

# AGRICULTURAL AND BLUE CARBON MARKET OPPORTUNITIES IN LATIN AMERICA AND THE CARIBBEAN



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Agricultural and Blue Carbon  
Market Opportunities in Latin  
America and the Caribbean

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**VCMi**



# KEY MESSAGES

**The agricultural sector in Latin America and the Caribbean (LAC) holds great potential to attract private investment for climate action and resilience through the voluntary carbon market (VCM).** The growing prominence of the VCM is expected to unlock about US 50 billion dollars of private finance per year by 2030 across all sectors. Governments are essential for harnessing the potential of the VCM by creating strong institutional frameworks and inclusive participatory decision-making processes that support credible project development and implementation. When governments create enabling environments for VCM investment, other key actors –like major donors, traditional cooperation agencies, and private philanthropies– can work better as partners in scaling up this important investment tool.

**Investment in the VCM can accelerate the transition to highly resilient, carbon rich, productive, and diverse agricultural production systems.** VCM projects and programs in agriculture and other sectors can attract significant investment, often in the form of foreign direct investment, and help catalyze a change to well-managed agricultural systems. Investment in food production systems in LAC is important to ensure the regional sector's economic growth and diversification, employment and poverty reduction, and food security and improved nutrition – all while facilitating climate-resilient ecosystem services.

**Investments through the VCM in the agricultural sector in LAC can yield significant climate benefits.** More than a third of current greenhouse gas (GHG) emissions from agriculture in LAC (2.4 billion metric tons of CO<sub>2</sub>e per year) could be eliminated by promoting practices that reduce net emissions of greenhouse gases from livestock and crop production sectors. Carbon credit buyers are increasingly interested in nature-based solutions – including agricultural carbon projects – in the region due to their high mitigation potential and contributions to multiple sustainable development benefits.

**However, tapping into VCM opportunities requires overcoming several systemic challenges.** Agricultural emissions are often dispersed over multiple farms, linked to various activities, and are

therefore difficult to measure. Because of these challenges, aggregating individual farms into large sectoral programs is crucial. Though recent years have seen significant technological advancements for carbon measurement and project oversight, monitoring emission reductions and enhancing carbon sequestration remains a challenge for the sector. Additionally, finance mobilized through the VCM alone is often unlikely to cover full program costs, meaning that VCM programs often depend on additional private or public investments, which adds a potential barrier to their success.

**Finance from the VCM can support the shift from sprawling, often-poorly managed livestock farms to productive, well-managed silvopastoral systems.** Given the significance of livestock to the LAC region and its contribution to ecosystem degradation and deforestation, transitioning towards intensified and well-managed livestock systems is essential for meeting climate and biodiversity goals. Well-managed livestock systems can enhance grassland diversity, food system resilience, farmer capacities, and livelihoods.

**Most agricultural production systems can increase carbon content by integrating on-farm tree planting with existing crop systems.** These agroforestry systems provide a straightforward production method (anchored in local traditions) which offers shade, reduces erosion, and increases carbon storage. While compatible with various types of crop production, agroforestry systems provide distinct opportunities for crops like coffee or cocoa.

**Significant untapped emissions mitigation potential exists in rice production and coastal ecosystems in LAC, both of which offer important climate and biodiversity benefits.** Although VCM projects and programs in these areas – and therefore, investment in such projects – are still emerging, VCM standards are generating new methodologies, which is a promising development for advancing VCM interventions in sustainable rice production and in blue carbon in the region and globally.

**Regional LAC governments – particularly agricultural ministries – can create an enabling environment for VCM investment.** For instance, policymakers can provide regulatory certainty by establishing clear, efficient, and standardized processes for investors and project developers interested in investing in agriculture-related projects through the VCM. In practice, this includes government action such as clarifying land titles, sharing baseline emission data, and building monitoring systems. Furthermore, governments can provide guidance to ensure equitable benefit-sharing from VCM finance, safeguarding the rights of Indigenous peoples and local communities, and establishing effective communication mechanisms with relevant national and subnational authorities.

**Political leadership by agricultural ministers is key to unleashing the positive contributions of the VCM while ensuring the high integrity of market activities.** To properly manage risk and opportunities, a regional coordinated collective action may be established to facilitate access to private finance to scale climate action and resilience through the VCM. This novel partnership can be thought of as a platform for capacity-building to facilitate access to the VCM for the agri-food sector of the LAC region, making visible the potential of the sector in GHG mitigation and its contributions to the SDGs by scaling private climate finance. A joint regional effort can help to reduce transaction costs and expedite robust design and implementation at the national level.

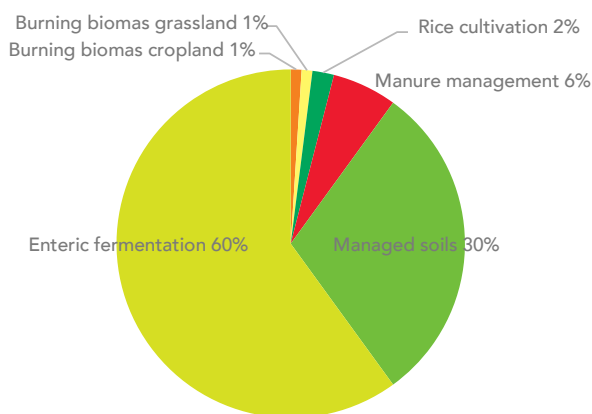
# 1. CARBON MARKETS AND AGRICULTURE IN LATIN AMERICA AND THE CARIBBEAN

**Actors within the agriculture sector face increasing pressure to address climate change.** Globally, agricultural lands contribute 20% of global anthropogenic GHG emissions by emitting approximately 10 GtCO<sub>2</sub>e per year. In many LAC countries, agriculture and other land use is responsible for the largest share of emissions. Cumulatively, the region’s emissions from agriculture and other land use total 2.4 GtCO<sub>2</sub>e per year. For example, in 2020, emissions from the land sector constituted 90%, 76%, and 53% of annual emissions in Paraguay, Brazil, and Colombia, respectively.<sup>1</sup>

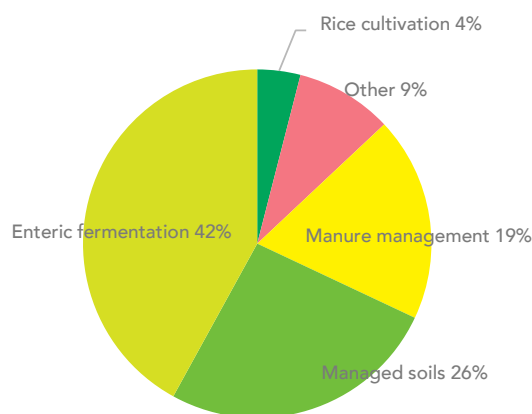
**In LAC, agricultural emissions can be primarily attributed to livestock and crop production (Figure 1).** Livestock emissions contribute to two-thirds (67%) of the total emissions from agriculture, mainly through enteric fermentation (i.e., the production of methane from ruminant animals) and manure management (i.e., the production of methane and nitrous oxide from animal excreta). It’s worth noting that almost half (45%) of GDP from agriculture in the region come from livestock production.<sup>2</sup> Soil management for crop cultivation, including for rice, accounts for the remaining 33%.

Figure 1. Sources of emissions in the agriculture sector in Latin America and the Caribbean. Source: FAO (2020)<sup>3</sup>

**Emissions from the agriculture sector in Latin America, by major category (share of total emissions)**



**Emissions from the agriculture sector in the Caribbean, by major category (share of total emissions)**



**The agriculture sector presents a unique opportunity to confront climate change.** Assuming cost-effective mitigation, agricultural lands have a global mitigation potential of 5.3 GtCO<sub>2</sub>e per year (of which an annual 0.9 GtCO<sub>2</sub>e in mitigation potential exists in LAC).<sup>4</sup> Due to the sector’s mitigation potential, it is crucial to shift the agriculture sector from a net emissions source to a net emissions sink. This transformation is also necessary to enable LAC countries to meet targets set by their Nationally Determined Contributions (NDCs) under the Paris Agreement. In fact, more than 80% of LAC countries have incorporated agriculture and land use sectors into their NDCs. Of these, all include mitigation

policies or measures for forests, 31% have policies for cropland, and 25% have policies for grasslands; but only 13% have policies on livestock, despite this sector’s significant emissions.<sup>5</sup>

**Agricultural mitigation efforts not only contribute to meeting national and global climate goals, but also pave the way for sustainable and prosperous rural livelihoods.** Implementing actions that ensure the sustainability of agricultural operations can simultaneously enhance the resilience of agriculture production systems, improve rural livelihoods, diversify and increase farmer incomes, and protect the LAC’s rich biodiversity.

**However, available finance for supporting the sustainable transition of the agricultural sector is limited.** The transition to net zero by 2050 could cost LAC countries nearly USD 700 billion per year.<sup>6</sup> Several economic and financial barriers also impede LAC countries' NDC implementation.<sup>7</sup> Amidst constrained public budgets and a substantial burden of public debt, governments are actively seeking opportunities to attract investments for mitigation actions from private and international sources of finance.

**The VCM can play an important role in accelerating climate action, driving finance toward projects**

**and programs (Box 1) that add to and complement government action.** Due to lower abatement costs and high sustainable development benefits, mitigation in the agriculture sector provides a unique opportunity for countries to drive investments into rural areas which are often deprived of public and private investment. Engagement in the VCM is not new to LAC countries. The region has significant experience in VCM participation; after North America and South Asia, LAC is the third largest provider of voluntary credits in the world and was responsible for nearly 16% of the total global voluntary credit supply in 2020 and 2021.<sup>8</sup>

*Box 1. Eligible activities in agricultural projects and programs in the Voluntary Carbon Market*

Agricultural projects and programs in the VCM generate carbon credits through a variety of management practices, including:



Activities that reduce emissions of methane and nitrous oxide, e.g., improved management of livestock, manures, fertilizer, and irrigation (e.g., in rice systems);



Regenerative agriculture practices that sequester soil carbon (e.g., no-tillage, retention of post-harvest residue on the soil, cover crop rotation, and biochar application);



Agroforestry (i.e., planting trees on pastures and crop lands);



Replacement of fossil fuels with biogas (i.e., methane obtained from residual biomass and animal manure) for energy and heat generation;<sup>9</sup>



Sustainable management of semi-natural ecosystems, which are also used for agricultural (e.g., grasslands) and fisheries activities (e.g., mangrove forests), such as avoiding conversion to cropland, restoring degraded grasslands by optimizing livestock grazing intensity, managing for fire and drought, and enabling vegetation regrowth.<sup>10</sup>

**In recent years, there has been a growing interest in agricultural projects and programs that generate credits that are sold on the VCM.** In 2022, over half of new project registrations on the VCM were for forestry and land use activities (Figure 2).<sup>11</sup> Sustainable agriculture projects have seen the largest increases in both credit issuance (growing 175%) and number of projects (growing 525%) from December 2021 to November 2022).<sup>12</sup>

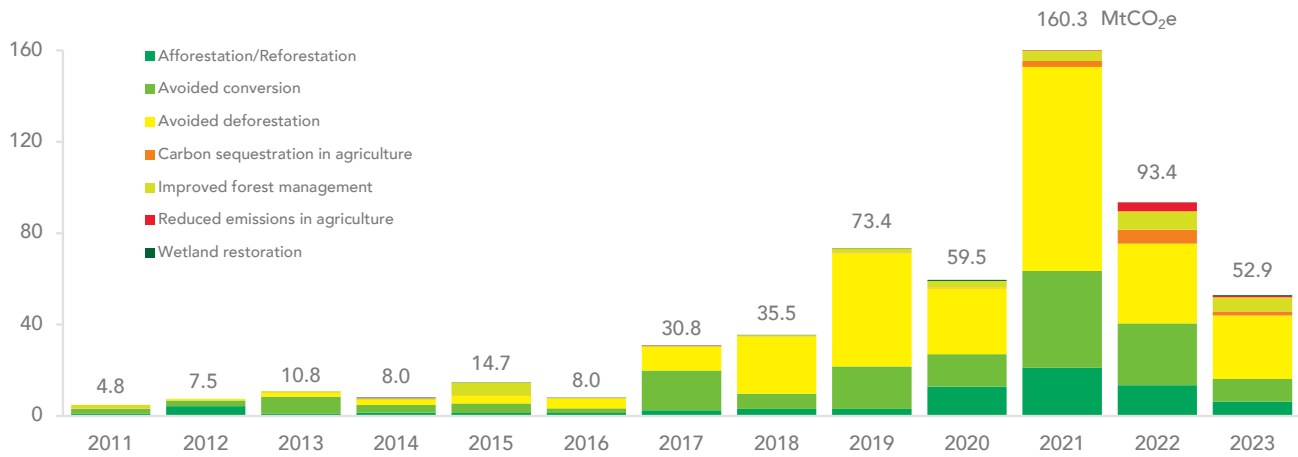
**This increased interest in carbon credits generated from agricultural projects is driven by several factors.** These include: (i) advancements in monitoring methods and technologies; (ii) the option to integrate individual projects into grouped projects or even landscape-level programs; and (iii) the recognition of the multiple co-benefits offered by agricultural climate action. Carbon market incentives can be used to increase the profitability of agricultural production

systems by transitioning to diverse, productivity enhancing, and resilient production practices.

**Despite this progress that has helped spur interest in agricultural projects, the sector still faces unique challenges that inhibit project development and weaken the sector's advancement within the VCM.**<sup>13</sup> Farmers are often risk-averse and reticent to change production practices or adopt new technologies, especially when these might reduce productivity, even if only temporarily, and the accurate measurement and verification of carbon credits from agricultural and forestry activities remains challenging. Since the number of carbon credits that can be generated per farm is often limited, it is necessary to aggregate high numbers of farms to justify the investment in carbon projects and programs. Finally, weak land tenure and land conflicts add to transaction costs, particularly for small farmers and communal lands.

Figure 2 Nature-based Solution (NbS) credit issuances per activity type. Source: Climate Focus VCM Dashboard (2023)

**NBS Issuances from 2011 until H1 2023**



If the agri-food sector in LAC engages with the VCM effectively and with high-integrity principles, the market can play a critical role in the sector’s access to private finance. Carefully considering and designing the sector’s engagement with the VCM is crucial. This is because poorly designed VCM projects can result in projects that don’t effectively reduce GHG emissions or other lasting benefits, resulting in insufficient credit integrity. The quality of VCM projects suffers when (i) projects are not aligned with host government policies and violate environmental, social or governance safeguards, or local communities are not consulted or involved in projects; (ii) emission reductions or removals are overestimated or non-additional (i.e., the emission reductions would have happened in the absence of the project); and (iii) resulting carbon credits are used by carbon buyers in a misleading or spurious way.

Governments hosting carbon market projects can help reduce risks by ensuring overall policy alignment, benefit sharing between Indigenous peoples and local communities, and compliance with safeguards. Policy makers can also create incentives for carbon market activities and proactively and strategically promote VCM investments into specific agricultural production systems or ecosystems. Embedding carbon market incentives into landscape-level programs can harness opportunities from the creation of sustainable rural economies. Such programs can be actively supported by governments, for example, by sharing data, conducting feasibility studies and standardized baseline measurement, and creating an enabling investment for mitigation projects. To minimize uptake and transaction costs, regional efforts and capacity-building could benefit from a partnership led by ministries of agriculture in cooperation with partners and donors.

## 2. CARBON MARKET OPPORTUNITIES IN THE AGRICULTURAL SECTOR



Carbon market incentives offer the potential to enhance the profitability of agricultural production systems through the adoption of diverse and resilient production practices. In the following section, we summarize VCM opportunities related to livestock production, rice cultivation, agroforestry systems, and coastal systems (i.e., blue carbon).

### Livestock



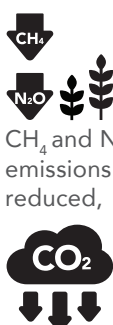
The VCM provides an avenue to mitigate livestock-associated emissions while promoting a transition

to sustainable and climate-resilient production systems. Small changes in behavior and management style that optimize production systems can yield swift, positive results in terms of productivity and enhance system resilience. Silvopastoral systems, improved grazing management, and enhanced farm management practices not only boost productivity but also create opportunities for higher and diversified farm incomes. Additionally, these practices contribute to greater biomass and soil carbon capture, decreased soil degradation, and increased biodiversity. Table 1 describes the mitigation activities related to livestock that can be developed with the support of the VCM.

Table 1. Mitigation activities for the livestock production system

PRACTICE	GHG MITIGATED	DESCRIPTION	ADVANTAGES	CHALLENGES
Silvopastoral systems	 CO <sub>2</sub> sequestered	Holistic system for managing a cattle ranching farm. It includes the planting of trees and legumes.	Easy to implement, tested practice with multiple benefits (biodiversity uplift, enhanced productivity, increased resilience). Can be combined with other practices such as improved pastures, grazing management, enhanced breeding and enteric fermentation management.	CO <sub>2</sub> sequestration takes time, requires advance finance.
Improved pasture management – improved forage species	 CH <sub>4</sub> emissions reduced, CO <sub>2</sub> sequestered	Planting grassland species adapted to soils, nitrogen fixing species, high protein grasses. These species will sequester higher amounts of CO <sub>2</sub> and improve feeding cycles.	Measures that improve the productivity of livestock operations and can come with multiple benefits (biodiversity, enhanced productivity). Leads to a professionalization of livestock operations.	Requires upfront investment. The reduction of methane emissions is difficult to measure in absolute terms. Methodologies focus on efficiency gains (accelerated weight gain).



<p>Improved grazing management</p>	 <p>CO<sub>2</sub> sequestered</p>	<p>Rotational grazing, improved forage system. Allowing the soils and grasses to recover allowing for increases in productivity and soil carbon sequestration.</p>	<p>Forms part of a suite of measures (improved pasture management and silvopastoral systems) that increase the competitiveness of the livestock sector, while increasing agricultural resilience.</p>	<p>Increased carbon content in soils remains challenging to measure.</p>
<p>Enteric fermentation</p>	 <p>CH<sub>4</sub> emissions reduced</p>	<p>Feeding cattle methane inhibiting antibiotics and test emerging technological solutions to reduce methane emissions generated by enteric fermentation.</p>	<p>Addresses the most important source of GHG emissions from livestock operations.</p>	<p>Enteric fermentation is the largest source of methane from livestock production. However, changes that can be made to direct livestock emissions are little and costly. The direct measurement of emission reductions from enteric fermentation is costly.</p>
<p>Manure management</p>	 <p>CH<sub>4</sub> and N<sub>2</sub>O emissions reduced, CO<sub>2</sub> reduced</p>	<p>Capturing and use of manure</p>	<p>Use of biogas instead of fossil fuels or fuel wood</p>	<p>Mitigation option not suitable for extensive cattle operation that make the capture of manure difficult.</p>

**Livestock production currently operates on degraded pastures, lacks professional management, and drives deforestation, and the VCM has the potential to initiate a much-needed transition away from these unsustainable practices.**

While VCM finance can provide only a limited amount of capital to each farm, when combined with technical assistance it can facilitate the transition of the sector toward more resilient and productive practices. Because of the limited nature of VCM finance on an individual farm basis, the successful operation of a VCM livestock program hinges on an aggregation of individual livestock projects into a larger-scale livestock program. In most cases, an aggregated program will require ongoing provisions of technical assistance and farmer support. There is also a potential risk that programs that yield productivity gains could incentivize the expansion of livestock systems, leading to increases – rather than decreases – in emissions (i.e., a “rebound effect”).

**Several existing livestock carbon projects can serve as examples for broader project development, such as those in in Argentina,<sup>14</sup> Brazil,<sup>15</sup> Paraguay, Uruguay, and Chile.<sup>16</sup>** For example, the NaturAll Carbon Project in Brazil aims at increasing soil organic carbon and GHG removals, avoiding soil degradation, improving soil fertility and productivity, creating better resilience to extreme weather events, providing food security, and preserving natural resources and ecosystem services. By implementing agricultural and livestock sustainable practices, the program will enhance 400 million hectares in 23 different states.<sup>17</sup> Another initiative – the collaboration between Ruuts and the Climate Neutral Group (CNG) – focuses on regenerative grazing that reduces costs and improves the socio-economic position and resilience of farmers who are increasingly exposed to climate-related threats. This large-scale carbon program is active in Paraguay, Uruguay, and Chile.<sup>18</sup>

## Rice

**Improving rice production methods can mitigate emissions while delivering added benefits for farms and landscapes.** These improvements can lead to higher yields, improved crop quality, and reduced climate impacts. Typically, rice is grown in flooded

fields, which reduces oxygen availability in soils and stimulates bacteria, which releases methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) – two powerful GHGs which both have stronger global warming potential than CO<sub>2</sub> in the atmosphere.<sup>19</sup> Fortunately, sustainable practices that reduce emissions from rice production are available and can be supported with finance mobilized by the VCM (see Box 2).

### Box 2. Mitigation activities for the rice production system

Mitigation opportunities in the rice sector:

- Alternating wetting and drying (AWD) techniques are water-saving technologies that farmers can apply to reduce irrigation water consumption without compromising rice yields.<sup>20</sup>
- Direct-seeded rice (DSR) is a crop establishment system where seeds are sown directly into the field, as opposed to growing seeds in a nursery for transplanting into flooded fields.<sup>21</sup>

Both practices contribute to lower methane emissions due to the reduced usage of water.<sup>22</sup> Studies undertaken in LAC have shown that AWD can reduce 25-70 % of methane emissions compared to traditional rice production.<sup>23</sup> While these activities can be implemented to harness VCM opportunities, caution is needed as, depending on design and implementation, unintended negative impacts (e.g.: reduced labor needs or productivity) may occur.

**Despite the increasing demand for carbon credits that support nature-related initiatives, the potential for mitigation through rice-related projects remains largely untapped.** Only a handful of rice-related projects have been registered and issued credits, the majority of them located in China and the U.S.<sup>24</sup>

**Policy makers in LAC can help facilitate the development of VCM projects that reduce methane and nitrous oxide from rice cultivation.** For instance, the Inter-American Institute for Cooperation on Agriculture (IICA), with the support of FONTAGRO (a co-finance mechanism for sustainable agriculture in LAC) and the Chilean Institute for Agriculture Research (INIA), has been implementing a System of Rice Intensification (SRI) production. SRI contributes to reducing methane emissions by preventing rice fields from flooding.<sup>25</sup> Additionally, implementing SRI has produced productive rice yields that slash the required number of seeds and amount of water (by half) and require fewer pesticides – thereby reducing production costs for farmers.<sup>26</sup>

**Two leading carbon standards –Verified Carbon Standard (VCS) and Gold Standard for Global Goals– are developing new methodologies for rice production projects that generate credits for the VCM.**<sup>27</sup> Meanwhile, in February 2023, VCS put the

application of an existing methodology on hold due to issues regarding the quality of the credits and doubts about the real occurrence of emission reductions.<sup>28</sup>

## Agroforestry systems

**Agroforestry systems are an accessible and effective 'low-hanging fruit' for climate change mitigation and fostering inclusive rural development.** Agroforestry systems refer to the in-farm combination of trees with crops or grasslands. By incorporating trees within a farming system, agroforestry systems not only sequester carbon from the atmosphere but also enhance biodiversity, boost crop yields, bolster food security for local communities, and provide valuable ecosystem services like improving soil fertility and regulating water resources.<sup>29</sup> Further, promoting agroforestry as a mitigation measure acknowledges and values the measure's history as a traditional production system in the region. Agroforestry has a deep-rooted history in LAC, which has partly been lost due to agricultural industrialization.<sup>30</sup>

**Implementing cost-effective agroforestry interventions in LAC can sequester more than 127**

**million metric tons of CO<sub>2</sub> per year.**<sup>31</sup> LAC produces important crops that thrive in agroforestry systems, such as coffee and cocoa (which are shaded crops) and avocado and other fruits (which are shading trees). While these crops are cultivated on a relatively small area of land compared to staple crops, these crops constitute an important source of revenue, often serving as the sole income source for many smallholders in the region.

**The VCM provides a valuable opportunity to direct private sector funding towards agroforestry projects.** The growing interest in removal credits from buyers on the market, coupled with the additional Sustainable Development Benefits offered by agroforestry, makes these projects highly appealing to buyers.<sup>32</sup> For instance, Acorn and Rabobank are supporting coffee and cocoa farmers in Colombia, Peru, El Salvador, and Nicaragua by monetizing the removals generated by agroforestry projects.<sup>33</sup> Smallholders are conducting reforestation practices, with Acorn remotely monitoring the carbon sequestration that these activities generate. Smallholders, who receive 90% of the value of the credits sold, are then able to diversify their income.<sup>34</sup>

**VCM projects that promote agroforestry can shift the coffee and cocoa production dynamics while supporting rural development in LAC.** For example, the Aprosaco Reforestation project is a community-led mitigation project implemented in small-scale farms in the Olancho region, Honduras.<sup>35</sup> This project aims to reforest the buffer zone of the Patuca National Park. By implementing agroforestry systems with cocoa, the project will protect and promote biodiversity while allowing smallholders to benefit from the sustainable production of timber and cocoa. Additionally, the project provides additional ecosystem services such as soil enrichment, water regulation, and avoided erosion.<sup>36</sup>

## Blue Carbon

**LAC countries also possess substantial potential for emissions mitigation through the preservation and restoration of marine and coastal ecosystems, known as “blue carbon.”** Blue carbon refers to the carbon stored in the coastal ecosystems of mangroves, tidal marshes, and seagrass meadows.<sup>37</sup> Globally, blue carbon ecosystems have a higher carbon density compared to terrestrial forests, storing the same amount of carbon in less than 3% of the area.<sup>38</sup> Due to their high carbon density, the loss of

one hectare of blue carbon ecosystems generates between ten and 40 times more emissions than the deforestation of terrestrial forests.<sup>39</sup>

**The LAC region holds a significant portion of the global blue carbon mitigation potential.** Central and South America are rich in mangroves, with each region boasting almost 20,000 km<sup>2</sup> of this vital ecosystem, representing a combined 28% of global mangrove forests cover. Additionally, Central America is rich in seagrass ecosystems, with more than 40,000 km<sup>2</sup> of these ecosystems.<sup>40</sup> Across the entire American continent, mangroves, seagrasses, and salt marshes collectively have a mitigation potential of 78 MtCO<sub>2</sub> per year.

**Blue carbon credits are attracting increasing VCM buyer interest due to their impressive mitigation potential and multiple sustainable development benefits.**<sup>41</sup> Along with emissions mitigation, blue carbon projects offer many co-benefits, such as ecosystem services (e.g., enhanced biodiversity and coastal protection); enhanced climate adaptation (e.g., by guarding against damage from storms and cyclones); and improved livelihood support for coastal-dwelling communities (e.g., via fishery and tourism).<sup>42</sup> Existing blue carbon projects can serve as model projects to scale similar interventions in the region, for example:

- In Colombia, Conservation International has developed a blue carbon project in the Cispatá Bay, registered under the Verra standard. The project aims at catalyzing VCM finance to support 12,000 coastal dwellers who depend on mangrove ecosystems for their livelihoods, while reducing GHG emissions through adequate management of mangroves, the promotion of sustainable development, the strengthening of local governance and the promotion of alternative production activities.<sup>43</sup>
- Apple is supporting the “Vida Manglar” project through its Apple Give Back program, highlighting the opportunities to catalyze investment for protecting blue carbon ecosystems by big players in the global economy.<sup>44</sup>

### 3. HOW GOVERNMENTS CAN FACILITATE VCM INVESTMENTS INTO AGRICULTURE AND BLUE CARBON

**While market mechanisms under the Paris Agreement are still evolving, the VCM presents a ready opportunity to leverage international finance to drive the transition of the agricultural sector towards more resilient production systems.** VCM finance allows governments and private actors to forge partnerships around the development of larger programs that aggregate a high number of farms. Public agencies can directly take on the role of aggregators and act as project sponsors, or they can collaborate with national or local producer groups to

facilitate the design and execution of sectoral carbon programs.

**The agricultural sector in LAC can create a competitive advantage over other sectors in the region to attract private investment by prioritizing high-integrity projects and credits as a distinct design feature of its VCM efforts.** To this end, governments – particularly ministries of agriculture – can create an enabling environment for VCM investments through various activities and joint efforts (Box 3).

*Box 3. Efforts to create enabling environment for VCM investment in the agriculture sector*



Increasing awareness of the role of VCMs with all actors in the sector, particularly farmers, and actively encouraging investments in projects or programs that generate carbon credits.



Providing capacity-building support to stakeholders (including farmers, local communities, local financial institutions, and other private sector actors), which focuses on the VCM, its potential, and its role in supporting local livelihoods and developing sustainable landscapes that help in transforming the agri-food sector.



Providing regulatory and political certainty to VCM transactions by clarifying the rules of engagement for the VCM in their countries and recognizing methodologies and/or protocols relevant to the agriculture sector.



Adopting environmental and social performance standards or safeguards that provide regulatory certainty to project investors and reduce risk for investors.<sup>45</sup>



Establishing baseline data and developing measurement, reporting and verification systems; that contribute to project documentation and the enhancement of the market (in regard to its transparency and efficiency).

**Governments can address the obstacles that limit farmers and private forest landowners from engaging with the VCM.** For example, the draft “Growing Climate Solutions Act”<sup>46</sup> in the United States proposes providing reliable information about markets, assistance to new participants, and standardized criteria for credit quality. Governments can also work with farmer organizations to create capacities and train project developers. Farmer

organizations and associations can act as project coordinators and help implement projects that benefit their members.

**Governments can also directly sponsor VCM projects and programs.** In some countries, public agencies – such as national park authorities, like in the case of forestry projects – act as project proponents and use VCM finance to support public investments.

Additionally, governments can maintain registries to track and monitor carbon credits and projects, simultaneously demonstrating their support for the VCM and increasing transparency of VCM-related activities in their countries.

**Finally, governments can further tap into the VCM by engaging in regional collaborations to facilitate and design VCM programs.** This may involve the establishment of a regional VCM platform that allows governments to share experiences and engage in knowledge exchange and joint learning. In the context of regional cooperation, governments can also design transnational initiatives that involve the

development of sectoral VCM programs, like in the livestock or coffee sector. These regional programs can be supported by joint information platforms that make available business models, methodologies, and data and ensure early engagement of farmers, the corporate sector, investors and philanthropy.

**Overall, governments around the world, including LAC countries, should work to scale up the VCM, given the massive potential it holds for advancing agriculture and blue carbon projects. Without private finance, like that mobilized through the sale of voluntary carbon credits, these key sectors may struggle to scale up at the rate needed to meet global nature and climate goals.**

## ENDNOTES

- <sup>1</sup> FAOSTAT. (2020). Emissions share (CO<sub>2</sub>eq) of agricultural land total emissions [Data set]. Retrieved from <https://www.fao.org/faostat/en/#data/GT/visualize>.
- <sup>2</sup> FAO Regional Office for Latin America and the Caribbean. (n.d.). Sustainable livestock farming and climate change in Latin America and the Caribbean. Retrieved September 18, 2023, from <https://www.fao.org/americas/priorities/ganaderia-sostenible/ar/>.
- <sup>3</sup> FAO. (2020a). *Regional analysis of the nationally determined contributions in Latin America*. Retrieved September 15, 2023, from <http://www.fao.org/documents/card/en/c/ca8249en>; FAO. (2020b). *Regional analysis of the nationally determined contributions in the Caribbean*. Retrieved September 19, 2023, from <http://www.fao.org/documents/card/en/c/ca8672en>.
- <sup>4</sup> Roe, S., Streck, C., Beach, R., Busch, J., Chapman, M., Daioglou, V., et al. (2021). Land-based measures to mitigate climate change: Potential and feasibility by country. *Global Change Biology*, 27(23), 6025–6058.
- <sup>5</sup> FAO. (2020a).
- <sup>6</sup> Aristi Baquero, J., Berner, C., Costantini, X., Francés, D., Goraieb, E., & Salazar de Fernando, L. (2023). *Are Latin American financial institutions ready for sustainability? | McKinsey*. Retrieved September 18, 2023, from <https://www.mckinsey.com/industries/financial-services/our-insights/are-latin-american-financial-institutions-ready-for-sustainability>.
- <sup>7</sup> FAO. (2020a).
- <sup>8</sup> Berkeley Carbon Trading Project. (2023). Voluntary Registry Offsets Database [Data set]. Retrieved from <https://gspp.berkeley.edu/research-and-impact/centers/cepp/projects/berkeley-carbon-trading-project/offsets-database>.
- <sup>9</sup> Methodology for animal manure management and biogas use for thermal energy generation | The Gold Standard. (n.d.). Retrieved September 18, 2023, from <https://www.goldstandard.org/our-work/innovations-consultations/methodology-animal-manure-management-and-biogas-use-thermal>; CDM: Methodology for collection, processing and supply of biogas to end-users for production of heat --- Version 1.0. (n.d.). Retrieved September 18, 2023, from <https://cdm.unfccc.int/methodologies/DB/42ES7QLLGWLEVXR5RTYFFWXQWGMBBC>.
- <sup>10</sup> VCM Primer. (n.d.). [vcmprimer.org](https://vcmprimer.org/). Retrieved September 18, 2023, from <https://vcmprimer.org/>.
- <sup>11</sup> World Bank (2023). *State and Trends of Carbon Pricing 2023*. Retrieved August 25, 2023, from <https://openknowledge.worldbank.org/handle/10986/39796>.
- <sup>12</sup> Abatable. (2023, January). Voluntary Carbon Markets Developer Overview 2022. Retrieved September 18, 2023, from <https://www.abatable.com/reports/voluntary-carbon-markets-developers-overview-2022>.
- <sup>13</sup> Wongpiyabovorn, O., Plastina, A., & Crespi, J. M. (2023). Challenges to voluntary Ag carbon markets. *Applied Economic Perspectives and Policy*, 45(2), 1154–1167.
- <sup>14</sup> Verified Carbon Standard. (n.d.-d). Project 3938: Carbono rural AR NEA. Verra. Retrieved September 18, 2023, from <https://registry.verra.org/app/projectDetail/VCS/3938>.
- <sup>15</sup> Verified Carbon Standard. (n.d.-c). Project 3746: NaturAll Carbon Program – Conservation Agriculture and Land Management in Brazil. Verra. Retrieved September 18, 2023, from <https://registry.verra.org/app/projectDetail/VCS/3746>.

- <sup>16</sup> Verified Carbon Standard. (n.d.-b). Project 3432: South American Regenerative Agriculture Through Regenerative Grazing (SARA) – Agricarbon. Verra. Retrieved September 18, 2023, from <https://registry.terra.org/app/projectDetail/VCS/3432>.
- <sup>17</sup> Verified Carbon Standard. (n.d.-c).
- <sup>18</sup> Regenerative agriculture in South-America - in development. (n.d.). *Climate Neutral Group*. Retrieved September 18, 2023, from <https://www.climateutralgroup.com/en/climate-projects/regenerative-agriculture-in-south-america/>.
- <sup>19</sup> Umali-Deininger, D. (2022, March 15). Greening the rice we eat. *World Bank Blogs*. Retrieved September 18, 2023, from <https://blogs.worldbank.org/eastasiapacific/greening-rice-we-eat>.
- <sup>20</sup> Sriphirom, P., Chidthaisong, A., & Towprayoon, S. (2019). Effect of alternate wetting and drying water management on rice cultivation with low emissions and low water used during wet and dry season. *Journal of Cleaner Production*, 223, 980–988.
- <sup>21</sup> International Rice Research Institute. (2018). What is DSR? *Direct Seeded Rice Consortium*. Retrieved September 18, 2023, from <https://dsrc.irri.org/our-work/what-is-dsr>.
- <sup>22</sup> Susilawati, H. L., Setyanto, P., Kartikawati, R., & Sutriadi, M. T. (2019). The opportunity of direct seeding to mitigate greenhouse gas emission from paddy rice field. *IOP Conference Series: Earth and Environmental Science*, 393(1), 012042.
- <sup>23</sup> Chirinda, N., Arenas, L., Katto, M., Loaiza, S., Correa, F., Isthitani, M., et al. (2018). Sustainable and Low Greenhouse Gas Emitting Rice Production in Latin America and the Caribbean: A Review on the Transition from Ideality to Reality. *Sustainability*, 10(3), 671.
- <sup>24</sup> Tran, D. D., Park, E., Tuoi, H. T. N., Thien, N. D., Tu, V. H., Anh Ngoc, P. T., et al. (2022). Climate change impacts on rice-based livelihood vulnerability in the lower Vietnamese Mekong Delta: Empirical evidence from Can Tho City and Tra Vinh Province. *Environmental Technology & Innovation*, 28, 102834.
- <sup>25</sup> Witkowski, K. (2023, May 9). Co-Innovando para una producción de arroz más sostenible y sensible al clima en Chile. *Blog del IICA*. Retrieved September 18, 2023, from <https://blog.iica.int/blog/co-innovando-para-una-produccion-arroz-mas-sostenible-sensible-al-clima-en-chile>.
- <sup>26</sup> Witkowski, K. (2023, May 9).
- <sup>27</sup> Verra. (2023, July 11). Request for Proposals: Methodology or Module for Greenhouse Gas Emissions in Rice Production Systems. Verra. Retrieved September 18, 2023, from <https://verra.org/request-for-proposals-methodology-or-module-for-greenhouse-gas-emissions-in-rice-production-systems/>; Gold Standard. (2023, July 6). New Methodology to Slash Methane Emissions from Rice Cultivation and Empower Smallholder Farmers | The Gold Standard. *Gold Standard*. Retrieved September 18, 2023, from <https://www.goldstandard.org/blog-item/new-methodology-slash-methane-emissions-rice-cultivation-and-empower-smallholder-farmers>.
- <sup>28</sup> Szabo, M. (2023, June 30). Verra withdraws UN rice farming offset methodology for review over integrity concerns. *Carbon Pulse*. Retrieved September 18, 2023, from <https://carbon-pulse.com/190420/>.
- <sup>29</sup> Anja, G., & Philip, D. (2022). Agroforestry: A Primer. Retrieved September 18, 2023, from <https://www.cifor-icraf.org/knowledge/publication/25264/>.
- <sup>30</sup> Budowski, G. (1987). The development of agroforestry in Central America. In *Agroforestry: A decade of development* (pp. 69–88). Retrieved September 18, 2023, from [https://apps.worldagroforestry.org/Units/Library/Books/Book%2007/agroforestry%20a%20decade%20of%20development/html/3\\_the%20development.htm?n=14](https://apps.worldagroforestry.org/Units/Library/Books/Book%2007/agroforestry%20a%20decade%20of%20development/html/3_the%20development.htm?n=14).
- <sup>31</sup> Roe, S. et al. (2021).
- <sup>32</sup> Streck, C., Bakhtary, H., Müller, R., Prahan, P., & Rey Christen, D. (2022, October). Shades of REDD+: Beyond carbon – evaluating the sustainable development co-benefits of carbon projects. *Ecosystem Marketplace*. Retrieved September 18, 2023, from [https://www.ecosystemmarketplace.com/articles/shades-of-redd\\_beyond-carbon-evaluating-sdgs/](https://www.ecosystemmarketplace.com/articles/shades-of-redd_beyond-carbon-evaluating-sdgs/).

- <sup>33</sup> Plan Vivo. (2021, December 3). ACORN. *Plan Vivo Foundation*. Retrieved September 18, 2023, from <https://www.planvivo.org/acorn>.
- <sup>34</sup> Acorn Rabo Bank. (n.d.). Coffee producers fight climate change | Acorn Rabobank. Retrieved September 18, 2023, from <https://acorn.rabobank.com/en/blog/coffee-producers-fight-climate-change/>.
- <sup>35</sup> APROSACAO REFORESTATION PROJECT: COMMUNITY REFORESTATION AND AGROFORESTRY WITH SMALL-SCALE COCOA FARMERS IN HONDURAS. (n.d.). *Gold Standard Registry*. Retrieved September 18, 2023, from <https://registry.goldstandard.org/projects/details/1808>.
- <sup>36</sup> APROSACAO REFORESTATION PROJECT: COMMUNITY REFORESTATION AND AGROFORESTRY WITH SMALL-SCALE COCOA FARMERS IN HONDURAS. (n.d.).
- <sup>37</sup> The Blue Carbon Initiative. (n.d.). Blue Carbon Activities. *The Blue Carbon Initiative*. Retrieved September 18, 2023, from <https://www.thebluecarboninitiative.org/carbon-projects>.
- <sup>38</sup> Duarte, C. M., Losada, I. J., Hendriks, I. E., Mazarrasa, I., & Marbà, N. (2013). The role of coastal plant communities for climate change mitigation and adaptation. *Nature Climate Change*, 3(11), 961–968.
- <sup>39</sup> Donato, D. C., Kauffman, J. B., Murdiyarsa, D., Kurnianto, S., Stidham, M., & Kanninen, M. (2011). Mangroves among the most carbon-rich forests in the tropics. *Nature Geoscience*, 4(5), 293–297.; Macreadie, P. I., Nielsen, D. A., Kelleway, J. J., Atwood, T. B., Seymour, J. R., Petrou, K., et al. (2017). Can we manage coastal ecosystems to sequester more blue carbon? *Frontiers in Ecology and the Environment*, 15(4), 206–213.
- <sup>40</sup> Bertram, C., Quaas, M., Reusch, T. B. H., Vafeidis, A. T., Wolff, C., & Rickels, W. (2021). The blue carbon wealth of nations. *Nature Climate Change*, 11(8), 704–709.
- <sup>41</sup> Conservation International Reports High Demand for Blue Carbon Credits from Cispatá, Colombia Mangrove Project. (n.d.). Retrieved August 29, 2023, from <https://www.conservation.org/press-releases/2022/06/23/conservation-international-reports-high-demand-for-blue-carbon-credits-from-cispat%C3%A1-colombia-mangrove-project>.
- <sup>42</sup> Mangroves – Naturally Resilient Communities. (n.d.). Retrieved September 18, 2023, from <https://nrcsolutions.org/mangroves/#>; Regenerative coastal tourism: protecting the planet through unforgettable experiences. (n.d.). Retrieved September 18, 2023, from <https://impact.economist.com/ocean/biodiversity-ecosystems-and-resources/regenerative-coastal-tourism-protecting-the-planet-through-unforgettable>.
- <sup>43</sup> Conservación Internacional Colombia. (n.d.). Lista Artículos. *Conservación Internacional Colombia*. Retrieved September 18, 2023, from <https://www.conservation.org.co/programas/Marino/Lista-Articulos/una-inversi%C3%B3n-crucial-en-carbono-azul>; Verified Carbon Standard. (n.d.-a). BLUE CARBON PROJECT GULF OF MORROQUILLO “VIDA MANGLAR”. Verra. Retrieved September 18, 2023, from <https://registry.terra.org/app/projectDetail/VCS/2290>.
- <sup>44</sup> La conservación del manglar, un salvavidas para el mundo - Apple (CO). (2019, April 22). *Apple Newsroom*. Retrieved September 18, 2023, from <https://www.apple.com/co/newsroom/2019/04/conserving-mangroves-a-lifeline-for-the-world/>.
- <sup>45</sup> VCM Primer. (n.d.).
- <sup>46</sup> Sen. Mike Braun. S.1251 - 117th Congress (2021-2022): Growing Climate Solutions Act of 2021. , (2021). Retrieved September 18, 2023, from <https://www.congress.gov/bill/117th-congress/senate-bill/1251>.



