FINAGRO
BIOFIN
The Biodiversity Finance Initiative
UNDP

Analysis and reform

of financial incentives in the agricultural sector with an impact on biodiversity in Colombia

This project is co-funded by the European Union
Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
Norway
Flanders State of the Art
Ministère de l'Europe et des Affaires étrangères
Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra
Swiss Confederation
Federal Office for the Environment FOEN
Belgium partner in development
Department for Environment Food & Rural Affairs
In partnership with Canada

Analysis and reform

of financial incentives in the agricultural sector with an impact on biodiversity in Colombia

UNITED NATIONS DEVELOPMENT PROGRAMME – UNDP COLOMBIA

Sara Ferrer Olivella
Resident Representative

Carla Zacapa Zelaya
Deputy Resident Representative

Jimena Puyana
Head of Climate Change and Sustainable Development

UNDP Technical Team

Diego Olarte
National Coordinator of the Biodiversity Finance Initiative - BIOFIN Colombia

Bayron Cubillos
Biodiversity Finance Analyst

Catalina Sosa Botero
Technical Associate on Harmful Incentives to Biodiversity

Katherinne Romero
Communications

Juan Francisco Espinosa
Consultant

Cristian Páez
Consultant

FUND FOR FINANCING THE AGRICULTURAL SECTOR – FINAGRO

Alexandra Restrepo García
President

Julián García Cardona
Acting Vice President of Strategic Affairs and Sustainability (e)

Carlos Betancur Arias
Director of Sustainability

Inés Adriana Pachón
Lead Professional of the Project at the Sustainability

Alejandra Castrillón Arboleda
Professional at the Direction Sustainability

Design and Layout:
El Bando Creativo

BIOFIN
The Biodiversity Finance Initiative

What is BIOFIN?

A global initiative to align finance with biodiversity conservation

Since 2015, **the United Nations Development Programme (UNDP)** has been implementing the **Biodiversity Finance Initiative (BIOFIN)** in Colombia. This global strategy aims to close the financial gaps that limit nature conservation.

BIOFIN supports governments in designing financial solutions to **mobilize, redirect, and optimize public and private resources**. The objective is to promote the sustainable use of biodiversity, ensure a fair distribution of its benefits, and contribute to the well-being of communities that depend on ecosystems.

In Colombia, BIOFIN has played a key role in advancing the implementation of the **National Biodiversity Strategy and Action Plan (NBSAP)**, led by the Ministry of Environment and Sustainable Development. One of the strategic pillars of this work has been the **analysis and reform of harmful financial incentives**, with the goal of aligning rural development and financial policies with the international commitments acquired by the country under the **Convention on Biological Diversity (CBD)**.

Introduction

Target 18 of the Global Biodiversity Framework and BIOFIN's role in Colombia

In a world that needs to transform how development is financed, Target 18 proposes a radical shift: moving from harmful incentives to positive incentives for biodiversity. BIOFIN Colombia has built a concrete pathway to turn this ambition into action starting with the analysis of incentives and progressing to the creation of sustainable financial models in the agricultural sector.

Adopted at COP15 of the Convention on Biological Diversity, Target 18 makes a clear call to reform financial flows that harm biodiversity:

> ***"By 2025,*** *identify and eliminate, phase out or reform incentives, including subsidies harmful to biodiversity, in a just,* ***effective and equitable way, reducing them substantially and progressively by at least USD 500 billion per year by 2030,*** *starting with the most harmful, and* ***scale up positive incentives*** *for the conservation and sustainable use of biodiversity."*

This goal inspires and supports the technical and political work led by BIOFIN in Colombia, in coordination with the national government and productive sector stakeholders.

Key milestones for transforming financial incentives in Colombia's agricultural sector

BIOFIN
The Biodiversity Finance Initiative

2015

BIOFIN is launched in Colombia with a methodology that, from the outset, includes the analysis of harmful and positive subsidies. This tool seeks to align the use of public and private resources with biodiversity conservation and sustainable development.

OECD

2020

The OECD estimates that approximately **USD 500 billion** allocated to agricultural production in 54 countries could be **potentially harmful to the environment**, marking a global milestone in exposing these practices.

2021–2022

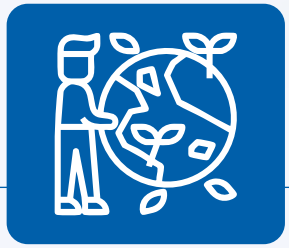
- BIOFIN Colombia conducts the **Study on Perverse Incentives and Subsidies in the Agricultural Sector**, in collaboration with various institutions.
- The analysis includes a **national inventory of 42 instruments**, a **case study in the La Mojana region**, and the evaluation of policies related to agricultural production, rural development, and land-use planning. As a result, **four key instruments** are prioritized to begin **a structured reform pathway**.

2022

Earth Track estimates that harmful subsidies in sectors such as **fossil fuels, mining, agriculture, marine fisheries, forestry, transport, and construction** may reach **USD 1.8 trillion annually**, equivalent to about **2% of global GDP**.

2023

- **Colombia's 2022–2026 National Development Plan**, under the banner *"Colombia, World Power of Life,"* incorporates a goal **to bring the net sum of positive and negative financial flows to zero**.
- It prioritizes investments that reduce GHG emissions and promote climate change adaptation, while reforming or eliminating incentives that contribute to biodiversity loss or increase emissions.



2024

The **implementation of the reform pathway for agricultural credit provided by FINAGRO**, one of the instruments prioritized in the 2021–2022 study, has begun.

BIOFIN also published the **Step-by-Step Guide to Redirect Harmful Subsidies for Biodiversity**, a practical tool developed to support countries in designing policies that improve their impact on people and nature.

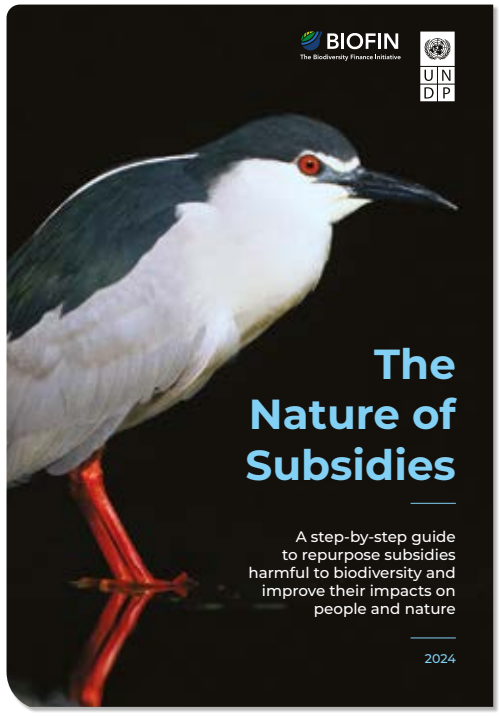
How can incentives generate negative impacts?

1. **They encourage the unsustainable use of natural resources:**

   When subsidies lower the real cost of water, land, or energy, the environmental value of these resources is overlooked. This leads to their accelerated depletion and creates imbalances that affect both productivity and the resilience of territories.

2. **They promote production models that cause environmental degradation:**

   Incentives focused solely on increasing output may lead to the overuse of agrochemicals, the expansion into areas of high ecological value, or the deterioration of key ecosystem services. In the long term, this results in rising costs for the government, the private sector, and local communities.



Working approach

Preselection

Preselection stage
- Hire an interdisciplinary technical team
- Establish a high-level working group
- Define the scope
- Conduct a literature review of best practices
- Develop a methodological approach

Research stage
- Map the main subsidies in key sectors
- Assess the potential impacts of subsidies on biodiversity
- Conduct a documentary review of those subsidies
- Schedule a validation meeting with key stakeholders
- Prioritize at least three subsidies for in-depth assessment

Validation stage
- Document the main findings from the research stage and validate them with key stakeholders
- Draft a final report on the prioritized subsidies with the greatest potential for redesign

Source: UNDP and the Biodiversity Finance Initiative (BIOFIN), 2024

Identify and assess redesign options

Reform option design

- Develop criteria and indicators for a multi-criteria evaluation
- Conduct an in-depth review of the prioritized subsidies
- Define the priority subsidies for redesign
- Schedule a validation meeting with key stakeholders

Validation stage

- Develop reform options (2 or 3 scenarios)
- Conduct an initial impact assessment
- Schedule a validation meeting with key stakeholders
- Conduct a political-economic analysis (with a gender and vulnerable group perspective)
- Design support programs for adaptation during the transition period
- Identify potential supporters and build a coalition
- Develop a feasible action plan for redesign
- Plan the budget and communication and advocacy strategy

Source: UNDP and the Biodiversity Finance Initiative (BIOFIN), 2024

Scenarios to reduce negative impacts on nature

Ecologize and reorient subsidies

In these approaches, the structure of the subsidy payment is often retained, but adjustments are made to the purpose, conditions, regulations, and incentives to reduce negative environmental impacts. For example, subsidies for fishing may be maintained but restrict the use of certain hooks and nets that harm fish and other species. Harmful subsidies can even be transformed into neutral or positive subsidies for biodiversity. Another example is the prohibition of the use of chemical fertilizers in ecologically sensitive areas or the exclusion of areas where a certain level of water pollution is observed.

Reduce the value of subsidies

Reducing the subsidy budget allocation can reduce the impacts that harm biodiversity and result in significant savings in public funds. For example, reducing a large subsidy by 5 percent can save millions of dollars.

Eliminate subsidies

In the first scenario, subsidies are completely eliminated only after a thorough analysis of the potential socioeconomic and environmental implications. In the second scenario, a phased approach is taken, gradually reducing subsidies over the years.

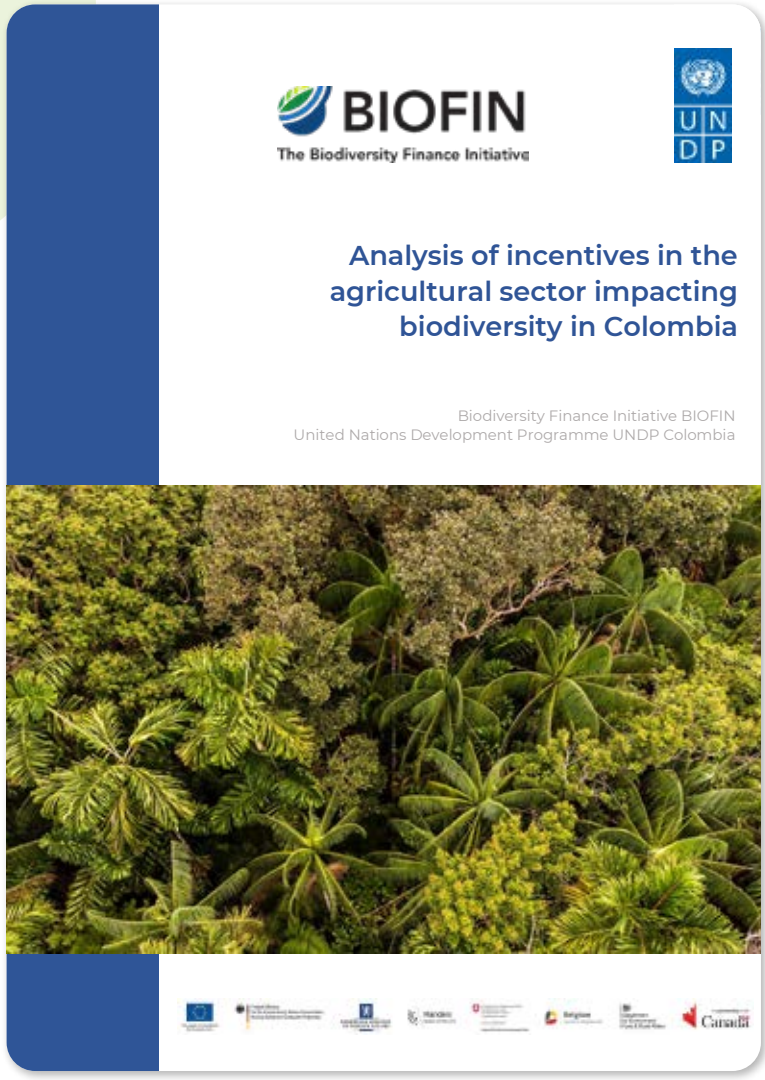
Small modifications to the most harmful elements

Only the most harmful elements, such as particularly harmful chemical fertilizers, can be removed without needing a significant change to the subsidy.

Incentives

that impact biodiversity: what the colombian case revealed

What unexpected negative impacts have been generated by the incentives in the agricultural sector? BIOFIN's analysis identified gaps and opportunities in the agricultural sector's instruments, revealing how certain policies and support mechanisms can generate unforeseen impacts on the country's biodiversity and ecosystems.



Incentives impacting biodiversity

What the colombian case revealed

In 2021, Colombia conducted its first national **inventory of agricultural instruments to identify** how they influence the country's biodiversity. This inventory included **42 instruments**, such as laws, policies, subsidies, and programs, which were analyzed based on **35 variables** that helped standardize their characteristics and implementation mechanisms.

These instruments were grouped into three major categories:

Category	Main subcategories
Agricultural Production	Financial, sanitary, marketing, and access to markets
Rural Development	Infrastructure, productive assets, differentiated policies
Land Policy and Territorial Planning	Access, formalization, administration, and land zoning

Each category encompasses various mechanisms: subsidies, tax exemptions, credits, regulations, resource transfer, and provision of public goods. Since the available data did not allow for direct attribution of biodiversity impacts, a **geospatial analysis** was applied to observe land cover changes associated with agricultural production systems.

What instruments did we identify?

The study allowed for the classification of instruments according to their focus and function within the agricultural sector. This grouping helps understand how different public policies and tools influence productivity, territorial development, and the sustainability of agricultural systems in the country.

Agricultural production (13 instruments)

This category includes instruments that promote the agricultural sector from both a productive and economic perspective. From forestry incentives to certifications for the commercialization of plant material or genetically modified organisms, mechanisms identified include:

- Rural capitalization incentives and rice storage
- Guarantee funds, credit lines, and agricultural insurance
- Certifications for good practices, production, and importation of inputs

Rural development (18 instruments)

This category includes instruments aimed at strengthening peasant economies, social capital, and the scientific development of agricultural systems. Among them are:

- Productive alliances, agricultural innovation, and co-financing of projects
- Illicit crop substitution and strategies for rural women
- Irrigation plans, agricultural extension, and commercialization support

Land policy and land use planning (11 instruments)

This category includes instruments aimed at territorial planning and land management for productive purposes. It includes processes of land allocation, management, and restitution, such as:

- Creation of Peasant Reserve Zones
- 2018-2038 Land Adjustment Policy
- Withdrawal of forest areas and land surveys for planning purposes

What agricultural sector factors drive biodiversity loss?

Based on the inventory of instruments and the guidelines of the *National Policy for the Integrated Management of Biodiversity and its Ecosystem Services – PNGBSE* (MinAmbiente, 2012), the main activities in the agricultural sector that contribute to biodiversity loss in Colombia were identified. These are grouped into five drivers defined at the national level and reflect productive processes that, directly or indirectly, place pressure on ecosystems and their biodiversity.

Below is a summary of the relationship between **biodiversity loss drivers** and the **agricultural sector factors** that trigger them:

Drivers of transformation and biodiversity loss – national level	Drivers and factors of transformation and biodiversity loss identified for the agricultural sector
Driver 1: Changes in land use (continental or aquatic), land occupation, and fragmentation of ecosystems	Driver 1: Expansion of agricultural land into new areas (land use change) ● 1.1 Colonization in tropical rainforest areas ● 1.2 Conversion of tropical savannas due to livestock and agribusiness activities ● 1.3 Transformation of wetlands and páramos ● 1.4 Expansion of illegal crops in forest areas ● 1.5 Impact on water bodies
Driver 2: Pollution and toxification	Driver 2: Growth of intensive production systems ● 2.1 Genetic uniformity and simplification of high-yield agricultural and livestock production systems ● 2.2 Loss of native and creole crop and livestock species and systems ● 2.3 Disappearance of rotation, succession, and intercropping practices, including forest barriers ● 2.4 Soil and water source degradation and loss due to pollution from inappropriate use of fossil fuels and agricultural inputs ● 2.5 Loss of pollinator populations due to habitat loss and use of agricultural inputs ● 2.6 Loss of insect and microorganism populations associated with biological pest control and soil fertility, due to habitat loss and agricultural inputs
Driver 3: Introduction and translocation of species	Driver 3: Introduction of exotic species and reproductive material ● 3.1 Impact on biodiversity through predation, competition, hybridization, habitat use, reproduction, rearing, and disease transmission ● 3.2 Alteration or destruction of the balance of local ecosystems and their impact on ecosystem service provision
Driver 4: Decline, loss or degradation of elements of native ecosystems and agroecosystems	Driver 4: Overexploitation of wild populations ● 4.1 Legal and illegal logging ● 4.2 Use of wild fauna for subsistence ● 4.3 Legal and illegal fishing, for commercial and subsistence activities
Driver 5: Climate change	Driver 5: Greenhouse gas (GHG) emissions ● 5.1 Methane emissions from livestock populations ● 5.2 Nitrous oxide (N_2O) emissions from the use of nitrogen-based fertilizers

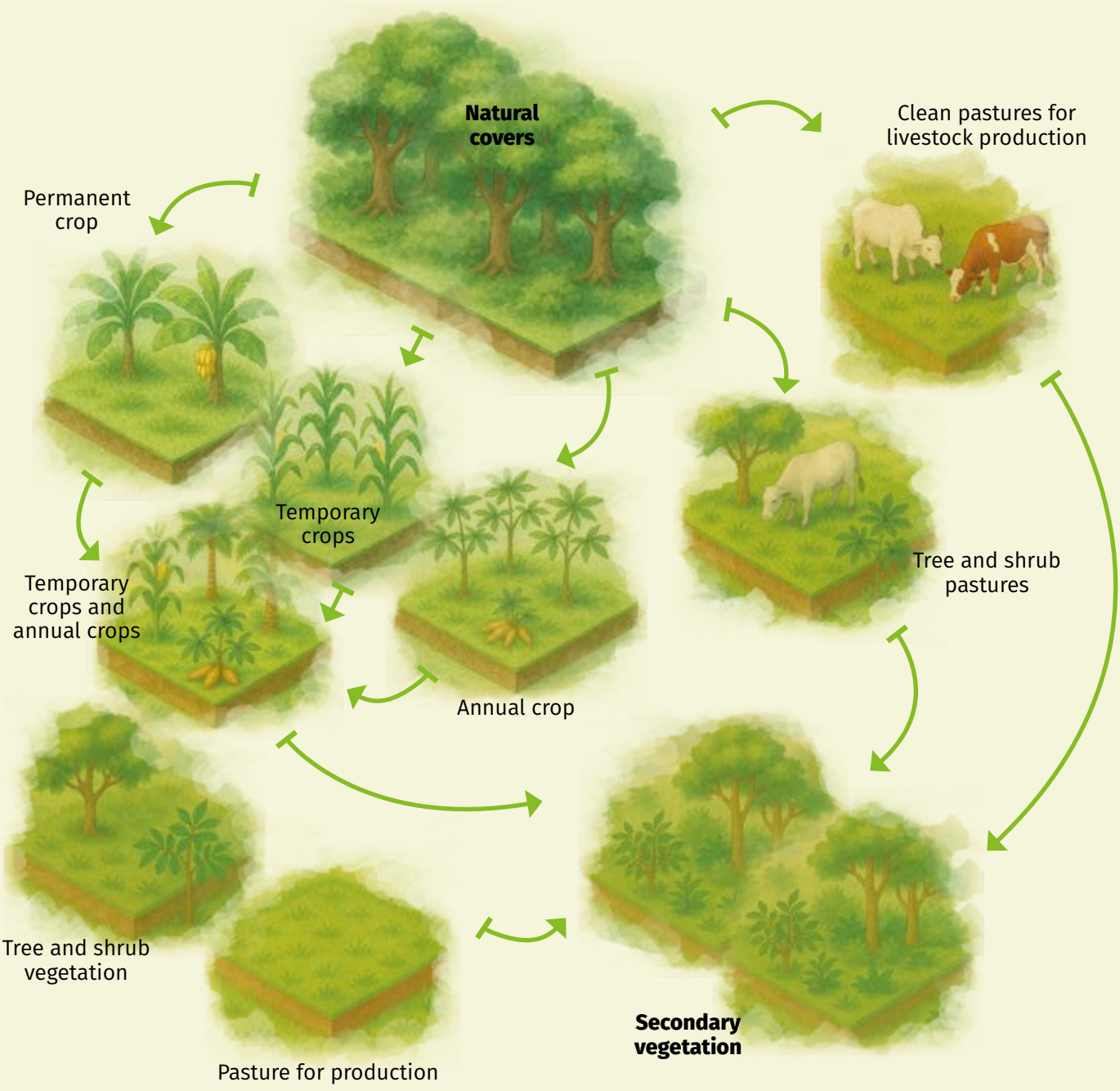
Note: For the analysis in this study, priority is given to Drivers 1 and 2 due to their high incidence in the country's agricultural production systems.

What do the analyses tell us?

This study explored how **31 instruments related to agricultural production and rural development**, along with **11 land-use planning instruments**, are connected to the **drivers of biodiversity loss** defined in the National Policy for the Integrated Management of Biodiversity and its Ecosystem Services (PNGIBSE, 2012).

The result is clear: **more than 90% of the instruments analyzed activate drivers of biodiversity loss**, either directly or indirectly, by promoting productivity or regulating land use.

However, **not all instruments have negative impacts**. Some display a **dual character**, as their effects may vary depending on how they are implemented—potentially contributing to biodiversity conservation. This diversity of effects highlights the importance of strengthening positive aspects and mitigating risks in order to move toward a more sustainable approach to land management and agricultural production.



What was prioritized for transformation?

Based on the analysis, **four key instruments** were prioritized, which—if reformed—could make a real difference:

- **Special Lines of Credit (LEC) and FINAGRO's development credit:** mechanisms that mobilize large amounts of resources in rural areas but still lack clear environmental criteria.
- **The policy to improve the competitiveness of the dairy sector:** which can evolve toward a model that values native breeds and sustainable practices.
- **The demarcation, recovery, and management of communal wetlands (playones comunales):** strategic areas currently at risk due to lack of control or adequate use.
- **The allocation of public lands (baldíos) to individuals:** a powerful tool for land access that requires strong environmental guidelines.

Results consultation

Case study: La Mojana

The national analysis of public policy and financing instruments was complemented by a territorial approach in **La Mojana**, selected as a case study due to its unique **ecological, hydrological, social, cultural, economic, historical, and governance conditions.**

In 2022, the **BIOFIN** initiative conducted a **regional analysis of agricultural sector incentives with potential biodiversity impacts**, aiming to **identify reform pathways tailored to the territory.** This exercise made it possible to examine how these instruments operate in practice and their differentiated effects in a setting where biodiversity and agricultural production coexist in a fragile balance.

The experience in La Mojana reinforces the importance of designing reforms with a territorial focus, and shows how a detailed socio-environmental characterization can guide the transformation of sectoral policies to make them more compatible with biodiversity conservation.

What is being done today?

Colombia, alongside Nepal and Kyrgyzstan, is leading compliance with **Target 18 of the Global Biodiversity Framework**, which calls on countries to reform public or private incentives harmful to biodiversity by 2025.

In 2023, **UNDP BIOFIN and FINAGRO** signed an agreement to begin greening the agricultural credit system. This means that loans will not only be based on productivity, but also consider the environmental and social context of each territory.

Why is it important?

Because transforming these instruments is a tangible and strategic **opportunity to change the way agriculture is practiced in Colombia**—an opportunity that brings together the state, the private sector, international cooperation, and above all, territories and communities.

And because **Colombia is proving that producing while conserving is possible**, if decisions are made based on evidence, political will, and long-term vision.

Pathway

to greening agricultural credit: from analysis to action

The transition toward positive incentives begins with redesigning of existing instruments. This section presents the methodological roadmap jointly proposed by **BIOFIN and FINAGRO** to green agricultural credit, including the steps, criteria, and adjustments required to mainstream sustainability as a standard practice rather than an exception.

How is agricultural credit being greened in Colombia?

Aware of the strategic role of financing in transforming rural Colombia, **FINAGRO and UNDP have designed a roadmap to green agricultural credit**. The goal: to ensure that access to credit not only boosts productivity but also strengthens ecosystem conservation.

This roadmap aims to align financing with **sustainable production models**, through a methodology that combines an ecosystem approach with technical, financial, and social criteria.

The process has brought together experts from the financial, agricultural, and environmental sectors to initially work on six productive value chains: **cattle ranching, rice, cocoa, coffee, cassava, and non-timber forest products**, selected for their territorial importance, level of organization, and credit demand**.**

What does the methodological roadmap include?

The roadmap is based on **three key components**, which are being implemented in an integrated manner:

Geographic targeting of agricultural systems using an ecosystem approach for the analysis of productive and financial information

Priority is given to areas in Colombia's continental territory where it is strategic to collect, analyze, and integrate environmental, productive, and economic information for the six value chains. This involves linking natural and transformed ecosystems present in the most representative municipalities for each agricultural system.

Identification of sustainable production practices

A package of practices and technologies is consolidated for each ecosystem, considering different levels of adoption (basic, intermediate, and advanced). Their economic benefits and implementation **costs** are also assessed.

Financial analysis of the productive transition

Through financial modeling tools, the credit conditions needed to support sustainable production are analyzed, taking into account production cycles and geographic location.

What is FINAGRO's role?

As an agricultural development bank, FINAGRO operates within the National Agricultural Credit System and channels resources through financial partners that serve the sector throughout the country. This methodological roadmap strengthens its role by aligning its operations with the country's environmental commitments and Target 18 of the Global Biodiversity Framework, which requires the transformation of harmful incentives for biodiversity by 2025.

What results are expected?

Through the application of this methodology, **recommendations will be developed regarding the credit conditions necessary to finance sustainable agriculture**. These recommendations will be submitted to the **National Agricultural Credit Commission**, so they can be implemented through the system's financial partners.

Where to begin?

Priority value chains and regions

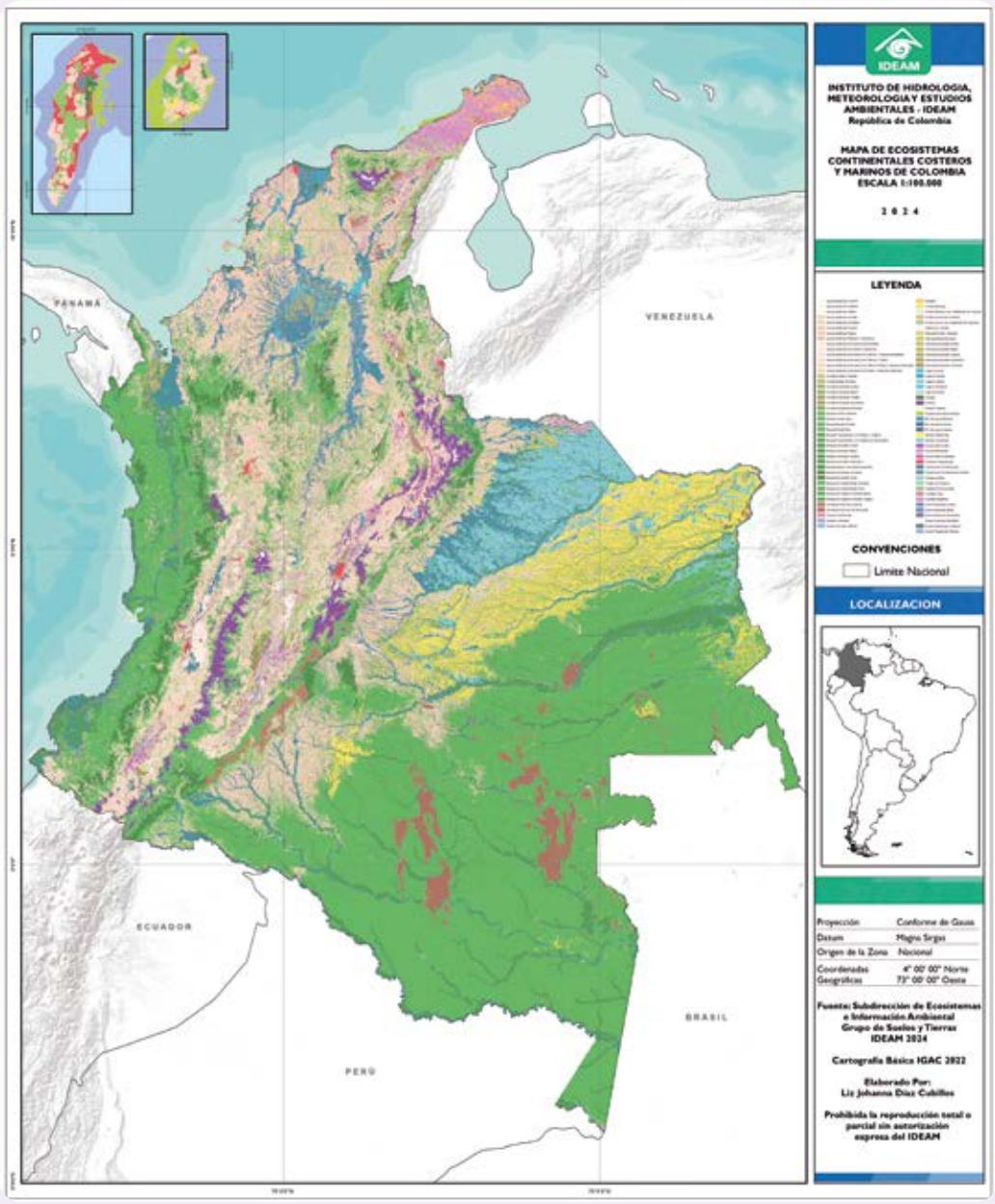
Not all territories or value chains have the same impact. For this reason, BIOFIN and FINAGRO proposed a geographic focus with an ecosystem-based approach, identifying areas and sectors where change can have the greatest positive impact on biodiversity and economic sustainability.

Geographic targeting of agricultural value chains: towards ecosystem-based financing

The sustainable transformation of agricultural value chains begins with a key question: **Where should efforts, resources, and knowledge be focused to achieve the greatest impact?**

Based on this question, the team developed a territorial and biophysical analysis process that allowed **for the geographic targeting of the most relevant value chains for sustainable financing.**

This exercise not only identified **where the value chains are located and their production levels**, but also the **predominant ecosystems in these areas** and how they should be addressed from a sustainability perspective.



How was the information processed?

The technical team followed a three-phase methodology, combining production data with environmental variables:

1

Initial information

Sources such as Geaoagro, the National Inventory, land cover maps, and ecosystem zoning provided a detailed initial map of productive land use and ecosystem supply.

2

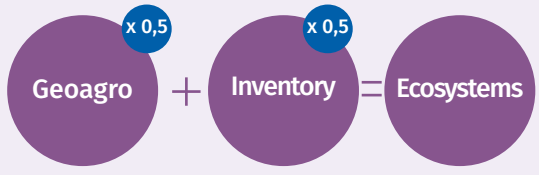
Prioritization

Based on the intersection of economic activity and environmental information, areas with the highest potential for intervention were identified, both by value chain and by ecosystem type.

3

Operation

Finally, the consolidated data enabled the construction of a productive targeting index, validated by FINAGRO and UNDP, to guide the phases of analysis of productive and financial information within the agricultural sector in Colombia.

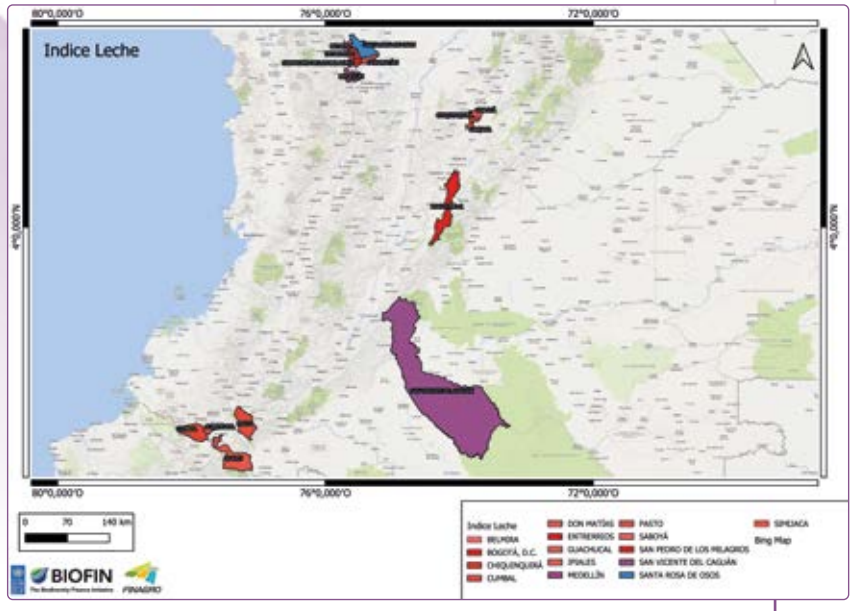


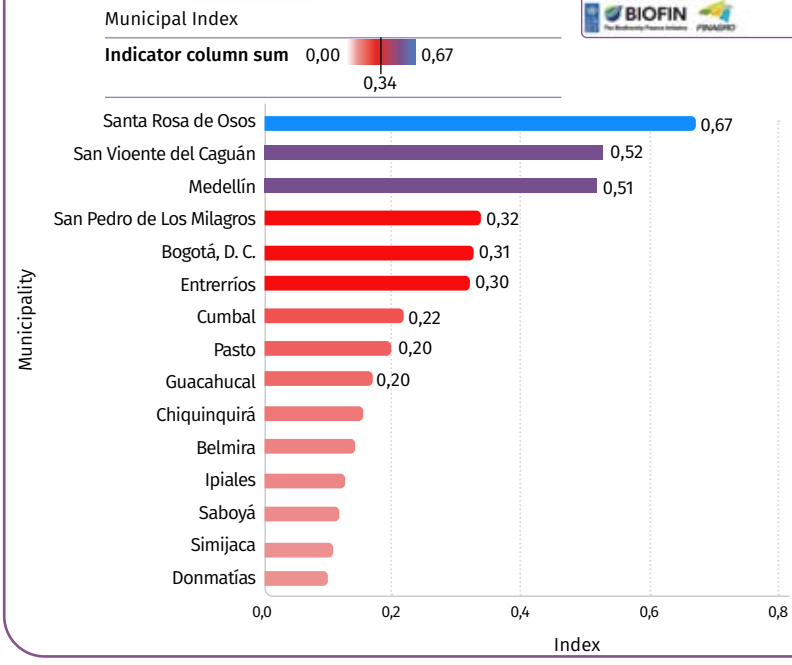
A sample of geographic targeting of agroproductive chains with an ecosystem-based approach

BIOFIN has worked with six agricultural value chains, identifying the most representative municipalities based on their productive use and credit placements, along with their predominant ecosystems. To exemplify the progress of this process, this booklet presents three case studies: milk, cocoa, and coffee. These chains were selected for their level of documentation, economic relevance, and their connection to the country's strategic ecosystems.

Through these examples, the process of geographic targeting is illustrated as a tool to guide the analysis of productive and financial information towards areas with high potential for economic and environmental impact. It is important to note that this targeting does not limit the application of the methodological roadmap to the identified municipalities; rather, it helps organize the analysis and facilitates decision-making in a gradual and strategic manner.

Milk: productive concentration in ecosystems of Caquetá

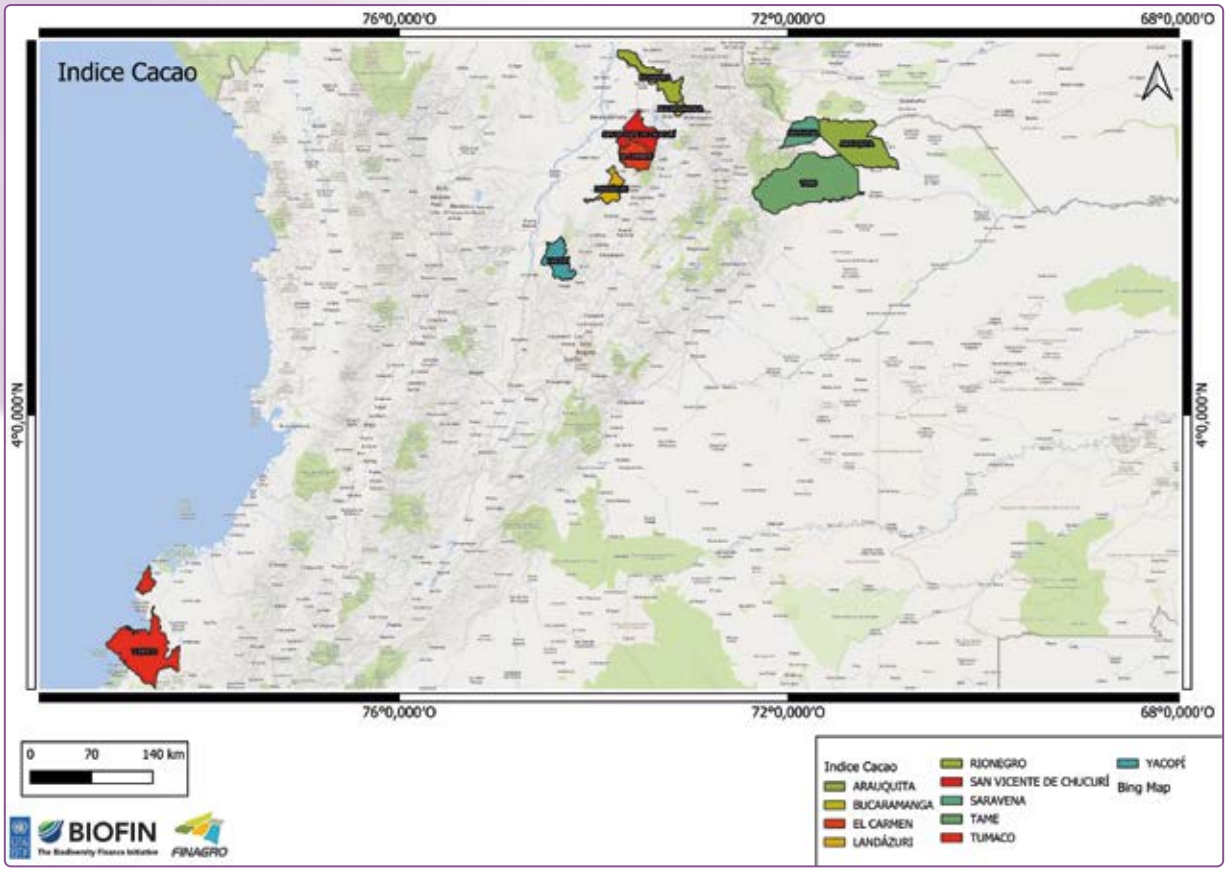


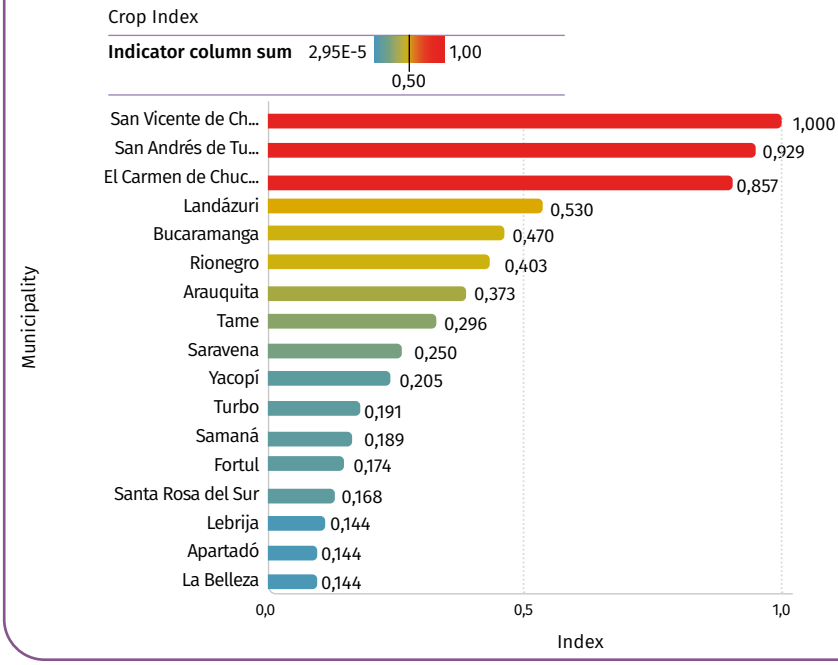


- Several municipalities in Caquetá stand out in milk production.
- This activity overlaps with strategic ecosystems that require sustainable practices to reduce pressure on biodiversity.

Cocoa:

productive versatility between Santander, Arauca, and the Nariño coast



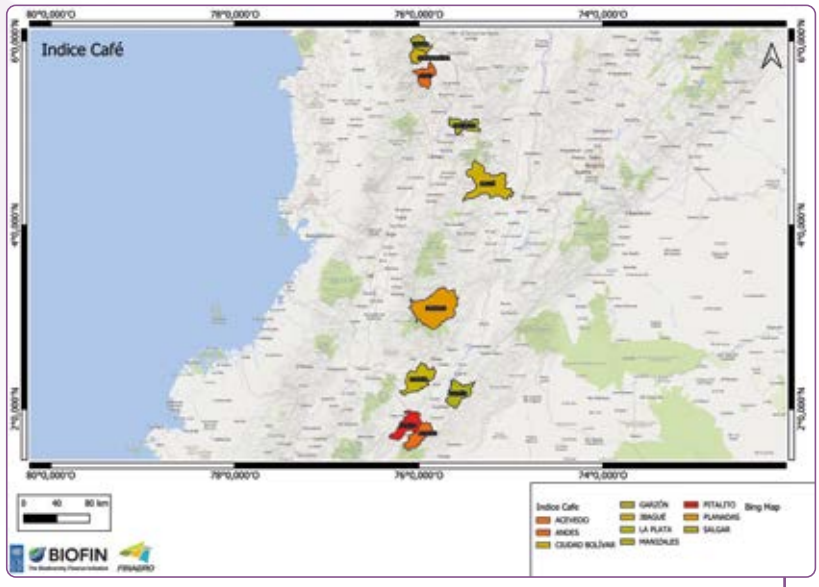


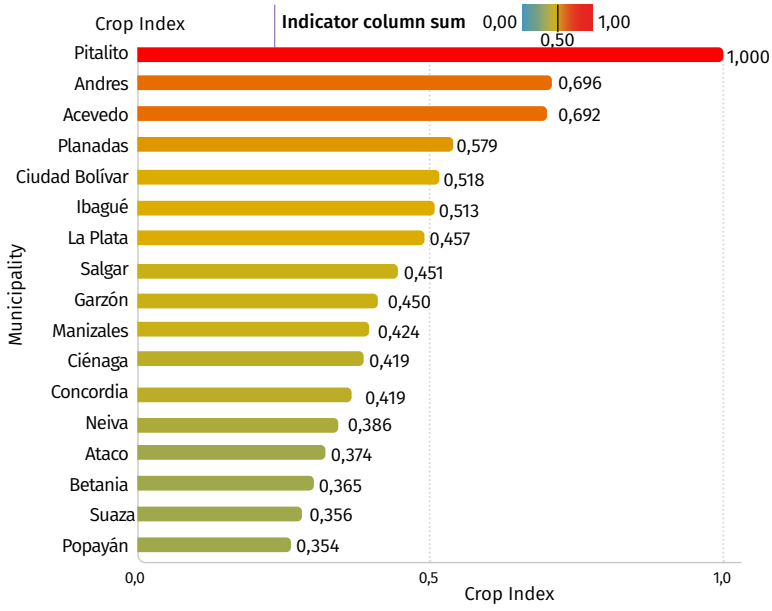
The cocoa targeting index reveals a highly adaptable value chain, with well-defined production clusters in regions with distinct biophysical conditions:

- In the northeast, **Santander and Arauca** share tradition and volume.
- In the southwest, **San Andrés de Tumaco** represents a strategic enclave with its own ecosystemic and social challenges.

This finding highlights the **need for differentiated territorial** approaches in financing, taking into account both the productive potential and the diversity of ecosystems.

Coffee: historical leadership and a sustainability opportunity





The coffee analysis reaffirms the historical strength of the Coffee Axis (Caldas, Quindío, Risaralda) and highlights the leadership of the department of Huila as one of the country's main producers. Most of the prioritized municipalities are located in transformed agroecosystems, which presents a dual opportunity:

- To maintain productivity
- And improve sustainability conditions through practices that restore ecosystem services.

Usefulness of the targeting results

This exercise enables the team to know precisely **where to act, who to work with, and how to adapt financial solutions** to the biophysical conditions of each territory. The information obtained allows for **smart targeting** that considers both profitability and ecosystem resilience.

In other words, sustainable financing is not just a financial calculation: **it is a territorial strategy with a human face and an ecosystem foundation.**

Understanding practices,

costs, and benefits to improve financing

This chapter delves into the **“Know”** component, which involves gathering and organizing technical information on sustainable agricultural practices, as well as the economic costs and benefits associated with their implementation.

With this information, the aim is to ensure that the loans required by producers transitioning to sustainable production are designed based on solid **evidence and territorial context.**

Example of one of the six value chains studied

Regulatory and technical framework for Sustainable Cattle Ranching (GBS, for its acronym in spanish)

The following information illustrates, as an example, the framework supporting Sustainable Cattle Ranching in Colombia.

Key instruments:

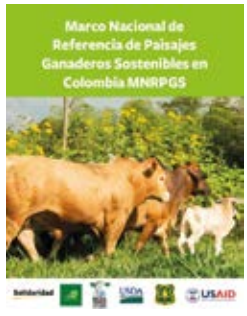
- **GBS Policy Guidelines 2022–2050**
  - A national policy framework for sustainable cattle ranching, setting objectives and guidelines through 2050.
- **Resolution 00126 of 2022 – Ministry of Agriculture and Rural Development**
  - A technical instrument supporting the guidelines, formalizing the regulations and protocols for GBS implementation.

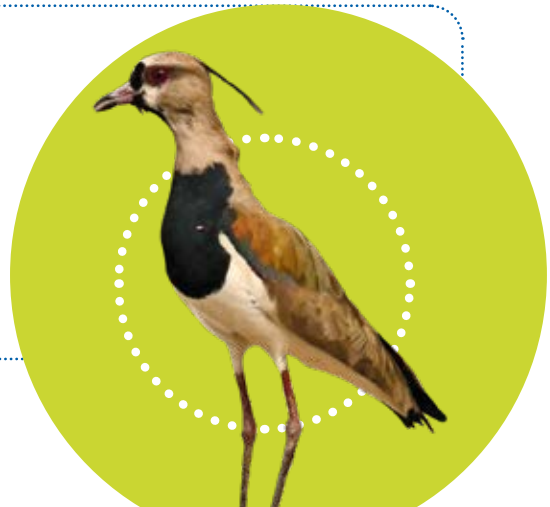
National Guidelines for Implementing GBS:

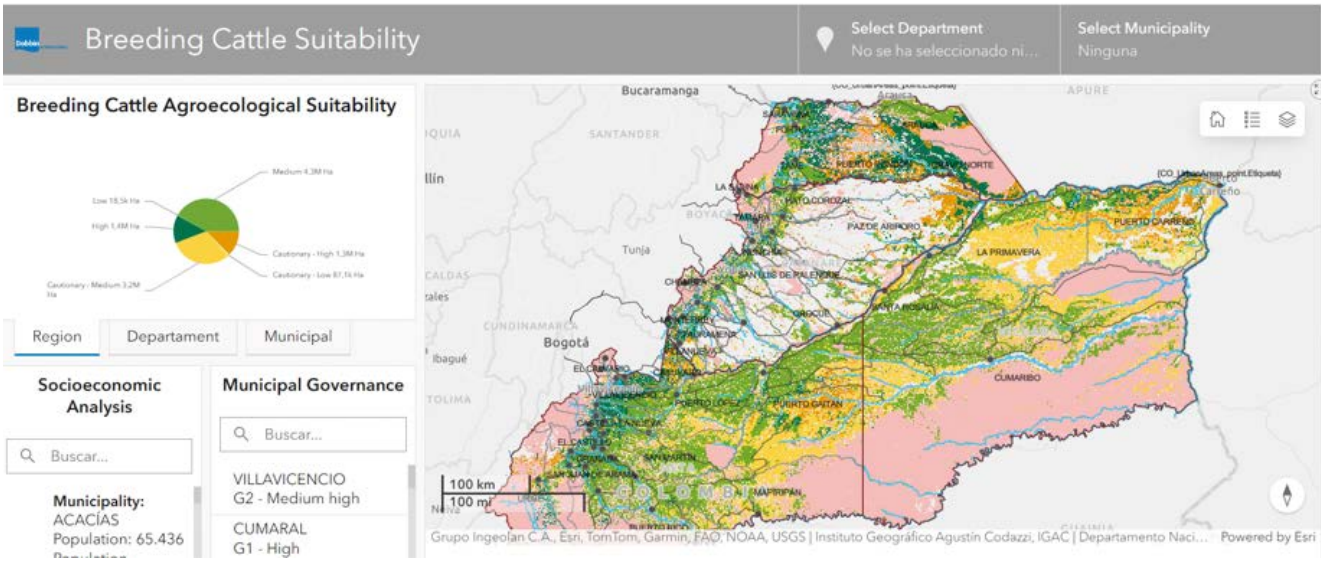
These guidelines are based on three key documents that provide tools and strategies for GBS implementation:

1. **Nationally Appropriate Mitigation Action (NAMA):** Designed to reduce greenhouse gas emissions in the livestock sector by promoting sustainable practices that contribute to Colombia's climate commitments.
2. **Guidelines for the Design of Sustainable Livestock Conversion Programs and Projects:** They provide a guide for the transformation of traditional livestock systems into sustainable models, considering technical, economic, and social aspects.
3. **National Reference Framework for Sustainable Livestock Landscapes:** Establishes criteria and standards for the sustainable management of livestock landscapes, promoting biodiversity conservation and efficient natural resource use.

These documents provide the conceptual and operational foundation that guides producers, technicians, public entities, and financial institutions in adopting sustainable productive practices in different regions of the country.







CIAT, CIPAV, & FEDEGAN. (2022). *Notas técnicas: Evaluación de aplicabilidad de prácticas silvopastoriles para 4 ecosistemas de la Orinoquia* [Technical notes: Assessment of the applicability of silvopastoral practices for four ecosystems in the Orinoquia].

Territorial application: case study in the Orinoquía

Studies carried out in 2022 by CIAT, CIPAV, and FEDEGAN have assessed the territorial suitability for cattle breeding in the Orinoquía, considering ecological factors (ecosystem type, ecosystem services) and productive factors (cattle density, pasture yield). These studies produced technical notes and suitability maps that serve as a foundation for targeting the implementation of sustainable practices by ecosystem, under the Orinoquía Biocarbon Project (Proyecto Biocarbono Orinoquia). This analysis provides key inputs to:

- Precisely knowing where to act according to the suitability of each territory.
- Adapting financial solutions to localized biophysical conditions.

Below are two fundamental technical tables that summarize:

1. Variables and criteria used for territorial suitability analysis
2. Applicability of sustainable practices in each type of ecosystem in the Orinoquía

Table 1. Applicability of Intensive Silvopastoral Systems (iSPS) by Agroecological Zone and Livestock System

Technology	Agroecological Zone				Type of System		
	Piedmont	Altillamura	Dissected Altillanura	Flooded Savanna	Breeding	Fattening	Dual Purpose
Intesive silvopastoral system	✓	✓	✗	✗	✓	✓	✓

CIAT, CIPAV, & FEDEGAN. (2022). *Notas técnicas: Evaluación de aplicabilidad de prácticas silvopastoriles para 4 ecosistemas de la Orinoquia* [Technical notes: Assessment of the applicability of silvopastoral practices for four ecosystems in the Orinoquia].

Table 2. Applicability of Introduced Pastures + Rotational Grazing by Agroecological Zone and Livestock System

Technology	Agroecological Zone				Type of System		
	Piedmont	Altillamura	Dissected Altillanura	Flooded Savanna	Breeding	Fattening	Dual Purpose
Introduced Pastures + Rotational Grazing	✓	✓	✓	✓	✓	✓	✓

CIAT, CIPAV, & FEDEGAN. (2022). *Notas técnicas: Evaluación de aplicabilidad de prácticas silvopastoriles para 4 ecosistemas de la Orinoquia* [Technical notes: Assessment of the applicability of silvopastoral practices for four ecosystems in the Orinoquia].

- **Table 1:**
  Evaluates the applicability of the Intensive Silvopastoral System, showing it is not suitable in dissected *altillanura* or seasonally flooded savannas due to ecological constraints.

- **Table 2:**
  Analyzes the introduction of improved pastures + rotational grazing, showing high technical feasibility across all four ecosystems evaluated.

Both tables highlight the importance of adapting productive practices to the ecological and social context of the territory.

This territorial exercise, led by **CIAT, CIPAV, and FEDEGAN in 2022**, allowed the validation of a set of **sustainable livestock practices and technologies**, evaluated for their applicability based on the ecosystems present, their technical requirements, and their compatibility with different production systems (beef, milk, dual-purpose). Additionally, a reference technical protocol was proposed to guide the establishment of sustainable productive units.

This analysis has served as an example for the broader process, as it concretely represents the type of evaluation being replicated in the prioritized municipalities for the six value chains. It focuses on identifying and validating the practices that best adapt to the ecosystems of each territory, serving as the foundation for designing relevant and effective financial instruments.

Comparative financial model:
conventional vs. sustainable

By understanding the practices, costs, and benefits of sustainable production systems, a financial model is developed to comparatively and complementarily analyze the economic performance of conventional production versus production with a sustainability approach.

This tool is essential for decision-making by **financial institutions, public policy designers, and leaders of productive sectors**, as it facilitates the design of instruments that respond to producers' realities.

Objectives of the model

- To describe the methodology that supports the transition toward sustainable agricultural systems.
- To identify the sources of information that inform economic projections.
- To demonstrate the financial, social, and ecological benefits of the sustainable model.

Methodological design of the model: an example in cattle ranching

The financial model is built upon key variables that integrate ecological, technical-productive, and financial information. Its structure is organized into four dimensions and considers both the producer's and the financial sector's perspectives.

	Producer's Perspective	Financial Sector's Perspective
1. Key Variables	Ecosystem FINAGRO information Productive orientation: (Meat, Milk and Dual-purpose) Implemented sustainable practices	
2. Information Inputs	• Production orientation • Characteristics of the Production area • Production parameters and characteristics • Technical assistance	• Financial characteristics of the credit operation: amounts, interest rates, terms
3. Expected Results	• Revenues and costs of conventional and sustainable production systems • Economic benefits from sustainable production • Positive medium- and long-term cash flow	• **Indicators:** profitability, liquidity, and coverage
4. Benefits	• Project Profitability • Liquidity: positive cash flow • Coverage: positive cash flow	• Credit portfolio diversification • Support for the agricultural sector • Rural social and economic development

Key indicators

- **Surface area (ha)** under conventional and sustainable management.
- **LSU (Large Stock Unit)** per hectare: efficiency of livestock carrying capacity.
- **Net Present Value (NPV):** profitability adjusted to current prices.
- **Internal Rate of Return (IRR):** expected return of the project.
- **Net Cash Flow (% of income):** annual sustainability of the business.
- **Net Cash Flow in Minimum Monthly Legal Wages (MMLW):** model's ability to ensure a decent livelihood.
- **Costs/Inputs vs. Income Ratio:** alert on risks to economic sustainability.

Information fields considered in the financial model

To build the financial model comparing conventional and sustainable cattle ranching systems, the following information fields were considered:

- **Geographic data:** ecosystem, department, municipality, and productive use.
- **Technical parameters,** according to the orientation of the livestock system: meat, milk, or dual-purpose.
- **Sustainable practices** selected by the producer, which may require financing for implementation.
- **Credit characteristics:** type of credit, interest rate, term, and grace period.
- **Average costs and revenues** of both conventional and sustainable production systems present on the farm.

This structure allows for a precise representation of the productive and financial conditions of the production unit, facilitating a comparative analysis between production approaches.

Opportunities of the financial model

The gradual transition towards sustainable practices in livestock farming opens concrete opportunities for various sector stakeholders:

- **For producers,** it strengthens their investment capacity in the medium and long term.
- **For the financial sector,** it represents an alternative to diversify its portfolio, align with ESG (Environmental, Social, and Governance) criteria, and consolidate its contribution to the economic and social development of rural Colombia.

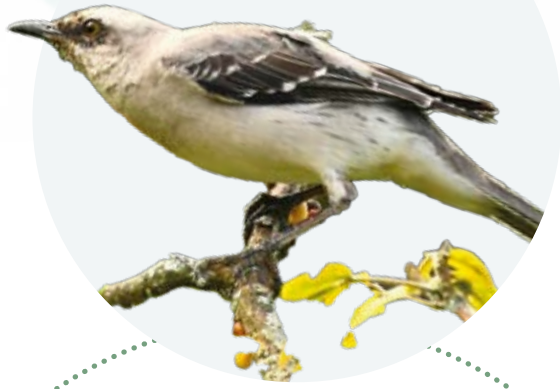
The financial model enables informed decision-making to design credit lines that align with the actual cycle of sustainable livestock production.

Greening of agricultural credit: an invitation to join the implementation

The pathway outlined in this booklet—which links knowledge of sustainable practices, financial modeling, and the design of credit lines aligned with the production cycle—offers a technical and strategic framework to move toward greener, fairer, and more effective agricultural credit.

The model shows that it is possible to structure financial schemes that support the transition to sustainable production systems in the prioritized value chains, without compromising business profitability or the stability of the financial system.

By integrating environmental, social, and productive variables, this approach aims to deliver comprehensive benefits: promoting biodiversity conservation, improving living conditions in rural areas, and strengthening institutional capacities to transform the agricultural sector.



We invite producers, financial institutions, cooperatives, local governments, and policymakers to join this pathway to green agricultural credit, as a concrete opportunity to promote sustainable rural development in Colombia with appropriate financial instruments aligned with current challenges.

Analysis and reform

of financial incentives in the agricultural sector with an impact on biodiversity in Colombia

This project is co-funded by the European Union

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Norway

Flanders State of the Art

Ministère de l'Europe et des Affaires étrangères

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra
Swiss Confederation
Federal Office for the Environment FOEN

Belgium partner in development

Department for Environment Food & Rural Affairs

In partnership with Canada