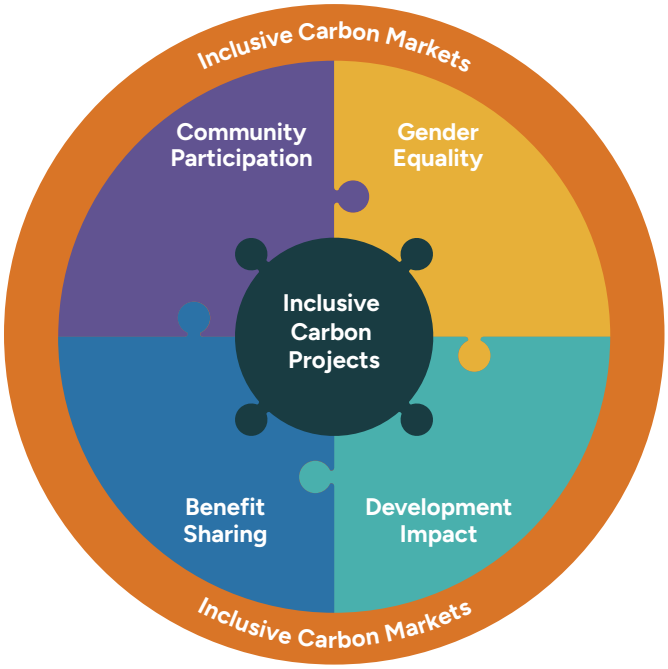
The Importance of Inclusivity in Carbon Markets

THE POTENTIAL FOR CARBON MARKETS to support a just, green transition for people living in poverty depends on the extent to which these markets are truly inclusive. Ultimately, the inclusivity of carbon markets is determined by the design and implementation of the carbon projects responsible for generating carbon credits. Realizing the goal of more inclusive carbon markets means first ensuring that carbon projects prioritize the equitable participation of communities, fair benefit distributions to participants, positive socioeconomic outcomes for underserved and marginalized communities, and gender equality.

More specifically, for carbon projects to be inclusive, they must ensure the following:

- **Community Participation:** Encourage equitable participation by involving local communities in project design and implementation. This means ensuring that community members, including women, have a say in how the project is structured and are fully aware of the terms of their participation. Additionally, projects should prioritize hiring community members to support project implementation and distribute opportunities and project resources fairly.
- **Benefit Sharing:** Provide fair and transparent compensation to participant communities by sharing a significant portion of any carbon revenues. Among the examples of inclusive carbon projects identified by CGAP, the proportion of revenues reinvested in local communities ranged from 60 to 80 percent. While benefits can be shared in different ways, including both in cash and in kind, project developers must recognize that any carbon removed or avoided is ultimately owned by those responsible for the mitigation activities and compensate them accordingly.
- **Development Impact:** Projects must prioritize impacts beyond just emissions mitigation. Activities should lead to meaningful improvements in participants' lives and livelihoods, as well as those of the broader community, in line with the SDGs.
- **Gender Equality:** Projects should contribute to gender equality and women's empowerment by guaranteeing equitable participation of and benefits for women. Women should have a say in the project design, have equal access to project resources such as training, and have decision-making authority over any benefits shared with communities. Projects can also consider including broader, gender-related activities such as education and health services to improve women's participation.

FIGURE 4. **The role of carbon projects in realizing more inclusive carbon markets**



Source: Authors.

Many Carbon Projects Fail to Include Low-Income Communities

Despite the potential for inclusive carbon markets to improve the lives and livelihoods of people living in poverty, many carbon projects are not sufficiently inclusive. People living in low- and middle-income countries are critical to contributing to the mitigation outcomes on which the issuance and sale of carbon credits depend. However, they also face numerous barriers to participating in carbon projects and accessing the benefits of carbon markets.

Even when communities are included in carbon projects, the benefits they receive may not reflect the considerable time, energy, and sometimes even financial resources that participants contribute to help carbon projects succeed. Therefore, whether—and how—carbon projects share benefits with local communities has emerged as a particular concern. One expert warns, "The revenue from carbon credit sales often does not filter down to the local communities working to protect their ecosystems" (White & Case LLP 2022). Carbon projects have also been plagued by accusations of "climate colonialism," with project developers accused of exploiting local populations and expropriating their carbon (Lewis 2023).

CGAP has identified several barriers that stand in the way of more inclusive carbon projects, including:

- **Participation of Low-Income Households:** Participation in carbon projects often requires the acquisition of green assets or inputs, the availability and cost of which are often out of reach for low-income households. In some cases, projects may use carbon revenues to subsidize costs and invest in distribution networks. However, for households living on less than USD 2 per day, purchase prices may still be prohibitively high. When households are unable to afford these products, this can also discourage investment in distribution networks that reach their communities, thus leaving them excluded from carbon projects and the benefits they provide.
- **Lack of Transparency in Benefit Sharing:** Verifying benefit sharing with local communities can be difficult. Indeed, Healy et al. (2023) note, "Given the lack of requirements or guidance from carbon crediting programs, it is unclear whether and how benefit-sharing arrangements are implemented in practice." Even for projects that share carbon revenues directly with communities based on their contributions, a lack of financial infrastructure and financial account ownership among project participants means that proceeds from the sale of carbon credits are often paid in cash. This not only creates opportunities for misallocation of funds, but also makes it difficult for buyers of carbon credits to verify that projects lived up to their benefit-sharing agreements.
- **Disruptions to Livelihoods:** Nature-based solutions projects that seek to protect and restore local ecosystems (for example, REDD+, agroforestry, and regenerative agriculture) can sometimes come at a cost for participating communities. In some cases, efforts to halt deforestation can disrupt local livelihoods. Additionally, projects that promote a transition to agroforestry or regenerative agriculture often result in initial reductions in agricultural productivity for smallholder farmers due to the need

to take land out of production for tree planting or reduce chemical fertilizer use. Without access to alternative income sources, participation in these projects can jeopardize farmers' livelihoods and food security. These disruptions can be especially harmful if projects fail to issue or sell credits, the price of carbon drops, or the benefits of the project are not as substantial as expected.

- **Gender Barriers:** Women play a leading role in ecosystem conservation and behavior change within their communities but face challenges that may prevent them from participating in and benefiting equitably from carbon project development. Unequal access to resources (such as land, capital, technology, or training), the burden of unpaid household labor, and exposure to gender-based violence can make it difficult for women to participate. Even when women are able to participate, gendered social norms that limit women's decision-making can limit their ability to access and control benefits (see Box 4).

BOX 3. **Higher prices for co-benefits can drive a greater focus on development impact**

Many carbon projects promise to deliver co-benefits, defined as development impacts aligned with the SDGs that go beyond emissions avoidance and removal (Ponce de León Baridó et al. 2023). Evidence shows that some buyers of carbon credits are willing to pay a premium for credits with certified co-benefits. In 2023, carbon credits with at least one co-benefit had a 78 percent price premium compared to projects without co-benefits, while those associated with SDGs had an 86 percent price premium (Donofrio et al. 2023). Gender impact is one of the most highly sought after co-benefits. Increasingly, buyers are demanding carbon credits that demonstrate clear evidence of impacts for women and are willing to pay more for these credits (Phillips and Jenkins 2022).

However, projects often face barriers to measuring, reporting, and monetizing co-benefits. Impact assessments for co-benefits come at a cost, while limited guidance on the measurement, monitoring, and reporting of impact creates challenges with transparency and quality of data supporting co-benefits claims. Carbon projects that report co-benefits vary widely in the granularity of their data, the level and types of details included in their reporting, the SDGs they prioritize, and evidence of long-term durability of impacts. This lack of transparency has negative effects on both the supply of carbon credits with co-benefits and the demand for those credits. On the supply side, it is difficult for projects with truly durable, high-quality co-benefits to distinguish themselves. On the demand side, buyers and investors struggle to discern which projects are delivering the greatest impacts. In both cases, this inhibits the mobilization of finance for truly impactful projects (Lee, Morales, and Macedo 2024).

However, new methodologies are emerging that aim to address these challenges. For example, Women Organizing for Change in Agriculture and Natural Resource Management (WOCAN) developed the W+ Standard, which is the first global standard to quantify impacts on on women's empowerment. The standard measures women's empowerment across six dimensions: time savings, health, education and knowledge, food security, income and assets, and leadership. The W+ standard also has a built-in requirement for benefit sharing with women and a minimum of 20 percent of the benefits from the sale of W+ credits need to be shared with women (W+ 2024).

As carbon markets evolve, continued scrutiny and refinement of co-benefit measurement methodologies like the W+ Standard will be crucial to maintain the integrity and impact of these additional claims. This is particularly important as cost-effective, improved methodologies and standards for measuring co-benefits can lead to a higher price premium, thus incentivizing carbon projects to prioritize development impact. Funders can also support co-benefits measurement efforts by providing funding and expertise that could help projects integrate co-benefits into project design or carry out impact assessments.

BOX 4. **Women stand to gain from carbon project participation, but face unique barriers**

Women, particularly rural and indigenous women, are often on the frontline of climate change adaptation and offer unique perspectives and problem-solving capabilities. They also make up a significant portion of the agricultural workforce and play a vital role in forest management (Wedeman and Petruney 2019). Women can benefit from their participation in carbon projects in their capacities as business owners, farmers, caretakers, and project leaders across sectors (Gabbatiss 2023). For example, in renewable energy projects (such as solar irrigation, clean cookstoves, and solar milling), women often benefit from time savings, reduced indoor air pollution, and new job opportunities as sales agents. In nature-based solutions projects like agroforestry or regenerative agriculture, women can achieve greater food security, nutrition, and income from carbon revenues. Across project types, women may improve their economic empowerment through access to new income streams, formal employment, and green technologies that increase productivity. They may take on leadership roles, develop skills, and participate in revenue-sharing decisions. Their participation can support greater financial inclusion through access to payments, accounts, and savings opportunities. Women can also contribute by developing, selling, and repairing green technologies. Importantly, including women in carbon projects can also improve climate outcomes for all, leading to more efficient use of climate finance. For example, a randomized trial found that forest user groups with a 50 percent gender quota conserved more trees and shared payments more equally (Cook, Grillos, and Andersson 2019).

However, many of the challenges that constrain women in a green transition also limit their ability to benefit from carbon markets. These constraints include:

- **Limited Land Rights and Decision-Making Power:** Women's lack of land ownership and control significantly restricts their ability to engage in and benefit from carbon initiatives like agroforestry or regenerative agriculture projects.
- **Inadequate Access to Information and Capacity Building:** Women often have less access to information about new technologies, projects, and market opportunities. They are also underrepresented in training and capacity-building efforts, as seen in a clean cookstove project in Bangladesh where women's limited access to business networks hindered their success (Bloomfield et al. 2014).
- **Time Poverty Due to Gendered Roles:** Women's heavy domestic workloads and care responsibilities severely limit their available time for participating in project activities and decision-making processes. This was evident in a community-based REDD+ project in Cameroon, where women's domestic duties restricted their involvement in project activities and decision-making (Awung and Marchant 2020).
- **Discriminatory Gender norms and Power Dynamics:** Entrenched patriarchal norms often exclude women from project governance and benefit-sharing arrangements. A review of multiple carbon forestry projects in Southeast Asia found that prevailing patriarchal norms often led to women being excluded from project governance and benefit-sharing arrangements (Liswanti, Tamara, and Djoudi 2020).
- **Lack of Gender-Responsive Project Design:** Many carbon projects fail to incorporate explicit gender equity goals, activities, or indicators, and do not conduct proper gender analyses to inform project design. In extreme cases, lack of safeguards to mitigate unintended harm might result in women being at risk of sexual exploitation, domestic violence, and threats from male community members or household leaders who feel excluded from project benefits.

Financial Services Can Help to Build More Inclusive Carbon Markets

STAKEHOLDERS HAVE INCREASINGLY emphasized the importance of ensuring that carbon markets benefit underserved communities. For example, the Integrity Council for the Voluntary Carbon Market, an independent governance body, includes "Sustainable Development" as a core principle relating to integrity and transparency in carbon markets (ICVCM 2024a). But living up to these principles will require new tools and approaches that can support the participation of people living in poverty, while also addressing barriers that often prevent them from benefiting equitably.

As project developers seek new ways to maximize the contribution of carbon markets to a just, green transition, financial services are emerging as a promising tool to enhance inclusivity and impact in carbon projects. CGAP research indicates that inclusive financial services can help people living in poverty overcome barriers to participating in and benefiting from carbon projects. Specifically, inclusive financial services can help in four main ways:

- **Credit and savings products can enable low-income households to participate in carbon projects,** by helping to spread the cost of adopting green technologies and practices over time.

As project developers seek new ways to maximize the contribution of carbon markets to a just, green transition, financial services are emerging as a promising tool to enhance inclusivity and impact in carbon projects

- **Digital payments can make benefit-sharing fairer and more transparent,** enabling more inclusive benefit-sharing models and providing transparent information on the amount of carbon revenues that project participants receive. Digital payments can also make benefit sharing more efficient for project developers and improve ease of access to carbon revenues for participants.
- **Financial services can help participants adapt and diversify their livelihoods,** helping them to transition away from unsustainable practices while protecting and even improving their incomes.
- **Women-centric financial services** can equip women to participate in carbon projects and take advantage of benefit sharing to improve their lives and livelihoods.

Savings and Credit Products Can Enable Participation in Carbon Projects

Even when carbon projects use revenues to improve the affordability and availability of green technologies and practices, they may remain out of reach for many low-income households. Biodigester manufacturer Sistema.bio offers one example of how improving affordability using carbon revenues alone can be insufficient to ensure the inclusion of people living in poverty. By leveraging the emissions avoided through the use of the biogas its systems produce, Sistema.bio is able to sell carbon credits and pass on the revenues to customers through lower prices for its products. In India, the company's entry-level biodigester costs Rs 35,000–40,000 (approximately USD 420–480), which it reduces to just Rs 5,000–8,000 (approximately USD 60–100) through the sale of carbon credits (Jovial 2024). While this represents a large price reduction, over 80 percent of Sistema.bio users live on less than USD 3.20 per person per day (Jha and Coll 2021). When factoring in other household expenses such as education, food, and agricultural inputs, even carbon-subsidized biodigesters would be out of reach for many of these households.

Credit products, when delivered responsibly with appropriate consumer protection measures in place, can help to overcome barriers to affordability. Understanding the important role financial services play in enabling participation in a green transition, Sistema.bio facilitates access to credit that helps customers spread the cost of carbon-subsidized biodigesters over time. The company offers various types of financing through its partners, including a partnership with the National Dairy Development Board that allows dairy farmers to purchase biodigesters on a payment plan, with installments deducted directly from milk sales. In other cases, Sistema.bio works with microfinance institutions (MFIs) and non-governmental organizations that provide direct financing to their customers (Sharma 2023).

Financing can also help low-income project participants invest in mitigation activities and gain greater control over their carbon. Rabobank's Acorn provides smallholder farmers with the inputs and training needed to adopt agroforestry, in which farmers integrate trees and shrubs into their fields to sequester carbon, improve yields, and increase resilience to climate shocks. Acorn provides its services on credit, with repayments deducted from future carbon revenues (see Figure 5). The model not only enables a greater number of smallholders to access agroforestry,

FIGURE 5. **An illustration of Acorn's financing model**

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Carbon revenues	-	-	-	€30	€30	€60	€60	€90	€90	€120	€120	€120	€90	€90	€90
Financing and repayments	-€150	-	-	€12	€12	€24	€24	€36	€36	€6	-	-	-	-	-
Farmer Earnings	€0	€0	€0	€12	€12	€24	€24	€36	€36	€90	€96	€96	€72	€72	€72

Grace period

No debt repayments or interest until carbon credits are sold

Repayment period

Debt repayments are deducted from carbon revenues paid to farmers

After debt repayment

80% of carbon revenues are paid to farmers

Note: This is for illustrative purposes only. Actual figures will vary depending on project context.

Source: Adapted from Rabobank (2023).

but also gives farmers more control over their carbon. After the loans are repaid, farmers receive 80 percent of the revenues from the carbon credits they generate, with Acorn and its local implementing partners each sharing the remaining 20 percent (Rabobank 2023).

However, credit products that rely on future carbon revenues for repayment can come with risks for carbon project participants. Volatile prices, uncertain demand, and factors that threaten the achievement of mitigation outcomes (for example, forest fires, pests, droughts, or technology failures) can jeopardize future carbon revenues. Therefore, credit products that tie repayment to future carbon revenues should be structured to protect project participants from indebtedness should these revenues fail to materialize. Acorn demonstrates how inclusive carbon projects can structure financing to protect vulnerable consumers. If credits fail to be issued or prices drop too low to cover loan repayments, farmers are not left indebted. Instead, Acorn and its investors bear the credit risk. Moving forward, the rise of specialized insurance products for carbon projects and other risk-sharing mechanisms could further mitigate risks for these communities, enhancing the inclusivity and resilience of carbon projects.

> Savings products can also help low-income customers to spread the cost of adopting green technologies and practices over time.

More generally, lending should adhere to consumer protection principles such as transparent loan terms and credit assessments that avoid overindebting borrowers. And for project participants who finance their purchases of green assets or inputs, warranties and aftersales service that match loan terms can prevent situations where borrowers are forced to repay loans for products that have broken down. Finally, bundling financing with insurance products could also help to protect project participants from indebtedness.

Similar to credit, savings products can also help low-income customers to spread the cost of adopting green technologies and practices over time. For example, KOKO Networks in East Africa offers a mobile money-enabled layaway plan that allows customers to save up for the purchase of the company's bioethanol stoves (see Box 5).

BOX 5. **How KOKO Networks leverages financial services to expand access to clean cooking**

Kenyan company KOKO Networks sells bioethanol cookstoves designed to replace cooking with charcoal and has raised over USD 100 million through selling carbon credits. Carbon revenues allow the company to subsidize the cost of its stoves by 85 percent (Wilson 2023) and make its fuel 40 percent cheaper than charcoal (Irwin-Hunt 2022). In an interview with CGAP, KOKO Networks underscored the important role that carbon finance plays in enabling their business model. Without access to carbon revenues, the company would be forced to raise prices and target more affluent customers, leaving millions of Kenyans to suffer the health and economic consequences of reliance on polluting cooking fuels.

Financial services are central to the company's business model. To ensure availability and simplify the user experience, sales of both their cookstoves and fuel are powered by mobile money, with customers able to purchase both at a network of high-tech fuel ATMs or "KOKO Points" installed in local shops (Siegmund 2020). Digital payments also enable the company to offer customers an innovative mobile layaway product, allowing customers to save to purchase a stove by sending flexible installments to their KOKO account. When the customer completes payments, they can pick up their stove from a participating shopkeeper.

Digital Payments Can Enable Fairer and More Transparent Benefit Sharing

In recent years, carbon project developers have been under increasing pressure to improve the transparency and fairness of how carbon revenues are shared with the communities responsible for delivering mitigation outcomes. For example, the Integrity Council on Voluntary Carbon markets Core Carbon Principles, adopted in 2023, specifically mention benefit sharing, calling for projects to both share benefits with local communities and make information on benefit-sharing outcomes publicly available (ICVCM 2024b). While most carbon standards have been reluctant to put in place specific requirements for project benefit sharing, some have moved in this direction. Plan Vivo is one carbon standard that requires the projects it certifies to adhere to several preconditions for sharing benefits. This includes mandating the existence of a benefit-sharing mechanism that specifies how much, how, and when benefits are shared, as well as rules requiring that at least 60 percent of carbon revenues must directly benefit project participants and other local stakeholders (Healy et al. 2023).

There are also indications that increased transparency could lead to greater demand from buyers. Based on a survey of nearly 500 corporate buyers of carbon credits, Boston Consulting Group and the Environmental Defense Fund assess that if project developers were to improve the transparency of benefit sharing, it could help to increase buyers' willingness to pay for high-quality credits (Ponce de León Baridó et al. 2023).

Digital payments can play a key role in making benefit sharing fairer and more transparent. By providing digital records of every transaction, including the date, time, sender, and recipient, digital payment services like mobile money can enhance the transparency of benefit sharing. Digital payments also enable cost efficiency for project developers by reducing costs and risks associated with physical cash distribution, while also providing more convenient access to carbon revenues for project participants.

Innovative companies like ATEC are increasingly leveraging digital payments to make benefit sharing fairer and more transparent. ATEC's innovative "cook-to-earn" model uses internet of things (IoT)–enabled electric cookstoves that track usage data, allowing ATEC to generate carbon credits from reduced emissions.

BOX 6. **ATEC pioneers more transparent benefit sharing with innovative cook-to-earn model**

Fair and transparent benefit sharing should include linking benefits received by carbon project participants directly to their contributions to mitigation activities (Dyck, Streck, and Trouwloon 2023). Electric cookstove company ATEC is taking this principle a step further, by paying cookstove users in real-time for the carbon emissions they avoid. In 2022, the company launched a pilot in Cambodia and Bangladesh to test a new "cook-to-earn" approach to sharing carbon revenues with its customers, who are primarily women (MECS 2023).

In the cook-to-earn model, ATEC equips its stoves, which customers obtain using pay-as-you-go financing, with IoT-devices that can measure cookstove usage in real-time. It uses the data generated by stove usage to measure the quantity of emissions that its customers have avoided by opting to cook using electricity instead of fossil fuels or biomass. These avoided emissions are used to issue carbon credits that can be sold to international buyers (MECS 2023).

ATEC shares 70 percent of its carbon revenues directly with users (ATEC Global 2023). For each kilowatt hour that their stoves consume, customers receive micropayments directly to their mobile money wallets, representing 70 percent of the value of their carbon. Key findings from ATEC's pilot showed that providing these incentive payments increased electric stove usage by 38 to 56 percent for new customers and 1 to 21 percent for existing users (MECS 2023).

Cookstove users receive 70 percent of the revenues their cookstoves generate in real-time, with payments sent to their phones via mobile money (see Box 6).

Vietnam's Payment for Forest Environmental Services program offers another example of the power of digital payments. The project's participants are located countrywide, complicating the task of disbursing payments in exchange for their contributions to efforts to protect and restore local forests. Payments were originally designed to be sent to community groups. However, a demand for greater transparency on behalf of the Vietnamese government led the program to pilot direct digital payments to households. With an increasing number of project participants having access to electronic banking and digital payment accounts, digital payments not only improved the transparency of benefit sharing, but also reduced transaction costs (Durbin et al. 2019).

Financial Services Can Mitigate Livelihood Disruptions

As mentioned earlier, carbon projects can sometimes negatively impact participants' livelihoods. Some projects may encourage farmers to alter livestock grazing practices or discontinue the use of chemical fertilizers, while projects aimed at reducing deforestation may interfere with economic activities such as selling charcoal. The resulting declines in agricultural yields and incomes, even if short term, can harm communities and undermine mitigation activities if participants abandon their projects.

Financial services could play a complementary role in carbon projects by enabling project participants to invest in adapting and diversifying their livelihoods to reduce reliance on unsustainable practices. In one example, Kenya Agricultural Carbon Project (KACP) implementing partner Vi Agroforestry told CGAP that in communities where farmers were part of strong village savings and loan associations (VSLAs), project participants were more likely to remain in the project long enough to realize benefits such as higher yields. The World Bank–managed BioCarbon Fund, which financed the KACP, notes that farmers used low-interest rate loans from the VSLAs to facilitate farm enterprises and other livelihood improvement activities (Syiem, Arpac, and Khan 2020). A study looking at the impact of a Vi Agroforestry project found that participating farmers organized into VSLAs had higher savings and added to their savings more often when compared with neighboring farmers who adopted similar sustainable agricultural practices but did not receive support to organize VSLAs (Nyberg et al. 2020). They also had significantly higher levels of food sufficiency and spent more of their incomes on their children's education (Nyberg et al. 2020). Considering the impact of providing farmers with access to financial services on key development outcomes and project performance, Vi Agroforestry informed CGAP that they are exploring transforming the VSLAs into more formal savings and credit cooperatives (SACCOs).

The examples identified during CGAP research primarily consisted of informal and semi-formal financial services such as VSLAs and SACCOs. Nevertheless, the impact observed suggests a potential role for formal financial services as well. Opportunities to integrate formal financial services into carbon projects to support livelihood diversification and adaptation are discussed later.

Women-Centric Financial Services Can Help to Address Gender Barriers

Access to financial services can have a transformative effect on women's lives and the well-being of their communities. This is also true for carbon projects, where financial services have an important role to play in addressing the barriers to women's equitable participation and benefits.

When carbon projects incorporate women-centric financial services, they can help to drive women's participation. In India, women often struggle to

participate in carbon projects due to a lack of financing for green assets like solar devices and clean cooking technologies. The example of Sistema.bio mentioned earlier illustrates this challenge: CGAP, in collaboration with Accion, funded a study in India to explore women's access to biodigester financing and found that women largely lacked the assets and credit histories needed to qualify for formal microfinance. Furthermore, barriers such as lack of mobility and control over household resources made it difficult for women to travel to the bank or repay high-interest rate loans.

In response, India's Self Employed Women's Association (SEWA) provides women with interest-free loans that enable them to participate in and control the benefits of carbon projects. The organization offers loans to women seeking to acquire biodigesters or solar-powered water pumps, with carbon revenues either directly shared with customers or used to reduce the cost of the asset (see Box 7).

Financial services can also support women in carbon projects by helping them take a leading role in conservation activities, as well as to transition to more sustainable livelihood practices. For example, the Khasi Hills Community REDD+ Project in India uses carbon revenues to provide grants to women's self-help groups, a form of village savings and loan association. Loans from the self-help groups have helped women to take a leading role in the carbon project and earn additional income, using the loans to establish tree nurseries that supply saplings for the carbon project. Access to finance also allowed women to shift away from practices that contribute to deforestation, for example, by providing loans for stall-fed animals like pigs and chickens to replace women's reliance on roaming cattle that degrade nearby forests (Plan Vivo Foundation n.d.)

> When carbon projects incorporate women-centric financial services, they can help to drive women's participation.

BOX 7. **SEWA leverages financial services and carbon markets to build women's asset ownership**

SEWA has put women's asset ownership at the center of its work with carbon markets. SEWA's loans for assets such as biodigesters and solar water pumps not only help to drive women's economic empowerment but are also designed to address the gendered social norms that prevent women from building asset ownership.

SEWA facilitates loans for women working seasonally as salt farmers in the Little Rann of Kutch region of Gujarat to purchase solar water pumps that replace the traditional diesel pumps used to pump brine into their salt pans. Women in this area work in extremely difficult circumstances for low pay (Mukherjee 2016). The pumps not only cost less to operate, but also lead to emissions avoidance that SEWA and its partners use to issue and sell carbon credits that generate revenues of 40,000 euros per year, of which 90 percent is shared among the 1,292 pump users. Carbon revenues provide a critical source of income that allows women to smooth consumption when paying for their children's education, helps to improve food security, and enables them to more easily repay their loans—especially during off-season months when flooding makes it impossible to earn income from salt farming.

In addition to solar water pumps, SEWA also facilitates loans to rural women to purchase biodigesters, the cost of which are subsidized by carbon revenues in collaboration with Sistema.bio. SEWA's work with carbon markets has supported its broader efforts to empower rural women. When SEWA receives an application for a pump or biodigester loan, it encourages households to add the woman as a legal owner or lessor of the family's home or land, providing women with joint ownership, addressing gendered social norms, and unlocking further economic opportunities.

Source: Nanavaty (2024).

Finally, financial services can help women to assert greater control over carbon revenues. Digital payment services such as mobile money offer a means to channel funds to women in ways that maximize their control over these resources (Klapper 2017). This is particularly important because, as Neera van der Geest from the Fair Climate Fund (FCF) notes, "women are often not perceived as the owners of their carbon credits" (van der Geest 2024). Social norms governing women's control over financial resources sometimes create challenges for FCF, which pledges to deliver revenues from the sale of cookstove credits to the women who have invested their time and energy into achieving mitigation outcomes. Van der Geest argues that ensuring women's control over carbon revenues can be difficult when women lack financial accounts. Depending on the project setting (for example, urban or rural) and type of clean cooking technology, FCF uses different strategies to overcome these challenges. In countries where more advanced clean cooking and carbon methodologies can be applied and women's financial account ownership is high, FCF uses digital payments to transfer revenues directly to women's accounts. In other, often more rural, contexts where women either lack access to mobile money or share their phone with other household members, FCF invests carbon revenues in women's cooperatives to ensure women have a say over how the payments they receive for their contributions to mitigation are used (van der Geest 2024).

Looking Forward: Opportunities to Maximize the Impact of Financial Services in Carbon Markets

WHILE THE USE CASES AND EXAMPLES presented in this paper underscore the potential for financial services to contribute to more inclusive carbon markets, more work is needed to maximize their impact. For many financial service providers (FSPs) and project developers, the case for integrating financial services into carbon projects is not well understood.[1] As a result, there are limited examples of financial services being leveraged effectively, and partnerships between FSPs and carbon project developers are rare. Moreover, the nascent models and collaborations that have emerged in recent years point to an opportunity to explore new use cases for financial services and drive greater innovation in financial products and services tailored to the needs of carbon project participants.

Project developers and FSPs can maximize their impact through collaborations that leverage their respective strengths and enable them to design, test, and integrate innovative financial services into carbon projects. Each stakeholder brings important and complementary knowledge and expertise that, when combined, can help overcome barriers to inclusion and scale. When these partnerships are structured to leverage each party's unique advantages and advance their shared interests, they can maximize impact for the communities they serve.

As carbon markets continue to mature, development funders and investors can also play a catalytic role in incubating innovative models and enabling the most promising projects to drive impact at scale. Support from funders can help financial services-enabled carbon projects to overcome barriers that stand in the way of proving their models and achieving scale—including high costs, volatile carbon prices, and a lack of access to affordable capital.

> Each stakeholder brings important and complementary knowledge and expertise that, when combined, can help overcome barriers to inclusion and scale.

1 CGAP defines financial service providers broadly, including any company or organization that provides or facilitates access to credit, savings, payments, or insurance products. This could include companies offering financing on-balance sheet, payment services providers, fintechs, licensed financial institutions, savings and credit cooperatives, and insurance providers.

Opportunity 1: Foster Greater Collaboration Between Financial Service Providers and Carbon Project Developers

Although some FSPs have begun to play a role in supporting low-income communities participating in carbon projects, this is the exception rather than the norm. FSPs often lack the capacity to navigate the complexities of carbon markets and may not see a clear role for themselves in carbon projects. With the exception of more non-traditional FSPs, such as asset finance companies, there are few examples of formal financial institutions becoming involved in carbon projects.

However, inclusive FSPs are uniquely equipped to support more inclusive carbon project development. For example, many FSPs have invested considerable resources in building the infrastructure, knowledge, and trusted relationships necessary to serve low-income customers at the last mile. The capacity of FSPs to sustainably operate in complex contexts and earn the trust of vulnerable populations is well-suited to supporting more inclusive carbon project development. One Acre Fund's collaboration with Acorn demonstrates how an organization that has spent years providing financial services to excluded populations can bring the benefits of carbon markets to those who need them most. In Zambia, One Acre Fund serves as a local implementing partner for Acorn, leveraging its experience in smallholder agriculture and relationships with local farmers to help them transition to agroforestry and tap into global demand for high-quality carbon credits (Rabobank n.d.). At the same time, it is important to emphasize that these collaborations should be structured to provide value to all parties, with FSPs and their customers fairly compensated for their contributions and strong consumer protections in place (see Box 8).

Evidence that access to financial services can support livelihood adaptation and diversification for carbon project participants also presents an opportunity for FSPs. The examples of financial service offerings to project participants uncovered by CGAP are limited to informal financial services such as VSLAs. While informal financial services have an incredibly important role to play, these informal financial institutions are limited in the amount of financing they can provide, as well as in the suite of products and services they can offer. Partnerships with

BOX 8. **Challenges in FSP–carbon project collaborations**

Partnerships between FSPs and carbon project developers come with risks that must be addressed. Carbon project developers often see value in the trusted relationships that many FSPs have with their customers but may not have the FSP's best interests—or those of its customers—at heart. CGAP spoke with one African MFI about an experience that underscores the need for greater capacity building for FSPs and transparency in collaborations between FSPs and project developers. The MFI had partnered with a cookstove manufacturer, helping to market the cookstoves and providing financing to enable MFI customers to purchase them. Upon investigation, the MFI discovered that the cookstove manufacturer had been selling carbon credits without the MFI or its customers' knowledge or consent, and with no transparency as to how the resulting carbon revenues were being used. According to the MFI's management, the cookstove manufacturer had also used the MFI's internal data to contact customers and track their usage of the cookstoves, raising concerns about consumer protection and data privacy.

The case highlights a critical knowledge gap in the microfinance sector regarding carbon markets. Managers at the MFI told CGAP that many FSPs lack the capacity to understand the complexities of carbon markets, leaving institutions and their customers vulnerable to exploitation. This example demonstrates the importance of transparency and fairness in partnerships between FSPs and project developers, as well as the need to improve the capacity of FSPs to understand how carbon markets function.

commercial banks and MFIs could amplify the impact of carbon projects, allowing them to offer a range of important formal financial services, including payments, savings, credit, and insurance to project participants.

Finally, FSPs are well-placed to help projects achieve, measure, and monetize co-benefits (see Box 3). For many years, the impact of financial inclusion has been measured not just in terms of account ownership but also by how it contributes to the SDGs (Storchi, Hernandez, and McGuinness 2020). FSPs can help maximize project co-benefits through the provision of high-impact financial services. They can also build the capacity of carbon project developers to develop more robust methodologies for quantifying development impact, while simultaneously improving the efficiency of monitoring, reporting, and verification. The inclusive finance community, including impact investors and FSPs, has created impact measurement and management frameworks and initiatives that could be directly relevant to measuring co-benefits in carbon projects (Lahaye, Kiamba, and Clarke 2024). By integrating the knowledge, skills, and tools developed by the financial inclusion community, carbon projects can increase the integrity of data and improve the lives of participants at the same time.

Opportunity 2: Drive Greater Innovation in Financial Services for Carbon Project Participants

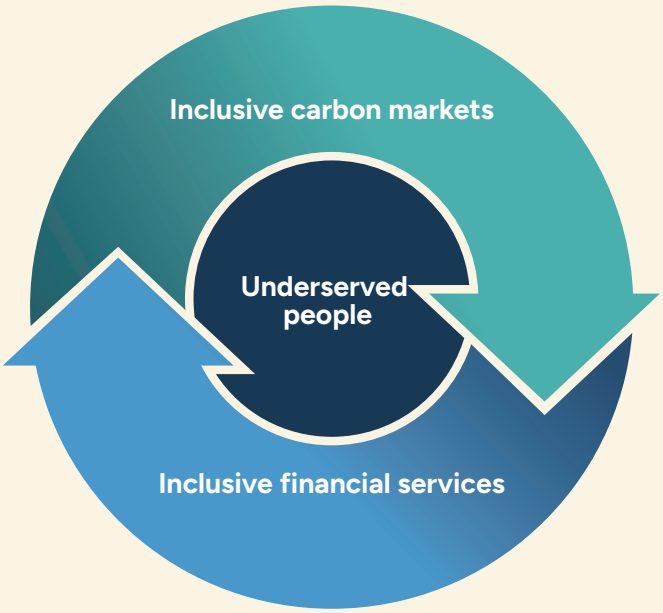
More innovation is needed to extend a broader range of financial services to carbon project participants, particularly those from underserved communities. By developing tailored payments, credit, savings, and insurance products, FSPs can collaborate with project developers to simultaneously support mitigation efforts, empower local communities, and promote environmental sustainability. Potential opportunities for financial services innovation include:

- **Digital Payment-Enabled Benefit-Sharing Models:** Digital payments, especially when combined with IoT, can create new opportunities for more transparent and impactful benefit-sharing models. ATEC's cook-to-earn model (see Box 6) demonstrates how digital payments can drive greater transparency while also tying benefits to project participants' contributions to emissions mitigation. Carbon projects and FSPs should explore how digital payments can enable similar benefit-sharing models for users of an array of green technologies, ranging from productive use appliances to e-mobility.
- **Leveraging Carbon Projects to Support Loan Underwriting:** FSPs can leverage benefit-sharing agreements that promise to share future carbon revenues with project participants to underwrite lending that enables people living in poverty to invest in mitigation activities and take greater ownership over their carbon. Similarly, future carbon revenues can be used to enhance participants' creditworthiness, enabling FSPs to extend access to a range of credit products that enable participants to invest in improving their lives and livelihoods (see Box 9).
- **Carbon Savings Accounts:** When carbon revenues are shared directly with carbon project participants, they need a way to manage their earnings effectively. FSPs can consider developing specialized savings accounts that enable better financial management and unlock access to a broader suite of financial services.
- **Insurance for Mitigation Activities:** Because the benefits carbon project participants receive are dependent on their contributions to mitigation, insurance products can help to protect their investments. FSPs should consider developing specialized insurance products that help protect investments in green assets, climate-smart agriculture, and other activities.
- **Women-Centric Financial Services:** While this paper noted several examples of women-centric financial services aimed at women's participation and benefits from carbon projects, most of the examples reviewed by CGAP were not designed with women's needs in mind. Moving forward, it will be critical to conduct demand-side research to better understand the needs of women participating in carbon projects and the barriers they face. The insights can in turn be used to design, test, and scale tailored financial products and services that support women's equitable participation in and benefits from carbon projects.

BOX 9. **A two-way street: How carbon markets can also advance financial inclusion**

While this paper is concerned with the role financial services play in improving the inclusivity and efficiency of carbon projects, there is also evidence that carbon markets can advance global financial inclusion. This can create a virtuous cycle, where carbon markets support inclusive financial service business models, and financial services make carbon markets more inclusive.

FIGURE 6. **Financial services can enable inclusive carbon markets–and vice versa**



Source: Authors.

Several examples suggest that carbon projects can help expand access to financial services by addressing the underlying causes of financial exclusion:

- **Carbon projects can break down barriers to account ownership.** Many green asset manufacturers offer financing to their customers to help them purchase their products. And when these companies use revenues to subsidize the cost of these assets, it also lowers the ticket size of loans, expanding access to lower-income customers who would previously not qualify for financing. Additionally, these companies often rely on digital payment services such as mobile money for customers to repay their loans. And for many carbon project participants, the financing they receive, and their use of digital payments, may represent their first experience with formal financial services, as well as a first step toward financial inclusion. In a study of pay-as-you-go, off-grid solar users, 31 percent either registered or reactivated their mobile money accounts to pay for off-grid solar (Tappendorf and Pheasant 2022). This can also drive increased usage of digital payment services. The same study found that mobile network operators saw a surge in usage, even for non-solar payments.
- **Ownership of green assets can help make participants more creditworthy.** When households finance a green asset, it can begin to create a formal credit history and unlock access to further financial services. For example, the off-grid solar provider Engie Energy Access (formerly Fenix International) worked with CGAP to offer its existing solar home system customers access to education loans, using customers' equity in their solar home systems and repayment histories to underwrite the loans (Mattern and Garcia 2021).
- **Innovative partnerships between FSPs and carbon projects can leverage benefit sharing to further expand financial inclusion.** Revenue from carbon credits may be able to enhance the creditworthiness of carbon project participants. By providing a steady, verifiable income stream, carbon credits can demonstrate increased financial stability to lenders. This additional income can potentially lead to better loan terms or increased access to credit. Participation in carbon projects also often involves detailed record-keeping and financial management, which can further boost a participant's profile with financial institutions.
- **Carbon projects' impact on livelihoods can lead to greater financial inclusion.** Carbon projects can generate co-benefits beyond emissions reduction, such as increased agricultural productivity, improved soil health, and diversified income sources. These co-benefits can lead to higher and more stable incomes for project participants, enhancing their economic profiles. As participants' financial situations improve, they become more attractive clients to formal financial institutions. This can open doors to a wider range of financial services that were previously inaccessible, including savings accounts, loans, and insurance products.

Opportunity 3: Expand Access to Project Financing to Prove and Scale Inclusive, Financial Services-Enabled Carbon Projects

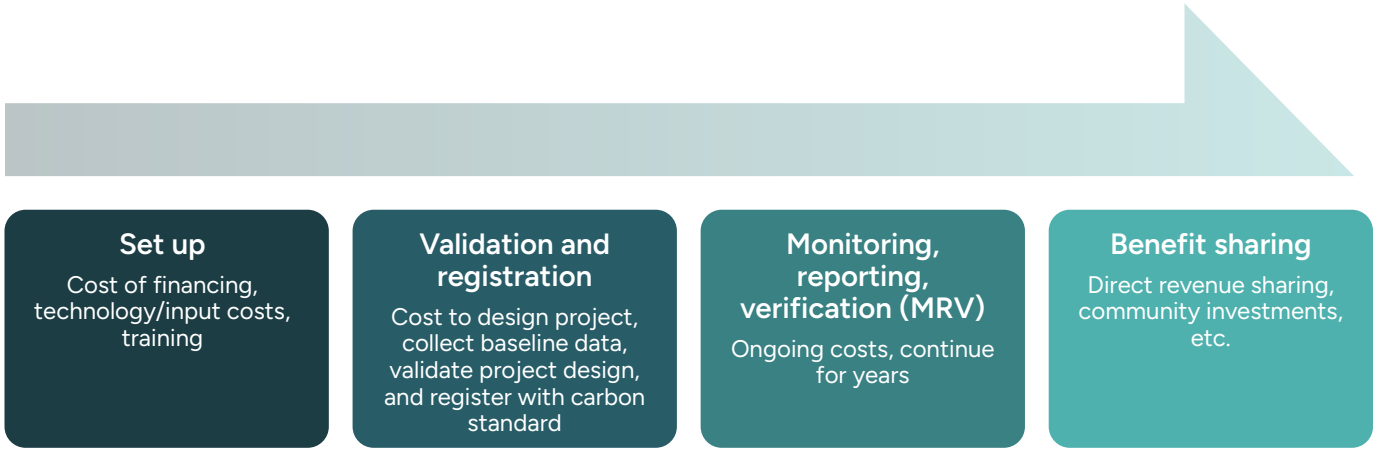
Carbon projects that deliver benefits to low-income, underserved people in emerging markets are generally expensive to set up and operate. They also often face uncertainty about revenue and returns, as well as long time horizons for generating those returns. These complexities around costs and revenue mean that project developers struggle to secure affordable, fit-for-purpose capital that can tolerate the risk levels and timelines of inclusive carbon projects.

Inclusive project developers need access to debt, equity, grants, and other forms of capital to meet upfront costs—long before their projects can earn revenue. Mercy Corps Ventures estimates that the total cost of developing a forest restoration carbon project that prioritizes inclusion of local communities could be as high as USD 3–5 million, which represents a significant barrier for developers seeking to implement inclusive carbon projects (Kou and Wardwell 2023). Without such financing, developers will struggle to launch projects, thereby impeding innovation. They also need access to working capital, appropriate debt, and financing partners to cover operating costs and enable participation among low-income, underserved users. In general, there is a need to develop a range of blended financing vehicles with the relevant risk, patience, and return expectations to cultivate more inclusive carbon projects.

Access to long-term capital will also be critical. Depending on the monitoring requirements of the methodology in question, the bulk of project costs occur years before the projects begin generating revenue. Monitoring periods can last from two to seven years (Climate Partner 2024). However, uncertainties around future carbon prices, political risk, and delivery risk can dissuade commercial banks and investors from extending access to appropriate long-term financing.

The need for affordable, long-term capital is also a challenge for FSPs. For example, developing lending products that can be repaid by future carbon revenues is difficult, given the lead time between the beginning of a project and when carbon credits are issued and sold. Access to capital to enable long-term finance has always been a challenge for inclusive finance providers, such as MFIs, and represents a barrier to driving greater financial innovation for participants in carbon projects.

FIGURE 7. **Overview of project development costs**



Source: Authors.

Development funders and investors have a critical role to play in supporting more inclusive carbon markets. Technical assistance and grant capital can drive early-stage innovation and the development of new models that unlock opportunities for people living in poverty to participate in and benefit from carbon projects. Impact investors can deploy patient capital that provides promising projects with the runway they need to prove their models. At the same time, donors and development finance institutions can help crowd-in project financing through de-risking and blended finance facilities that enable proven projects to scale.

More specifically, development funders and investors should consider the following:

- **Finance Pilot Projects:** Developers cannot secure the financing needed to launch large projects without a successful track record. Executing smaller pilot projects can be a useful first step in substantiating impact claims while also building the credibility needed to secure financing for larger projects. Funders could catalyze future investment by financing such pilots of inclusive projects.
- **Grant Windows to Launch Inclusive Projects:** Carbon projects face steep set-up costs, including executing feasibility studies, authoring project design documents, and covering registration costs. Interviews with project developers have highlighted the difficulty of covering these costs as a substantial barrier to entry, particularly for early-stage companies.
- **Concessional Debt or Recoverable Grants for On-Lending:** Many inclusive carbon projects require developers to finance assets for low-income participants. However, few financial institutions or investors are willing to offer low-cost debt with sufficiently long time horizons. By providing low-cost capital for on-lending to project participants, funders can significantly increase scale and impact.
- **De-Risking Commercial Financing:** In addition to volatile and unpredictable carbon credit prices, delivery risk can make it difficult to assess future revenue and can increase the risk profile of inclusive carbon projects. Donors and development finance institutions can deploy first-loss guarantees and provide minimum price guarantees or "buyer of last resort agreements" to de-risk projects for other investors
- **Connecting Buyers and Developers:** Most carbon credit buyers prefer to purchase credits via bilateral agreements rather than on exchanges or marketplaces. This means that developers with strong relationships have a better chance of securing buyers. Funders can support developers in emerging markets, particularly early-stage companies, to connect with buyers and build credibility.

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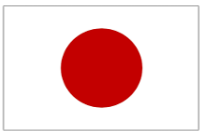
CGAP Members



CGAP members and strategic partners as of June 2024

CGAP Members (continued)

MetLife Foundation

Ministry of Foreign Affairs and International Cooperation

Ministry of Foreign Affairs of the Netherlands

Norad

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Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development and Cooperation SDC

Sida

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UKaid
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CGAP Strategic Partners

AXA

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Fundación BBVA Microfinanzas

CGAP members and strategic partners as of June 2024

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