



**The
Lab**

SPV FOR SILVOPASTURE SCALING

INSTRUMENT ANALYSIS
SEPTEMBER 2024



SPV for Silvopasture Scaling

LAB INSTRUMENT ANALYSIS

September 2024

DESCRIPTION & GOAL

A special purpose vehicle (SPV) that promotes the transition from conventional to sustainable cattle ranching practices in medium-sized farms in Colombia. The vehicle provides ranchers with the necessary capital and technical assistance to implement silvopastoral systems (SPS) and supports the development of a grouped carbon project. It will generate revenue through profit-sharing agreements with ranchers on productivity gains and the sales of high-quality carbon credits.

SECTOR

Land Use/AFOLU; Sustainable Agriculture; Forestry

FINANCE TARGET

Grants: Foundations, Governments

Concessional Investments: Development Finance Institutions, Guarantee Providers

Commercial Investments: Corporates, Impact Investors, Institutional Investors

GEOGRAPHY

Initial phase: Colombia

Potential scalability: Mexico, Brazil

The Lab identifies, develops, and launches sustainable finance instruments that can drive billions to a low-carbon economy. The 2024 Lab cycle targets four thematic areas (mitigation, adaptation, high-integrity forests, and sustainable agriculture and food systems) and five geographic regions (Brazil, East & Southern Africa, India, Latin America & the Caribbean, and the Philippines).

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CLIMATE
POLICY
INITIATIVE

SUMMARY

Conventional cattle ranching currently occupies 80% of Colombia's agricultural land and directly employs more than 800,000 people in the country ([Becking et al. 2021](#)). While ranching contributes over 28% of Colombia's greenhouse gas (GHG) emissions and drives deforestation in some regions, this activity is also highly vulnerable to the impacts of more frequent and intense climate events. Transitioning to more sustainable, climate-resilient, and nature-positive ranching models is imperative to accomplish the country's climate objectives and development goals.

To address these challenges, The Nature Conservancy (TNC) is designing a special purpose vehicle (SPV) to finance the transition to silvopastoral systems (SPS). SPS encompasses diverse sustainable management practices that integrate native trees and vegetation transforming degraded pastures into productive grazing lands. These systems enhance soil health, increase biodiversity, improve productivity, and capture carbon, making them crucial for climate mitigation and adaptation.

The SPV will finance this transition to SPS through profit participation agreements, reducing the burden of upfront capital costs for ranchers. It will also provide technical assistance, leveraging over a decade of empirical research and experience developing SPS in Colombia through the Mainstreaming Sustainable Cattle Ranching (MSCR) project ([World Bank, 2019](#)). Additionally, the SPV will structure an associated carbon project and commercialize the credits, creating an additional revenue stream.

Assessed against the Lab criteria, the SPV is:

- **Innovative:** The vehicle addresses barriers such as lack of access to capital for medium-sized ranchers, ranchers' aversion to debt, and lack of required technical knowledge. It does so by combining profit participation agreements (instead of loans), carbon credit revenue, and long-term technical assistance.
- **Actionable:** The instrument leverages TNC's long-standing experience leading the transition to regenerative agricultural practices in Latin America, as well as its close engagement with local farmers and partner organizations. Additionally, it aligns with national climate priorities.¹
- **Financially Sustainable:** The instrument proposes a commercially viable return for private investors through the combination of profit-sharing agreements on productivity gains and carbon credit sales. Moreover, the structure includes a guarantee to mitigate downside risk, as well as a concessional layer to adjust the return for different types of investors.
- **Catalytic:** The pilot will leverage grants and concessional capital to demonstrate the viability and financial feasibility of silvopastoral interventions, helping drive private investment and encourage widespread adoption of sustainable agricultural practices across Colombia, with a potential of up to 1.4 million hectares suitable for SPS.

¹ Colombia has defined the transition to SPS as a prioritized Nationally Appropriate Mitigation Action (NAMA) to accomplish the NDC target of reducing 51% of total emissions by 2030.

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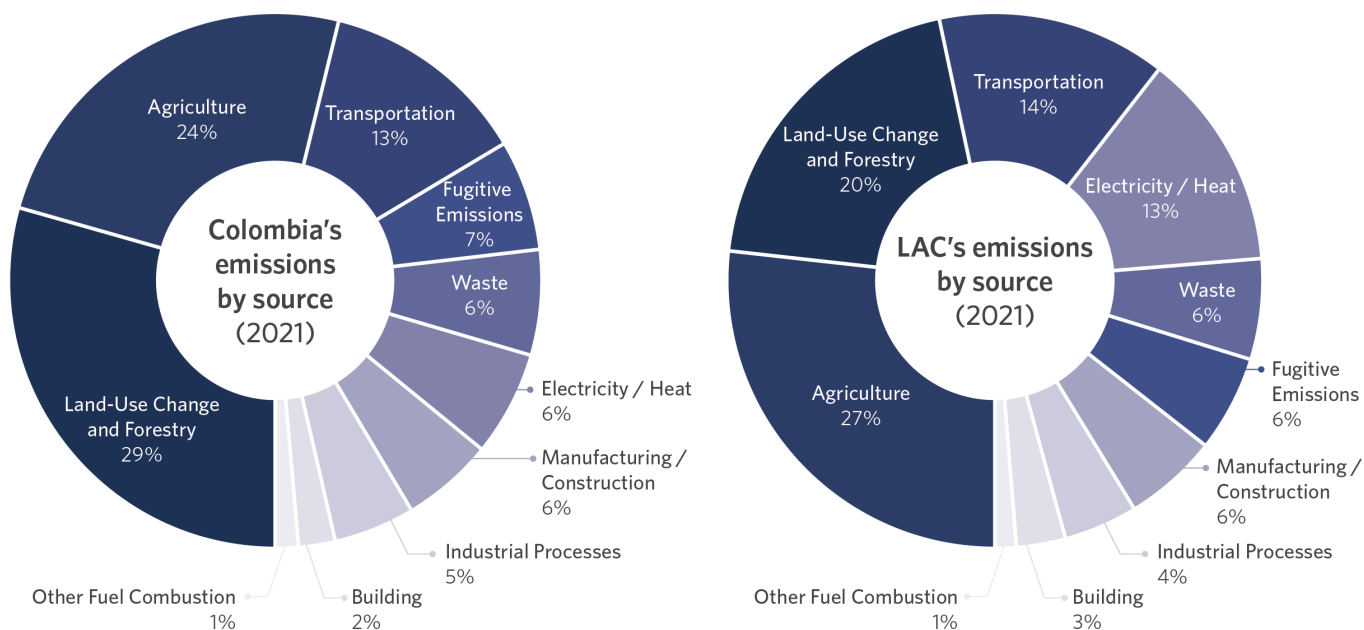
CONTEXT

Transitioning to regenerative cattle ranching presents a promising opportunity to abate carbon emissions, restore critical ecosystems, and enhance rural resilience.² The SPV for Silvopasture Scaling aims to mainstream this transition in Colombia, where the ranching sector contributes to over a quarter of the country's emissions.

The purpose of the SPV for Silvopasture Scaling is to enable the reduction of land-use emissions from the cattle ranching sector, as well as to promote enhanced resilience in rural communities through the productive restoration of degraded grazing landscapes. This will be achieved by implementing SPS which will lead to productivity gains and higher income for medium-sized ranchers.

The potential for SPS implementation in Latin America is high, with at least 378 million hectares of pastures degraded ([El Pais, 2022](#)). Along with eight other countries in the region (e.g., Brazil, Mexico, Costa Rica), Colombia has included sustainable cattle ranching as a key national mitigation strategy in their NDCs.

Figure 1: Colombia's and LAC's carbon emissions by source (2021)



Agriculture, Forestry, and Other Land Uses (AFOLU) contribute 54% of Colombia's current emissions (See Figure 1), which is 7% higher than the share for Latin America and the Caribbean region ([Climate Watch, n.d.](#)). Notably, cattle ranching contributes 28% of the domestic emissions, which come mainly from enteric fermentation,³ manure management, and land degradation, which together account for 15% of total emissions. Moreover, the

² SPS implementation is a specific approach to regenerative cattle ranching that fosters land rehabilitation through its focus on tree cover, soil health, biodiversity, and sustainability.

³ Associated with cattle digestive processes.

sector contributes an additional 13% of emissions linked to further land use conversion ([World Bank et al. 2022](#)).

The sector is crucial to the livelihoods of many Colombian families. Occupying 80% of Colombia's agricultural land, more than half a million families generate income through cattle ranching, guaranteeing a significant share of the national beef and dairy supply ([Becking et al. 2021](#)). At the same time, around 94% of cattle farming is done by small and medium-sized farmers ([Fedegan, 2021](#)). Approximately 45% of the 2.7 million farmers in rural Colombia live in poverty ([CGIAR, 2018](#)), and are highly vulnerable to accentuated climate impacts, such as intense droughts and floods.

For a decade, the Mainstreaming Sustainable Cattle Ranching in Colombia (MSCR) project played a key role in testing the implementation of SPS in five regions of the country ([World Bank, 2019](#)). With strong participation of 4,100 farms, the project achieved significant environmental, social, and productive benefits, and impacted over 150,000 hectares. The implementation of SPS, however, has not been widespread due to barriers like ranchers' lack of access to financing alternatives and aversion to debt, as well as lack of the technical knowledge required.

In this context, and having been a partner in the MSCR project, The Nature Conservancy (TNC) through the SPV for Silvopastoral Scaling instrument aims to provide necessary capital and technical assistance in a way that meets the local needs and materializes the opportunity of scaling the adoption of SPS in the region.

CONCEPT

1. INNOVATION

The SPV is a novel approach for overcoming ranchers' lack of access to capital and debt aversion, and enabling repayment through a profit-sharing agreement approach, while providing the necessary technical assistance to successfully implement and manage SPS.

1.1 **BARRIERS ADDRESSED: OVERCOMING FUNDING AND TECHNICAL SUPPORT CONSTRAINTS FOR MEDIUM-SIZED FARMS**

Despite their proven benefits, SPS adoption has been limited by barriers associated with a lack of access to adequate investment capital and the necessary technical knowledge.

In Colombia, less than 25% of agricultural loans go to ranching ([FINAGRO, 2021](#)). Loan conditions such as required credit history, interest rates, collaterals, and repayment schedules are often misaligned with ranchers' realities and needs, which disproportionately affects small and medium-holder farmers' access to capital. Existing financing alternatives from development and commercial financial institutions still have a limited reach in remote rural areas, where farmers operate informally ([FINAGRO, 2022](#)). This misalignment has historically resulted in a reluctance by Colombian farmers to take on commercial loans due to distrust in the formal banking system.

Moreover, SPS are knowledge-intensive and require precise implementation and management, which is why quality technical assistance is crucial in guaranteeing their effective adoption. In addition, available credit offer is frequently limited to working capital, excluding technical assistance.

To address the lack of capital and ranchers' debt aversion, the instrument will directly finance the initial on-farm implementation of the SPS. The financing will take the form of a profit-sharing agreement, based on the resulting productivity gains, and benefiting from familiarity with a similar and widely used local scheme called 'cuentas en participación'.⁴ To overcome the capacity barriers, the SPV will provide dedicated technical assistance through a 5-year period.

1.2 **INNOVATION: A COMPREHENSIVE SOLUTION TO SPS IMPLEMENTATION**

Unlike traditional loan-based models, the SPV profit-sharing approach will allow for repayments to be tied to productivity gains rather than fixed payments, using an investment model that ranchers are already familiar with. Moreover, repayments will have a one-year grace period.

The instrument also proposes the development of a grouped carbon project that will issue high-quality carbon credits based on the increased vegetation and tree cover, as well as

⁴ 'Cuentas en participación' follow the same structure of profit-sharing agreements, where each party makes a financial or in-kind contribution and the resulting gains are distributed.

the enhanced soil carbon sequestration. This intervention will provide ranchers with a new and long-term revenue stream, enhancing the financial sustainability of the vehicle.

In contrast to instruments that target large farms with debt financing, this SPV specifically will support medium-sized farms. Furthermore, the SPV will structure the different components of the intervention (SPS implementation, technical assistance, and carbon credit issuance) as separate facilities, allowing different types of investors to allocate capital according to their appetite.

As mentioned above, several instruments similar to the SPV were identified in Colombia. Although some of them include a guarantee and technical assistance in their design, the main differential factors of the SPV for Silvopasture Scaling are the investment through a profit-sharing model and its focus on medium-sized farms. See Annex 1 for an extended list.

Table 1: Market Positioning of the SPV

Similar Instruments	Description	Main Characteristics	Differentiation of SPV for SPS
Línea de crédito para Ganadería Sostenible Bancolombia	Credit line to promote sustainable livestock systems.	<ul style="list-style-type: none"> Provides concessional loans directly Includes a guarantee from national government Private financial institution 	<ul style="list-style-type: none"> Profit-sharing model Focus on medium-sized farms
&Green Fund SAIL Investments	Finances the transition of large farms to zero-deforestation practices, focusing on supply chains involved in commodity production in tropical forests.	<ul style="list-style-type: none"> Provides debt directly Large-sized farms International investment fund 	<ul style="list-style-type: none"> Profit-sharing model Focus on medium-sized farms
Agri3 Fund	Provides guarantees to leverage concessional loans by local financial institutions to support sustainable agriculture.	<ul style="list-style-type: none"> Provides guarantees to local financial institutions International investment fund 	<ul style="list-style-type: none"> Direct investment through profit-sharing model
Línea Especial de Crédito de Desarrollo Productivo FINAGRO	Provides guarantees to financial institutions that give loans to sustainable agriculture and food-productivity-related enterprises.	<ul style="list-style-type: none"> Provides guarantees Public institution 	<ul style="list-style-type: none"> Profit-sharing model Targets farmers directly

2. INSTRUMENT MECHANICS

The SPV will be run jointly by TNC and an experienced managing partner. This vehicle will be responsible for the overall implementation of the strategy, including farmer outreach, structuring profit-sharing agreements, implementing SPS interventions, overseeing the provision of technical assistance, and developing the carbon credit project.

As previously mentioned, each of the key areas of intervention will be operated in a separate facility:

- **The SPS Facility** will directly finance and lead the on-farm implementation of silvopastoral systems. To this end, the SPV will hire an external implementing partner with the required technical expertise and on-the-ground presence. This facility will

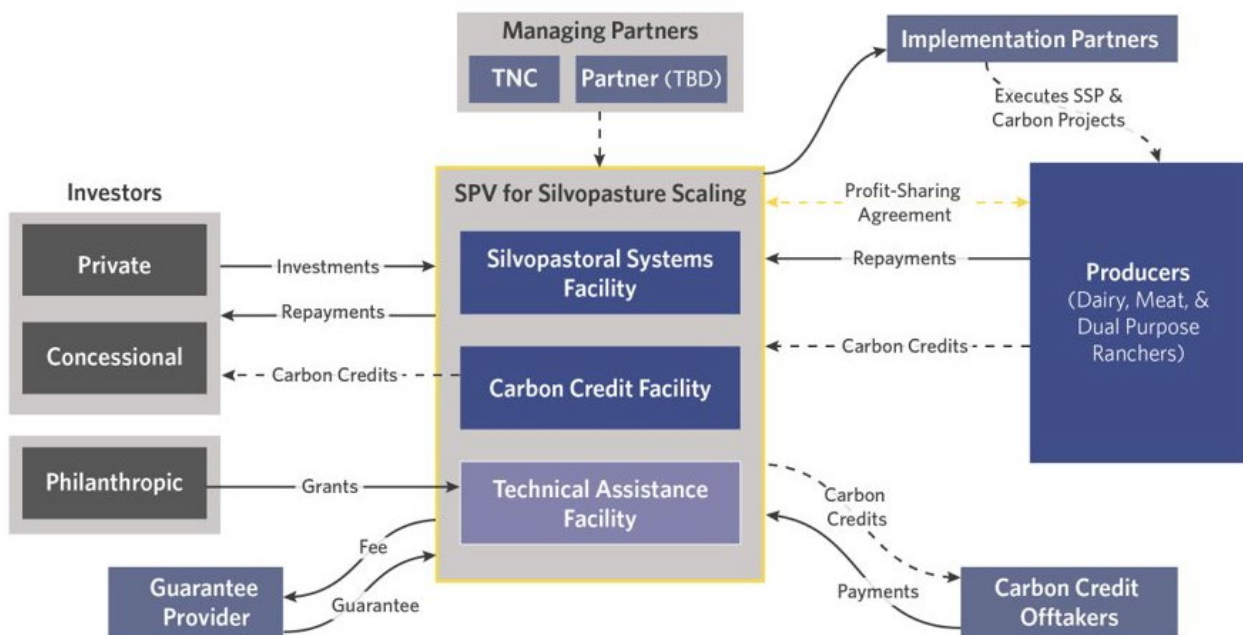
structure the profit-sharing agreements based on productivity gains achieved through SPS, which will be the revenue source to repay investors.

- **The Carbon Credit Facility** will design and develop a grouped carbon project that aggregates mitigation impacts across participating farms. It will also ensure the issuance and sale of the resulting carbon credits. Carbon project structuring will be led by TNC's global carbon markets team, supported by an implementation partner supervising the quality and integrity of the credits generated.
- **The Technical Assistance Facility** will be financed through philanthropic or development capital (e.g., grants). The Center for Research on Sustainable Agriculture (CIPAV), an autonomous research center established in 1992, will provide technical assistance and monitoring of the SPS implementation. This personalized support will be provided during the first five years.

The vehicle will include a number of de-risking mechanisms to protect downside risk for investors and make the strategy viable. It will include a guarantee to mitigate the risk of not materializing productivity gains or not collecting repayments. Meanwhile, direct technical assistance and close engagement with farmers will reduce the risk of SPS implementation failure. Additionally, the proponent team is exploring potential partnerships with beef and milk off-takers to ensure preferential purchase of the sustainable products, and have an additional guarantee of repayment. Moreover, the instrument will have a concessional capital tranche targeting DFIs and impact-first investors, to further improve the return profile for commercial investors.

Figure 2 below illustrates the mechanics of the instrument.

Figure 2: Instrument Mechanics



The instrument will target private and concessional investors for the SPS and Carbon Credit Facilities, and philanthropic and development capital providers for the Technical Assistance Facility. However, the pilot (the intervention of the first two cohorts of enrolled farms) will be fully financed with philanthropic capital to test the case and build a track record. Subsequent cohorts will aim to attract both private and concessional capital, as per the description above. Due to the long tenor of the interventions, it is expected that the closure

of support of the first two cohorts will overlap with enrollment and engagement with subsequent cohorts. However, given that productivity gains are expected to materialize as early as year 1, these will be critical for the fundraising for cohorts 3 to 7.

2.1 POTENTIAL CHALLENGES TO INSTRUMENT SUCCESS

A successful implementation of the SPV will require buy-in from ranchers. Although SPS has been successfully implemented and there is expressed interest by small and medium cattle ranchers, the vehicle still needs to test the effectiveness of the financing model and garner ranchers' support. To address this, TNC has started convening workshops with local rancher groups to validate their interest in SPS and the profit-participation scheme, and so far has received positive feedback.

Another critical element will be the selection of a managing partner for the vehicle with the required operational and fund management competencies and track record to complement TNC's technical expertise. The proponent team is currently considering several potential partner institutions that were identified throughout the Lab process based on their expertise and local presence. Governance, operational, and legal processes need to be designed in more detail, to ensure integrity and transparency in the measurement of environmental and productivity results, as well as to have robust mechanisms in place to enact repayments.

The carbon credit facility, while novel and impactful for the context, has inherent uncertainties related to potential regulatory changes and price volatility. To better understand the viability of this component, TNC is currently conducting a full feasibility study for the carbon project under the specific conditions proposed by the instrument. This study will identify in more detail potential implementation risks, and will outline an action plan for their adequate mitigation and management.

The carbon credit project will follow Verra's methodology for Improved Agricultural Land Management (VM0042), but will incorporate elements of the Afforestation, Reforestation, and Revegetation (VM0047) for the forest restoration component. When it comes to carbon projects in the voluntary carbon project, TNC is committed to raising the bar of excellence for carbon integrity by exceeding current industry standards. They will therefore leverage the internal expertise of their dedicated carbon markets team to ensure the highest carbon integrity as well as internal commitments to the delivery of transparent and demonstrable social and biodiversity co-benefits. Moreover, TNC has already engaged in conversations with potential corporate off-takers interested in the anticipated purchase of the removal credits, which would provide a desirable market risk mitigation strategy.

Finally, the profit-sharing model and the long tenure of the investment add risk factors for commercial investors, such as the novelty of the asset and the engagement with ranchers. To address this concern, and as mentioned previously, the instrument proposes a blended structure that includes grant capital for technical assistance, a guarantee, and a concessional tranche to balance the risk-return profile for commercial investors and ensure market viability. TNC is also exploring other de-risking strategies such as conversations to secure a partnership with a beef/milk off-taker that guarantees the purchase of products from participating farms.

Table 2 below summarizes the challenges identified for the instrument and the mitigation strategy.

Table 2: Instrument Challenges and Mitigation

Key milestones and potential risks	Mitigation Strategy
<p>Securing ranchers' buy-in</p>	<p>Southern Cesar was selected as the initial target region because previous SPS projects have been successfully implemented nearby, so ranchers are already familiar with and curious about the SPS model.</p> <p>TNC is conducting farmer engagement workshops to present drafts of the proposed model to the ranchers and get their feedback to ensure that the instrument fits their specific needs. The first workshop made evident their interest and appetite for an innovative approach to improve the productive model in the region.</p>
<p>Identifying and selecting a suitable managing partner</p>	<p>The TNC team aims to complement its technical expertise on regenerative agriculture, conservation and carbon projects with a partner with extensive fund management and operational capabilities.</p> <p>TNC team is currently engaging with several potential partner institutions that were identified throughout the Lab process based on their expertise and local presence, and that have expressed their interest in the instrument.</p>
<p>Addressing uncertainty regarding carbon credits markets and regulation</p>	<p>To ensure the integrity of carbon projects, TNC's carbon team is conducting an in-depth feasibility study and will lead the project structure and development. TNC's carbon credit policies are stringent, and require a robust MRV system, as well as demonstrable social and biodiversity co-benefits.</p> <p>Additionally, to ensure transparency and community participation, the project will include capacity building with ranchers, and safeguards strategies for participation and inclusion from the feasibility stage and through the project design phase.</p> <p>No regulatory changes are anticipated in the short term. However, TNC will engage in constant dialogue with the national government to detect new regulation that can impact the project in a timely manner.</p> <p>In terms of the carbon credits price volatility, TNC has two main mitigation strategies. The first one, as mentioned above, is to ensure high standards and co-benefits that will result in higher market price. The second, is to engage with corporate off-takers that are interested in securing anticipated purchases with an established price that will de-risk market fluctuations.</p>
<p>Fundraising with commercial investors</p>	<p>The instrument design includes a number of de-risking strategies to attract commercial capital: a guarantee, a concessional capital tranche with a lower return expectation, potential anticipated off-taker agreements for beef, milk and carbon credits, and a 5-year technical assistance component.</p>

MARKET TEST AND BEYOND

3. IMPLEMENTATION PATHWAY AND REPLICATION

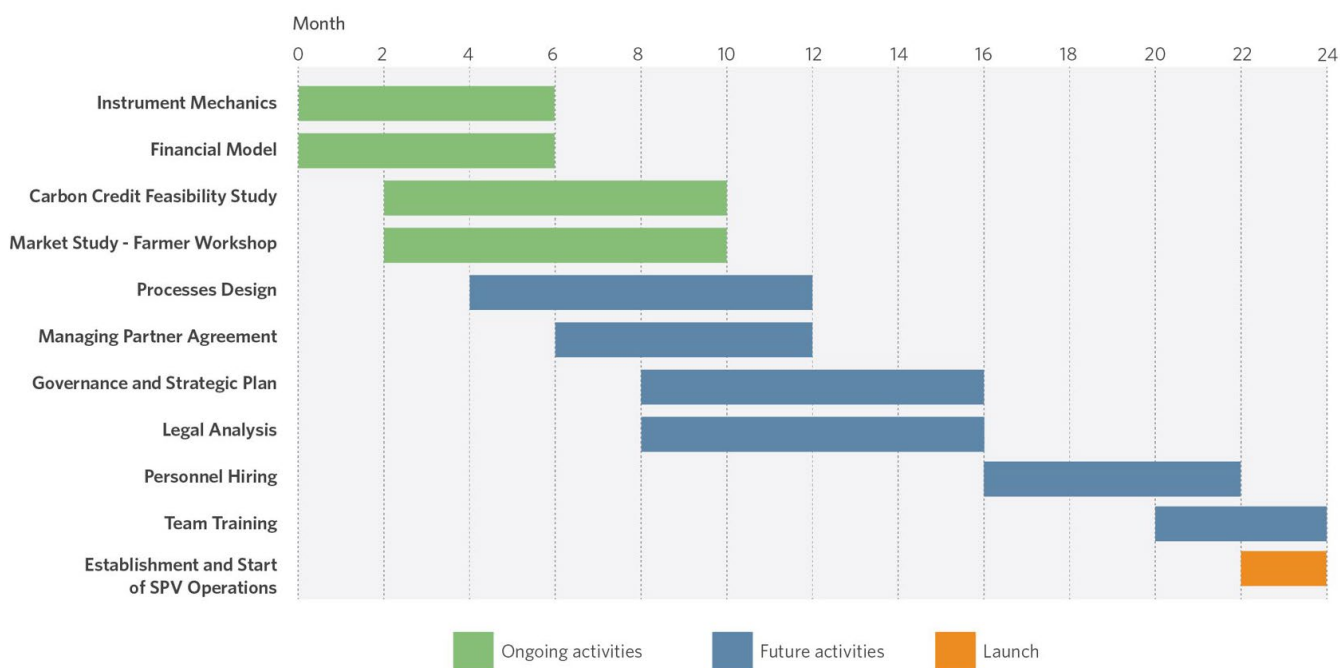
The pilot project in El Cesar, Colombia, will serve as a model for financing and scaling sustainable cattle ranching practices. The long-term vision is to extend the approach to other regions and countries, once the concept is proven and refined.

TNC will set up the vehicle to implement the strategy, starting with a cluster of farms in El Cesar, a region in northeastern Colombia characterized by a high concentration of mid-size farmers, degraded pastures under conventional grazing, and the presence of relevant national beef and milk off-takers. El Cesar was also chosen for the pilot due to TNC's previous knowledge and contacts in the area.

To structure the SPV, the team recently started fundraising, securing a USD 1.25 million grant from the Grantham Foundation to cover pre-operational expenses. With this grant, the team aims to achieve several key milestones of their pre-operational objectives (Figure 3), including:

1. **Carbon Feasibility Assessment:** Assess the financial, technical, legal, and social feasibility of integrating carbon projects.
2. **Intervention Modeling and SPV Refinement:** Structure processes, finalize financial models for various ranching operations, design specific silvopastoral interventions, and development of profit-sharing and investment repayment models.
3. **SPV Set-up:** Establish the operating company, hire key staff, and support the first year of operations.

Figure 3 Vehicle Pre-Operational Activities Timeline



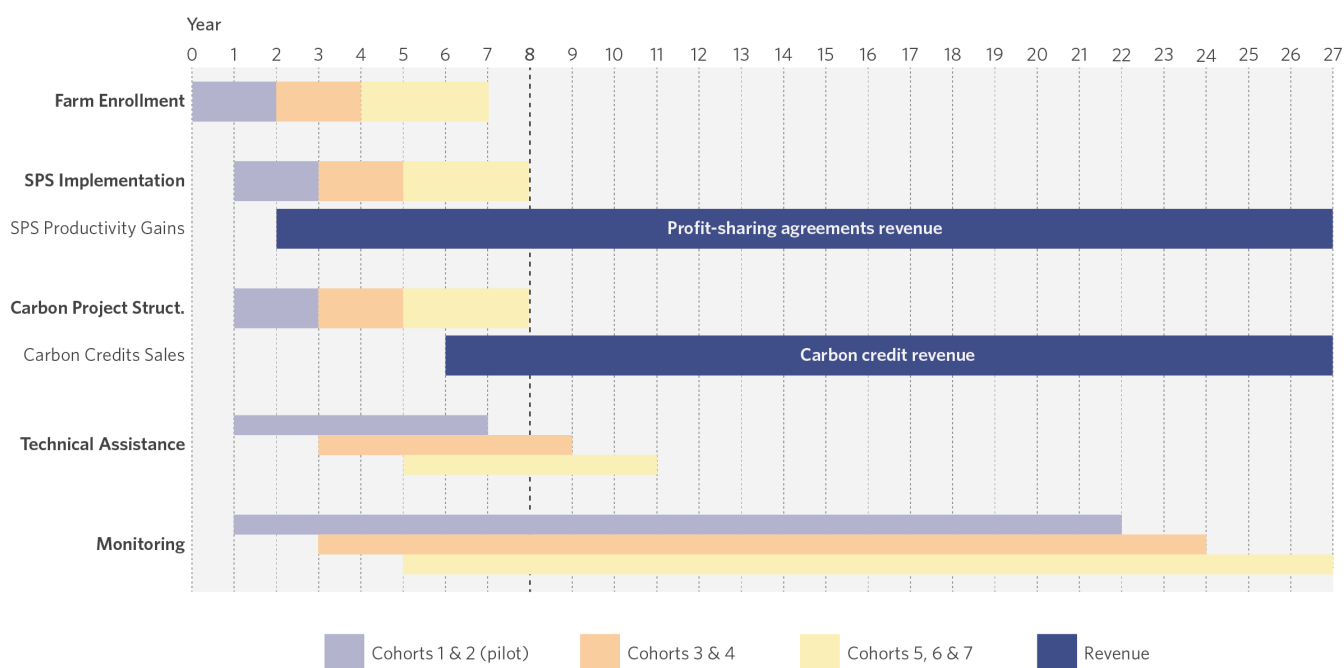
With the SPV established, the focus will turn to farmer outreach and enrollment, and due diligence for cohort 1. Enrollment will be spread across seven annual cycles, with each cohort formalizing the participation of ranchers with the signature of a profit-sharing agreement and a carbon commercialization agreement. An implementation partner hired by the SPV will then begin the design, planning, and execution of the silvopastoral interventions.

Once the initial setup of the system is completed, the implementation partner will pay regular visits to the farms to conduct land use planning, implement the SPS, provide technical support for their correct management, and monitor results. As discussed in previous sections, this technical assistance will aim to bridge financial and technical capacity gaps over a 5-year period (Figure 4).

Based on data gathered in the MSRC project, farms should start to perceive productivity gains around a year following SPS implementation.

In parallel, the SPV will have designed and registered the grouped carbon project, which will officially begin with SPS implementation. Issuance of the first carbon credits is expected to take place five years after the initial intervention.

Figure 4: Farm Operational Timeline



As mentioned previously, the first two farm cohorts will serve as a proof of concept pilot to demonstrate the vehicle's operational capabilities and viability, and initial benefits of SPS. This pilot will be financed by philanthropic grants.

Two years after the initiation of the pilot, cohorts 3 to 7 will be financed through concessional and commercial capital, leveraging a guarantee to reduce the investment's risk profile, as well as a concessional tranche to increase the return profile for commercial investors.

After establishing seven successful cohorts, the model is expected to be scaled to other regions of Colombia. Depending on the results, the approach can be replicated in other countries in the region, such as Mexico and Brazil, where similar agricultural and political enabling conditions exist.

4. FINANCIAL IMPACT AND SUSTAINABILITY

4.1 QUANTITATIVE MODELING

The SPV intends to reach a total of 986 farms, each with an average area of intervention of 60 hectares per farm. Following the envisioned operational timeline presented (Figure 4), the financial model reflects a 27-year timeline, and assumes that the farms start receiving productivity gains in the year following SPS implementation.

To finance these projects, the instrument is seeking USD 59 million in its initial stages. Once productivity gains start to materialize, the vehicle aims to reinvest USD 37 million to support the operations. The distribution of the sources of capital is shown in Table 3.

Table 3: Capital Stack of the Vehicle

Capital Stack	Cash Needs (USD million)	% of total needs
Pre-Operational	1.25	1
Equity	43	44
Operational Investments	16	17
Reinvestment	37	38

The capital will be distributed as follows:

- **Equity** will be used to cover the implementation of the SPS (SPS Facility) and carbon project (Carbon Credit Facility).
- **Grants** will support the initial setup of the vehicle and the cost of technical assistance (TA Facility).
- **Repayments from the profit participation agreements will be reinvested** for SPS intervention, the carbon project, and operational expenses.

The total cost of the vehicle is estimated at USD 97 million.

The model assumes two revenue streams for the SPV:

- **Productivity gains** originating from the improvements in milk production and cattle growth rates, as well as reductions in production costs. These are estimated to total USD 165 million (67% of the total revenues) and to peak in year 14 after initial execution.
- **Carbon credit revenues** are expected to total USD 82 million (33%), assuming that the first credits are issued and sold in year five, and conservatively estimated at a price of USD 12 per ton.

Using the assumptions described above, the model anticipates reaching breakeven in year 8 after the start of the implementation, assuming an exit multiple of 4x for investors. The projected cash flows indicate an EBITDA of USD 150 million and an IRR of 14%. As mentioned, USD 37 million of the revenues are expected to be reinvested in the vehicle.

A relevant component for the success of the vehicle is the revenue from carbon credits. Given the still early stage of voluntary carbon markets and their regulation, carbon credit prices tend to be volatile and represent an investment risk. Table 4 shows a sensitivity analysis of the resulting IRR as determined by different carbon credit prices. The results that even at a

carbon credit price of USD 5, the vehicle will likely be able to maintain an IRR above Colombia's risk-free rate.⁵

Table 4: Carbon Credit Sensitivity Analysis Testing

	Financial Indicators			
		Cash Flows (USD million)	% of total Revenues	Vehicle IRR
Assumed Carbon Credit Price (USD)	1	7	4%	10.5%
	5	34	17%	12%
	12	82	33%	14%
	20	137	45%	16%
	25	171	50%	17%

4.2 PRIVATE FINANCE MOBILIZATION AND REPLICATION POTENTIAL

As previously discussed, the total capital needs of the vehicle (including reinvestments) are estimated at USD 97 million. Based on the model, Table 5 shows the distribution of the capital use.

Table 5: Capital Use of the Vehicle

Vehicle Component	Cash Needs (USD million)	% of total needs
SPS Implementation	56	57
Carbon Certifications ⁶	6	16
Technical Assistance	16	17
Operational Expenses ⁷	19	20

If proven successful, the vehicle could be replicated in other geographies, prioritizing expansion within Colombia, and then into other countries of Latin America and the Caribbean (LAC).

Criteria for identifying eligible countries for replication include:

- **Similar agricultural and environmental conditions:** Regions with a similar concentration of mid-size farmers, degraded pasture lands, and established markets for beef and milk.
- **Existing partnerships and local knowledge:** Countries where TNC has offices and has a track record and established partnerships working in regenerative agriculture.

⁵ The risk-free rate is estimated to be around 9.8%, as reported by [World Government Bonds](#). (consulted on August 2024).

⁶ Costs related to monitoring and carbon credits. Financing for the development of the carbon project is modelled within the SPS Implementation.

⁷ Aggregated values of the entire vehicle including all three facilities.

- **Supportive policy environment:** Regions where national policies align with sustainable agriculture and carbon sequestration goals, and the voluntary carbon markets are active.

Based on these criteria, potential countries for replication include:

- **Mexico:** Similar agricultural conditions and a strong market for sustainable beef and dairy products.
- **Brazil:** Extensive pasture lands and significant potential for carbon sequestration through improved grazing practices.

5. ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACT

Silvopastoral systems are a unique and comprehensive intervention that brings multiple climate, biodiversity, and social impacts. They foster soil and ecosystem restoration, lower cattle-related emissions, enhance climate resilience, and provide additional income for ranchers.

Figure 5: Theory of Change (ToC)

GOAL	Mainstreaming sustainable cattle-ranching practices based on silvopastoral systems (SPS) with the purpose of improving productivity, enhancing farmer's resilience and livelihoods, reducing GHG emissions and optimizing land use			
IMPACT	Climate mitigation <ul style="list-style-type: none"> • Reduced methane emissions • Increased carbon sequestration • Reduced pressure of deforestation 	Climate adaptation Enhanced resilience to enhanced climate risks (drought and floods) through ecosystem restoration and sustainable management	Ecosystem conservation & restoration Improved soil health, watershed protection, increased biodiversity	Improved ranchers' livelihoods
OUTCOMES	<ul style="list-style-type: none"> ✓ Improved cattle diets ✓ Increased carbon sequestration 	<ul style="list-style-type: none"> ✓ Enhanced soil health ✓ Biodiversity gain 	<ul style="list-style-type: none"> ✓ Improved animal welfare ✓ Enhanced resilience 	<ul style="list-style-type: none"> ✓ Higher productivity ✓ Stabilized productivity
OUTPUTS	<ul style="list-style-type: none"> ✓ Hectares of land transitioned to regenerative practices 	<ul style="list-style-type: none"> ✓ Increased forest cover, restored soils and protected watersheds 	<ul style="list-style-type: none"> ✓ Knowledge transfer and capacity building on SPS 	<ul style="list-style-type: none"> ✓ Profit-sharing agreements with ranchers
ACTIVITIES	Implementation of silvopastoral systems	Development of carbon projects	Provision of technical assistance	

5.1 ENVIRONMENTAL IMPACT

5.1.1 CLIMATE MITIGATION

Transitioning extensive grazing systems to SPS has significant potential for nature-based mitigation in a sector that is a key player in Colombia's absolute emissions. Colombia's Cattle Ranching NAMA estimates that under moderate to optimistic scenarios, SPS could be implemented on 600,000 to 1.4 million hectares of previously cleared lands, and contribute between 15% - 34% of the target emissions reductions by 2030 (World Bank et al. 2022).

The SPV targets 59,000 hectares in El Cesar. By planting trees and shrubs while incorporating improved management practices such as rotational grazing and watershed protection, degraded pastures can be restored into healthier and richer soils and marginal areas can be reforested. This is particularly relevant for El Cesar, where 82% of the territory's soil is already degraded ([PIGCCT, 2015](#)).

The new vegetation, in turn, provides a diverse and higher quality diet for cattle, which contributes to reducing methane emissions from their digestive processes (enteric fermentation), and restoring soil health leading to increased carbon sequestration. Moreover, SPS allows farmers to produce more on less land, with the potential to go from less than 1 to as much as 4 head of cattle per hectare (as shown by the MSCR project), while reducing the pressure to further convert lands.

Through the MSCR project, SPS were implemented on 4,100 farms, which resulted in a total reduction and avoidance of 1.5 MtCO₂e, or 375 tCO₂e per farm. The instrument expects to avoid and reduce 1.2 MtCO₂e and has significant potential to scale to other regions in the country.

5.1.2 ECOSYSTEM CONSERVATION AND RESTORATION

Soil degradation from conventional cattle ranching is the result of overgrazing, compaction, loss of organic matter, and erosion. In the state of Cesar, most land is currently under inappropriate land use, with cattle grazing occupying nearly three times the area considered suitable for this use ([PIGCCT, 2015](#)), misuse results in widespread moderate to severe erosion.

The transition to SPS in degraded landscapes contributes significantly to ecosystem and soil restoration. The incorporation of diverse vegetation and forest cover on degraded pastureland improves soil quality and adds structural complexity, enhancing habitats for biodiversity and increasing connectivity in fragmented ecosystems. Moreover, as trees and shrubs fix nitrogen and recycle nutrients through organic material depositions, they improve soil fertility. The implementation of SPS has positive and measurable benefits on the abundance, diversity, and mobility of birds, dung beetles, and bats.

The SPS approach proposed in the instrument also includes the protection of natural ecosystem remnants, and the restoration of riparian areas for watershed protection, all of which ensure the flow of critical ecosystem services. The SPV expects to impact 59,000 hectares of degraded land, including an estimated 5% or 3,000 hectares in conserved and restored natural forests.

The MSCR project enabled the conservation of 18,000 hectares of natural ecosystems, avoided deforestation in 1,600 hectares, and facilitated a significant increase in species abundance, including a 30% increase in bird diversity across all implementation regions.

5.1.3 CLIMATE ADAPTATION

Colombia is highly vulnerable to the impacts of climate change, as the country already routinely experiences damaging droughts and floods intensified by climate variability. The growing threat of extreme events on degraded ecosystems with low adaptative capacity poses additional risks for the already stressed agricultural sector. El Cesar has multiple conditions that exacerbate this vulnerability, with 89% of the population living in multidimensional poverty ([FAO et al. 2019](#)), 54% of the households experiencing food insecurity ([PIGCCT, 2015](#)), and an average water scarcity index of 57% that tends to worsen under predicted climate change scenarios (IDEAM, 2015).

Over the past decade, the cattle ranching sector has been severely impacted by more intense El Niño and La Niña climate events which have affected over 20% of the cattle inventory and over 35% of all grazing lands ([Ramirez-Díaz et al. 2021](#)). The main impacts include an increase in heat stress, a deficit of water supply, fodder loss, and pest and disease outbreaks. This, in turn, has led to drops in milk and beef production, decreased fertility rates, and negative impacts on animal welfare ([Bravo Parra, 2021](#)).

SPS are a proven approach to enhance the resilience and adaptative capacity of the cattle sector through ecosystem restoration. Tree shade, increased fodder availability, and sustainable management lead to more nutritious and stable pastures and water supply, reduced heat stress, and biological pest control, leading to more reliable production and farmer income.

5.2 SOCIAL AND ECONOMIC IMPACT

The SPV targets medium-sized producers, who rely on cattle ranching as their main productive activity and source of income. If production is threatened by climate change, so are their livelihoods.

SPS brings adaptation benefits for ecosystems, cattle, and farmers alike. They have proven to result in increased productivity reflected in kilograms of meat or liters of milk produced and higher quality. The MCSR project recorded a 25% increase in milk production and a 26% increase in animal load. Impacts were also reflected in a 9% reduction in production costs. Together, these benefits resulted in an additional income of USD 576 per hectare, which is highly significant for tropical farmers, especially in the context of increased climate vulnerability.

Moreover, the SPV opens a new revenue stream for farmers through the production and sale of carbon credits.

The instrument will measure the environmental and socioeconomic impact at both the vehicle and farm levels. The key metrics at the vehicle level are shown in Table 6:

Table 6: Key impact indicators at the instrument level

Objective	Metric	Adaptation relevant	Level
Sustainable land use	Number of farms impacted		Output
Sustainable land use	Number of ranchers trained (Female / Male)	x	Output
Sustainable land use	Hectares with silvopastoral systems implemented	x	Output
Climate mitigation	Tonnes of carbon emissions (e) reduced		Impact
Climate mitigation	Emissions per kg of meat / Emissions per liters of milk		Impact
Ecosystem conservation & restoration	Hectares of protected natural ecosystems	x	Output
Ecosystem conservation & restoration	Hectares of restored forest	x	Output
Ecosystem conservation & restoration	Km of riparian areas protected	x	Output
Ecosystem conservation & restoration	Hectares of avoided deforestation	x	Output
Ecosystem conservation & restoration	Variation in abundance of indicator species	x	Impact
Ecosystem conservation & restoration	Soil health indicators	x	Impact
Ecosystem conservation & restoration	Variation in agrochemicals use		Impact
Productivity & farmers' livelihoods	Variation of income per farmer from SPS productivity gains (Female / Male)	x	Impact
Productivity & farmers' livelihoods	Variation of income per farmer from carbon credit sales (Female / Male)	x	Impact
Productivity & farmers' livelihoods	New jobs created (Female / Male)	x	Impact
Productivity & farmers' livelihoods	Variation in liters per cattle head		Outcome
Productivity & farmers' livelihoods	Variation in kg per cattle head		Outcome
Productivity & farmers' livelihoods	Variation in production costs per lt/kg		Outcome
Productivity & farmers' livelihoods	Variation in animal load per hectare		Outcome

NEXT STEPS

TNC is currently focused on structuring the pilot. In the coming months, the team will conduct workshops to test farmers' interest in the proposed profit participation approach and will conduct a full carbon feasibility study.

Conversations with investors who have expressed interest in the model are ongoing, as well as with meat and beef off-takers who would be relevant partners during implementation.

A key next step for the instrument is to finish the pre-operational phase, securing a suitable implementation partner and carrying out the legal and operational arrangements needed to launch, in addition to finding the guarantee provider.

REFERENCES

Acción de Mitigación Nacionalmente Apropriada NAMA: De La Ganadería Bovina Sostenible en Colombia. 2022. World Bank, Fedegan, Fondo Acción, TNC, CIPAV. <https://cipav.org.co/wp-content/uploads/2021/10/Reporte-NAMA-Bovina-de-Colombia.pdf>

Becking JBT, Ramirez Diaz M, Diaz Rios LB. Building pathways to sustainable cattle ranching in Colombia: Why and how private sector should engage and support the sustainable transformation of cattle production in Colombia. World Bank Group.

<http://documents.worldbank.org/curated/en/653941623047310683/Building-Pathways-to-Sustainable-Cattle-Ranching-in-Colombia-Why-and-How-Private-Sector-Should-Engage-and-Support-the-Sustainable-Transformation-of-Cattle-Production-in-Colombia>

Boosting agriculture as key to lasting peace in Colombia. 2018. CGIAR. <https://ciat.cgiar.org/annual-report-2017-2018/boosting-agriculture-as-key-to-lasting-peace-in-colombia/>

Bravo Parra AM. 2021. Cadenas sostenibles ante un clima cambiante. La ganadería en Colombia. Bonn (Germany): Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). 142 p. ISBN: 978-958-8945-52-1. <https://cgspace.cgiar.org/items/c8168c50-85a1-4728-9840-f2c67eb5754f>

Climate Watch. [date unknown; accessed 2024 Aug 16]. <https://www.climatewatchdata.org/data-explorer/historical-emissions?historical-emissions-data-sources=climate-watch&historical-emissions-gases=all-ghg&historical-emissions-regions=COL&historical-emissions-sectors=&page=1>

Colombia - Mainstreaming Sustainable Cattle Ranching Project. 2019. World Bank. [accessed Jun]. <https://documentos.bancomundial.org/es/publication/documents-reports/documentdetail/971881609126306199/colombia-mainstreaming-sustainable-cattle-ranching-project>

Colombia. Ministerio de Ambiente y Desarrollo Sostenible. 2015. Plan Integral de Gestión del Cambio Climático Territorial (PIGCCT) del Departamento de Cesar. Bogotá (D.C.): UT CAEM-E3 (consultor). <https://www.minambiente.gov.co/cambio-climatico-y-gestion-del-riesgo/planes-integrales-de-gestion-del-cambio-climatico-territorial/>

FAO, Agencia de Desarrollo Rural. 2019. Plan integral de desarrollo agropecuario y rural con enfoque territorial El Cesar. <https://www.adr.gov.co/wp-content/uploads/2021/07/CESAR-TOMO-1.pdf>

FINAGRO. 2022. El crédito agropecuario, ¿Qué opinan los productores? Agronet. <https://www.agronet.gov.co/Noticias/Paginas/El-cr%C3%A9dito-agropecuario,-%C2%BFQu%C3%A9-opinan-los-productores.aspx>

IDEAM. 2015. Estudio Nacional del Agua 2014. Bogotá (D.C.): Instituto de Hidrología, Meteorología y Estudios Ambientales

Ramirez Diaz M, Perez Rodriguez KK. 2021. Silvopastoral systems, a powerful approach for cattle ranching to adapt to climate change. World Bank.

<https://documentos.bancomundial.org/es/publication/documents-reports/documentdetail/295291623048193452/silvopastoral-systems-a-powerful-approach-for-cattle-ranching-to-adapt-to-climate-change>

Monsalve M. 2023. Latin America loses 22% of its fertile land, the equivalent of three Colombias. El Pais. <https://english.elpais.com/climate/2023-11-18/latin-america-loses-22-of-its-fertile-land-the-equivalent-of-three-colombias.html>

ANNEX 1 – LIST OF COMPARABLE INSTRUMENTS

Name of Fund	Organization	Description
Línea de crédito para Ganadería Sostenible	Bancolombia	Financing line through which Bancolombia aims to promote environmental conservation by financing livestock systems that are environmentally friendly, promoting more productive systems that respect forested areas and bodies of water.
&Green Fund	SAIL Investments	&Green is an investor looking for businesses that fit within the core mission of delinking deforestation from major commodity supply chains. They finance the transition of these supply chains from extractive to truly sustainable blueprints for others to adopt, replicate, and scale.
Agri3 Fund	Agri3	The AGRI3 Fund aims to mobilize USD 1 billion by offering credit enhancements and technical assistance for projects that protect forests and support sustainable agriculture. It provides guarantees to financial institutions and manages a Technical Assistance facility to develop investable opportunities.
Línea Especial de Crédito de Desarrollo Productivo	FINAGRO	This special credit program finances food security activities (short-cycle crops, vegetables, fruit) with favorable rates for producers until funds are exhausted. Eligibility requires that at least 50% of the area financed for planting or 50% of members in non-planting activities be small producers. FINAGRO acts as a second-tier entity, providing resources under promotional conditions to financial institutions, which in turn grant credits to productive projects, facilitating access to financing.
Ecopec - Climate Smart Cattle Ranching	TNC Brazil	The initiative offers a business model providing loans and technical assistance to Brazilian ranchers adopting sustainable practices. Livestock traceability secures loans, enhancing meat supply standardization and enabling better negotiation for deforestation-free beef.
Crédito de Línea Sostenible	Bancolombia	Credit line to finance projects that seek alternatives to maintain and preserve the environment through preferential interest rates.
Agrosostenible	BBVA	Credit for working capital and investment in agricultural, agro-industrial, and marketing sectors. Designed for individuals with agricultural businesses, or companies involved in transformation, commercialization, and support services across the value chain
Ecobusiness Fund	Finance in Motion	The Ecobusiness Fund has promoted biodiversity conservation by financing institutions and businesses in Latin America, the Caribbean, and sub-Saharan Africa. It supports companies that enhance sustainable resource use and climate change mitigation and adaptation.
Sustainable Agriculture Finance Facility	JGP	SAFF offers a specialized credit bundle for integrated crop-livestock-forest (ICLF) systems adoption stages in Brazil, featuring tailored timelines, risk profiling, unique certification, and technical support. It aims to mobilize significant capital, intensify livestock production, and

		store substantial carbon, with projections to expand across diverse biomes.
Credito Medio Ambiente Sostenible	AyC Colanta	Through the Sustainable Environment Line, Colanta Family livestock farmers can access financing up to USD 35 million for forest conservation, water source protection, waste management plans, renewable energy technologies, innovative techniques, reforestation, and other projects that reduce the carbon footprint.