



Annual Cooperation Report

2022



Contenido

Background	4
1. Implemented Projects and Technical Assistance	5
1.1. Adapted Agroforestry Systems for the Central American Dry Corridor (AGROINNOVA)	5
1.2. Feasibility Study for the Dairy Sector in Guyana	7
1.3. Technical Evaluation of Coffee and Cocoa in Guyana	7
1.4. Diagnosis of the Tissue Culture Laboratory of the Salvadoran Coffee Institute.....	8
1.5. Project Biodiversity and Sustainable Agro-silvopastoral Landscapes, known as BioPaSOS	9
2. New Cooperation Proposals IICA-CATIE	11
2.1. Proposal for the Condor Kutuku Corridor Landscape in the Amazon of Peru and Ecuador	11
3. IICA-CATIE Investment Fund	12
3.1. Propagation module for hybrids and improved coffee varieties.....	12
3.2. Investment project in energy efficiency.....	14
3.3. Productive improvement of the milk and meat herd	15
4. CATIE collaborated with IICA at COP27 - Americas Agriculture Pavilion	16
5. Americas Forest IICA-CATIE	17

Background

On March 24, 2022, a new General Interinstitutional Cooperation Agreement was signed between the Inter-American Institute for Cooperation on Agriculture (IICA) and CATIE (Tropical Agricultural Research and Higher Education Center), with the objective of establishing the basis for joint cooperation between both institutions for carrying out actions in the technical, financial, legal, and operational areas of interest to both parties, and seeking to enhance and amplify the support they provide to their member states in sustainable development issues related to the agricultural, livestock, and forestry sectors. It is also important to note that this is an agreement between parties to promote joint work and strengthen CATIE's financing, the sustainability of the two institutions, and the creation of investment funds aligned with the main objective of the Center.

Initially, joint efforts focus on actions to strengthen productive innovation processes, sustainable agribusiness, research and technology transfer in tropical agriculture and sustainable agri-food systems. It also includes work in biodiversity conservation, watershed management, integrated management of water and soil resources, as well as synergies between adaptation and mitigation of agriculture to climate change and crops such as coffee, cocoa, and other tropical crops, sustainable livestock, and agroforestry and silvopastoral systems.

Another focus of cooperation is associated with strengthening the capacities of the public sector, agricultural producers and their families, and private sector organizations that contribute to reinforcing the competitiveness and sustainability of agriculture, adaptation to climate change, and food and nutritional security. The agreement also establishes actions to contribute to the development of sectoral policies, public-private institutional frameworks, projects, and activities for the sustainable management of rural territories.

This report presents the main actions developed in 2022 and the implementation of joint projects, within the framework of this institutional cooperation.



7 Implemented Projects and Technical Assistance

1.1. Adapted Agroforestry Systems for the Central American Dry Corridor (AGROINNOVA)

This project is implemented by IICA and CATIE, together with 20 partner institutions, with the aim of improving the climate resilience and food security of at least 3,000 small basic grain producers in the six countries that make up the Central American Dry Corridor (Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, and Panama).

To achieve its objective, the implementation of adapted multi-strata agroforestry system models (SAFM) has been encouraged, which promote innovations to increase yields, protect water sources, improve soil, favor biodiversity, and generate additional income. In 2022, the establishment of 93 agroforestry demonstration plots was completed to strengthen the public-private capacities of agricultural research, technology transfer, and extension on SAFMs (Table 1)

Table 1. SAFM model types established in the 93 demonstration plots in the six project action countries of AGROINNOVA in the Central American Dry Corridor.

Country	Number of demonstration plots	SAFM Models
Costa Rica	15 plots	<ol style="list-style-type: none"> 1. Agroforestry system with coffee and timber or fruit trees planted in rows or scattered, in association with basic grains. 2. Agroforestry system with coffee and timber or citrus trees planted in rows or scattered, in association with banana plants. 3. Agroforestry system with trees planted in rows or scattered, in association with improved pastures and forage banks, for silvopastoral purposes.
Panama	15 plots	<ol style="list-style-type: none"> 1. SAF of coffee with timber and fruit trees in line or dispersed in association with bananas and livestock. 2. SAF of timber and fruit trees in line or dispersed in association with bananas and basic grains. 3. Agroforestry-pastoral system with trees in line or dispersed in association with basic grains, improved pastures, and forage banks.
El Salvador	15 plots	<ol style="list-style-type: none"> 1. SAF of timber and fruit trees in line or dispersed in association with basic grains and bananas 2. Agro-silvopastoral system with trees in line or dispersed in association with vegetables, improved pastures, and forage banks.
Guatemala	18 plots	<ol style="list-style-type: none"> 1. SAF of coffee with timber and fruit trees in line or scattered in association with bananas 2. SAF of coffee with timber and fruit trees in line or scattered in association with basic grains
Honduras	15 plots	<ol style="list-style-type: none"> 1. Coffee with timber and fruit trees in line or dispersed in association with bananas 2. Coffee SAF with timber and fruit trees in line or dispersed in association with bananas and basic grains 3. Agroforestry system with timber and fruit trees in line or dispersed in association with improved pastures and basic grains

It should be noted that AGROINNOVA incorporates a gender perspective, through the Goat Field School for women of the Costa Rican Pacific, where 25 women were trained to become knowledge multipliers on topics related to goat production management and innovation, agroforestry systems, sustainable intensification strategies, and value-added.

Likewise, the strategy of rural youth involvement in agriculture has been promoted through the training of young people from agricultural technical schools, where agroforestry goat field schools were also developed with eight technicians from the Ministry of Agriculture and Livestock (MAG) of Costa Rica and 26 young people from the 27 de Abril Professional Technical College. In these field schools, seven theoretical-practical training modules were taught, and a goat module was built and enabled as a demonstrative showcase for the Guanacaste region.



The ECA was developed with several approaches, including education with a gender perspective, which provides equal opportunities to women and men of all ages, from different parts of the Costa Rican Pacific (Table 2).

Table 2. Women and men directly benefited from the ECA

Agroforestry goat farming Field School for farmers and technicians in the Dry Pacific Corridor of Costa Rica	
Quantity of women impacted through this ECA	13 producers
1 technician	8 productores 6 técnicos
ECA agrosilvopastoral caprine for students, 27 de Abril Agricultural Technical Professional High School.	
Quantity of women impacted through this ECA	9 Students 1 teacher 1 family mother 1 technician
Quantity of men impacted through this ECA	2 teachers 9 students 1 Family guy

1.2. Feasibility Study for the Dairy Sector in Guyana

The IICA office in Guyana invited CATIE as a partner in preparing a report on the Evaluation of the Milk Value Chain, from production to consumption, focused on regions 2, 3, 4, 5, 6, and 10, to support the Ministry of Agriculture of Guyana in planning the development of the dairy sector. The study covered primary and secondary activities of the milk value chain and described the marketing of imported milk and dairy products, identifying the countries of origin and import trends over the years.

The study also tracked local production of raw milk and some value addition by producing «paneer» and fresh cheese. The analyzed data showed that the consumption of milk and dairy products has been increasing, making investment in the local dairy industry a profitable venture.

Similarly, the study revealed that the sector is dominated by men and that the population of dairy farmers tends to be older people. One key factor for the development of the value chain is the availability of land for grazing, as there are conflicts over its use in rice production and urbanization. As part of the study, a SWOT analysis of processing plants was included, and the characteristics of primary production were identified, related to feeding and genetics, milk handling, hygiene, and waste management. Regarding marketing, negotiations between actors and price variations between regions were identified, and most producers prefer retail sales. As expected, the price was a key element for the producer, and in all regions, the most frequent price of raw milk was G\$100 (US\$0.45).

The study recommended various actions to improve the milk value chain, including policy actions, legal strategies oriented towards private and public sector participants, strengthening the capacities of different chain actors, improving communications among them, and supporting activities with a strong emphasis on organizational structure, as well as the role and responsibilities of each actor. Finally, the study provided recommendations for priority actions to improve the models of the milk value chain.

1.3. Technical Evaluation of Coffee and Cocoa in Guyana

IICA and CATIE worked together on a rapid evaluation of coffee and cocoa cultivation in Guyana to formulate recommendations and present possible approaches to revitalize both crops, which are considered priority products for the country, to the Guyanese Ministry of Agriculture.

As part of this cooperation, it was agreed that IICA and CATIE would support Guyana with the introduction of proven genetics, the necessary infrastructure to materialize the benefits of improved techniques, the development of technical and farmer capacities through various agroforestry models, laboratory techniques transfer, propagation and conservation, and germplasm management.

After the evaluation, it was found that the visited regions showed significant efforts and initiatives that are being carried out by producing families to improve their production systems. It is highly necessary to design, consolidate, and implement an initiative aimed at strengthening the agri-food systems of these regions, mainly aimed at crops such as cocoa and coffee, which have significant opportunities to generate income for families.

The IICA and CATIE team recommended to the Ministry of Agriculture the introduction of new coffee varieties, as well as other Iberica coffee varieties in regions 1, 2, and 10, based on the environmental conditions of those regions. The establishment of the arabica varieties was mainly recommended for evaluation purposes since the mentioned regions do not meet the general altitude and soil conditions for a good agronomic response of this coffee species.

In addition, new high-yield cocoa varieties were recommended for genetic diversity and increased production. The identification of existing cocoa plants through molecular marker tests is imperative to determine what is currently available locally and what is being propagated and distributed to farmers.

Finally, genetic diversity, the cultivation of different species for specialized markets, the reduction of diseases and pest pressures, the possibilities of intercropping with other high-value crops, and the utilization of the country's numerous microclimates were identified as factors that support investment in the coffee and cocoa industries in Guyana.

1.4. Diagnosis of the Tissue Culture Laboratory of the Salvadoran Coffee Institute

In collaboration, IICA and CATIE conducted a technical cooperation mission requested by the Salvadoran Coffee Institute (ISC), with the objective of conducting a diagnosis of the current capacities and existing needs for the reactivation of operations and services of the ISC tissue culture laboratory, as well as a proposal for the implementation of new areas of interest for the institution. In the past, this laboratory provided services for the vegetative reproduction of coffee plants. It had specific projects: a) in vitro reproduction of the parents of the Nemaya variety (*Coffea canephora*) and b) in vitro reproduction of F1 hybrid varieties (*Coffea arabica*).

The diagnosis found that the laboratory has laminar flow cabinets, scales, autoclaves, magnetic stirrers, growth rooms, and sufficient glassware in general. With the exception of the autoclaves, whose operation must be verified, most of the equipment has already exceeded its useful life, so it was recommended to acquire new equipment. The spaces must be redesigned to offer greater safety to the personnel and an efficient workflow between the laboratory areas. There is a greenhouse that can be used for the acclimatization of the plants produced in the laboratory, which must be remodeled.

Finally, the diagnosis recommended that the in vitro culture laboratory be used only for research, due to the physical area of the ISC not allowing for future expansions to increase its capacity. Agreements would have to be established with other institutions, such as the National Agricultural

and Forestry Technology Center (CENTA) and/or the National School of Agriculture (ENA), which do have sufficient space to establish new areas, both for laboratories and greenhouses for commercial production of coffee plants.

1.5. Project Biodiversity and Sustainable Agro-silvopastoral Landscapes, known as BioPaSOS

After four years of implementation, the BioPaSOS project laid the foundation for the Mexican states of Chiapas, Jalisco, and Campeche to continue promoting sustainable livestock farming. This project, which ended in December 2022 and was funded by the International Climate Initiative (IKI), was implemented by CATIE with the support of IICA, in coordination with the National Commission for the Knowledge and Use of Biodiversity (CONABIO) and the Ministry of Agriculture and Rural Development (AGRICULTURE), together with multiple local partners in their intervention territories.

The project promoted climate-smart and biodiversity-friendly agro-silvopastoral approaches and sought the sustainable management and long-term conservation of biodiversity, through the promotion of agro-silvopastoral technologies and other livestock practices.

Among its main results, the project implemented an intervention model with participatory methodologies, such as ECA, which takes into account local problem analyses and the construction of participatory solutions to promote silvopastoral systems and good livestock practices, in order to reduce GHG emissions, the impact on biodiversity, the impacts of climate change, and support informed and timely decision-making, as well as the creation of partnerships with actors from the public, private, academic, and other partners.

Other important results are:

- Through 68 ECAs, in the three states, the capacities of 1232 livestock producers (78% and 22%, respectively) were strengthened and 20 municipalities were impacted.
- 35,000 hectares were transformed in the three pilot areas.
- In more than 140 demonstration plots and more than 80 livestock ranches, the carbon footprint was monitored, which was possible to reduce with sustainable practices, such as agro-silvopastoral systems.
- Technical-scientific information was successfully generated for knowledge management, more than 10,000 people, distributed in 63 countries, participated in the regional knowledge platform.
- Evidence was generated for the adjustment of the institutional and political framework for the state of Chiapas and Campeche.
- In Chiapas and Campeche, guidelines were developed for the development of sustainable livestock farming at the state level.
- A proposal was developed in Chiapas for the inclusion of the sustainable livestock approach and the promotion of agro-silvopastoral systems in 2022, in collaboration with the Livestock Development Committee of the Honorable State Congress of Chiapas.
- A joint declaration was signed by the Secretaries of Agriculture for the promotion of sustainable livestock farming among the states of Chiapas, Jalisco, and Campeche.

For BioPaSOS government counterparts, such as Carlos Alberto Jiménez Garza, Director of the Area of Productive Chains and Sustainability of the Ministry of Agriculture and Rural Development (SADER) of Jalisco, the project was a meeting point and balance, with productive activities that allowed them to reverse and mitigate long-term environmental consequences.

Today, Jalisco has a solid and coordinated public policy with sister institutions such as SEMADET, intermunicipal boards, federal agencies, with whom we have also been performing and carrying out some tasks from the state and for the state. In that same sense, I thank the BioPaSOS project and its technicians who have been accompanying us in the territory of Jalisco, Jiménez stated during the BioPaSOS closing event.

In Chiapas, the Ministry of Agriculture, Livestock and Fisheries (SAGyP) and the Ministry of Environment and Natural History (SEMAHN), together with BioPaSOS, built and published guidelines to promote sustainable livestock farming.

Public-private partnerships were another pillar. For example, in Campeche, the creation of the Sustainable Livestock Agroecosystems Working Group of the State of Campeche (AGS-CAM) and a Network of Young and Women Biodiversity Monitors in Agricultural Landscapes of the State of Campeche (Bio-Cam), was promoted, together with the iNaturalist platform.

Within the notable work of CATIE and IICA in the BioPaSOS project, the knowledge management component achieved encouraging results, including:

- 10,248 people from 63 countries trained through a virtual course on agro-silvopastoral systems.
- Development of 13 virtual forums in which 1,560 people from 23 countries were trained in sustainable livestock and biodiversity conservation topics.
- Development of tools such as the virtual BioPaSOS app, the GeoWeb BioPaSOS geographic information viewer, the Toolbox for Promoting Sustainable Livestock Development publication, and the Regional Platform for Sustainable Livestock, all available on the website www.biopasos.com.
- Repository of information on relevant livestock topics in the region.

2 New Cooperation Proposals IICA-CATIE

2.1. Proposal for the Condor Kutuku Corridor Landscape in the Amazon of Peru and Ecuador

This proposal was formulated in response to a call from the Biodiverse Landscapes Fund (BLF), a program of the British Department for Environment, Food & Rural Affairs (DEFRA), with the participation of IICA as the leader of the proposal and CATIE, Disclosure Insight Action (CDP), the Peruvian Association for the Conservation of Nature, and the National Cooperative Business Association Clusa International (NCBA CLUSA) as partners.

The project aims to reduce poverty and create economically sustainable opportunities in the communities living in the Condor Kutuku Corridor landscape, through the protection, sustainable management, and restoration of the landscape, which will safeguard biodiversity and maintain and manage ecosystem quality. The project will work with women and marginalized groups, who do not have equal recognition in agricultural management, use, and production.

Additionally, the lack of value towards the natural capital of local communities by the market has limited their development. The challenge is to overcome these limitations through the development of profitable production models that can be scalable and environmentally friendly.



3 IICA-CATIE Investment Fund

In order to strengthen CATIE's finances, the directors general of both institutions agreed to create an investment fund to promote green business innovations aligned with the mission of IICA and CATIE.

3.1. Propagation module for hybrids and improved coffee varieties

In accordance with the investment proposals presented to expand the capacity for propagating hybrids and improved coffee varieties, progress on the execution of these investments and recovery as of December 31, 2022 is detailed. Additionally, a projection of prospective sales for 2023 is included.

The coffee plant propagation module was inaugurated by the directors general of IICA and CATIE in October 2022. It is projected to produce 1,000,000 plants at its maximum production level by May 2024.



Status. The coffee nursery and clonal garden scaling project is in the operation and investment recovery phase of the IICA-CATIE Fund and some additional investments with CATIE resources.

Currently, a marketing plan is being developed with the Communication and Marketing Office aimed at boosting demand for coffee plants in new market niches. In addition, the growth in installed capacity for plant production has also considered the strengthening of seed sources (Breeding factory), where CATIE can already offer seeds and plants of 10 coffee varieties considered of high cup quality, as well as offer the possibility of producing coffee plants grafted onto Nemaya, since a seed lot of this material has been established, which is required by producers with special soil conditions.



Formalized sales. In the period 2021-2022, 111,300 plants were sold, generating an income of USD\$89,040. Sales registered for 2023 to date (April) represent an income of USD\$81,295. An additional income of USD\$95,000 is projected for the end of 2023, which represents a production of 220,000 plants and would recover the investment corresponding to the main sources: the IICA-CATIE Investment Fund and CATIE resources.

Table 1. Summary of results of the coffee plant production module.

Detail	2021-2022	April 2023	Total
Income	89 400,00	94 290,00	130 617,66
Expenses	36 327,66	12 995,00	49 322,66
Operational Profit	53 072,34	81 295,00	81 295,00
Investments			144 174,00
IICA CATIE Fund	90 000,00		
CATIE	54 174,00		

3.2. Investment project in energy efficiency

The energy efficiency investment project was designed with the objective of generating a return on investment in electricity cost savings and not necessarily in generating profits. For this reason, the company EcoSolutions was hired to design the draft and its implementation.

The project has three stages:

- **Reduce CATIE's electricity bill through electricity consumption efficiency.** This will be achieved by changing the AC equipment using cutting-edge technology, improving and monitoring consumption to improve efficiency.
- **Design and implementation of a photovoltaic self-consumption system.** This generation will be delivered to the Costa Rican Electricity Institute (ICE) for its respective debit to the total CATIE bill. There will also be a migration of luminaires to LED technology.
- **Design of a photovoltaic system for co-generation with ICE.** This stage will be used to generate profits by selling what is generated to third parties.

In turn, the first stage has been subdivided into stages and will first focus on the Henry A. Wallace Building and the Gilberto Pérez Building. To date, the investment is USD\$95,370.00, an annual saving of USD\$18,088 is projected, and the investment recovery would be achieved in 6.2 years.

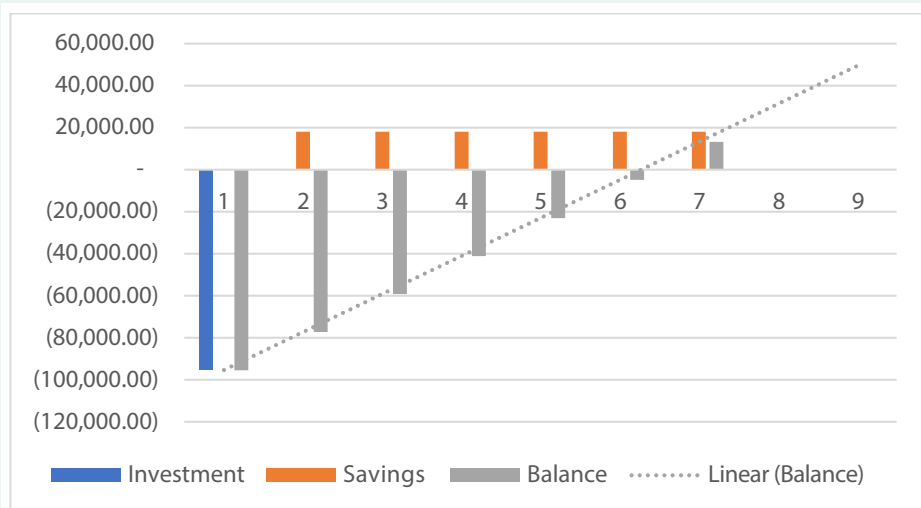


Figure 1. Energy Efficiency Project, First Stage - Wallace and Pérez Buildings
Projection of Investment Recovery

The implementation of the remaining investments of the first stage and subsequent ones will depend on the income of resources to the IICA-CATIE Investment Fund.

3.3. Productive improvement of the milk and meat herd

Investments were directed towards the efficient development of dairy and fattening cattle activities, which allows CATIE to improve the livestock production system carried out on the Commercial Farm, primarily focused on improving infrastructure, pasture renewal, safety, and livestock purchases.

With the investments made, the capacity for animal breeding has been increased with greater animal welfare, the corrals have been improved for ease of operations, a sidewalk was built to reduce the frequency of injuries to the animals, and the biodigester was reactivated. Also, 15 hectares of pastures were renewed, which adds to the possibilities of increasing productivity in the commercial dairy and fattening cattle project.

As of December 31, 2022, USD\$118,994 was executed with respect to the approved investment plan. In addition, USD\$22,778 was invested, which is not reflected in the following table, because it corresponds to the investment in two houses for cowboys and a monitoring system with surveillance cameras.

Table 2. Execution of the investment fund in dairy and fattening livestock

Detail	Investment (USD \$)	Execution 2021 (USD \$)	Execution 2022 (USD \$)	Total Execution (USD \$)	Balance (USD \$)
Milk substitute purchase	35 990	31 858	-	31 858	4132
Pasture renovation	30 000	1365	20 529	21 894	8 106
Purchase of manure tank	16 450	15 917	-	15 917	533
Milking units (2)	11 500	-	1182	1 182	10 318
(Side walk construction (1km)	11 500	8 797	2298	11 094	406
Infrastructural improvement to calves corral	10 000	4758	-	4758	5 242
Improvements to general livestock corral	10 000	6525	15 405	21930	-11 930
Scale	5 000	-	-	-	5 000
Biodigester improvements	10 000	4357	5904	10 261	-261
Totals	140 440	73 576	45 319	118 894	21546

Regarding the return on investment, for the case of milk production obtained from purchased animals, the savings in fertilizer and electricity use are quantified in Table 2. It is more comprehensive to show the results of other investments, such as pasture renewal and infrastructure. Additionally, the project as such requires other complementary investments.

It should also be noted that the use of material produced in the dairy for sugarcane cultivation as fertilizer is not considered.

4 CATIE collaborated with IICA at COP27 - Americas Agriculture Pavilion

The Director General of CATIE participated as a panelist in the parallel event titled: The unique role of nutrient-rich animal proteins for sustainable food security. In this space, CATIE presented its work on sustainable intensification of livestock systems and the impacts on productivity and emissions reduction throughout the value chain. In turn, it provided examples of how its work is being used to develop livestock NAMAs in Mesoamerica.

Also, the General Directors of IICA and CATIE participated in a parallel event titled: Putting food on the table during a climate crisis, in which CATIE reported how its research and innovations are responding to local needs and its experience in building alliances with stakeholders for transformative changes. For its part, IICA presented its approaches to translating science into action and identifying critical areas for innovative policies.



5 Americas Forest IICA-CATIE

During 2022, IICA and CATIE made progress in the technical and landscape implementation of the Americas Forest IICA-CATIE, which is an initiative that contributes to preserving biodiversity by restoring ecosystems and natural habitats in the area, provides access to biodiverse tree spaces, and raises greater awareness of the importance of trees and ecosystem services for sustainability and combating climate change. The Americas Forest is in Vásquez de Coronado and Turrialba, Costa Rica, and has four components:

- **Space afforestation:** with the support of CATIE's Forest Seed Bank, a georeferenced species inventory was prepared at IICA's facilities in Vásquez de Coronado, including national trees from Latin America and the Caribbean and species native to the tropics, which were identified and located according to forest criteria by CATIE professionals and according to the landscape design prepared with the professional support of the IICA Community Projection Association.
- The afforestation plan was developed, and native species were selected and identified for planting points. As part of the celebration of Tree Day, the Green Urban Recovery Fund (FRUV) project was launched with the support of the German Government, GIZ, the National System of Conservation Areas (SINAC), and Fundecooperación, which facilitated a space for community participation in urban green recovery. In addition, the Adopt a Tree campaign was carried out, with the support of CATIE's Forest Seed Bank, which donated over 100 trees.
- The landscaping proposal was led by the IICA Community Projection Association. The landscaping was based on a master plan that guided the proposal for signage (main label, totems by region, species plaques), the installation of the trail with more sustainable materials (plastic wood), and the integration of the educational module.



- **Increase in agrobiodiversity:** representative crops from countries in Latin America and the Caribbean, such as coffee, cocoa, banana, cotton, avocado, and citrus, among others, are integrated. Additionally, a medicinal plant garden was established.
- **Pollinator gardens:** plants that favor the presence and growth of insects are used to improve the distribution, abundance, and effectiveness of pollinators.
- **Environmental education and community outreach:** The forest has an educational module to explain the importance of trees and the ecosystem services they provide. Additionally, educational tours are organized for children, youth, adults, and seniors. The guided tours have allowed for knowledge management and capacity building on topics such as green recovery, tree planting, promotion and recognition of pollinators, medicinal species, and good agricultural practices, according to the management and knowledge plan of the Forest of the Americas.
- Between May and August 2022, 403 people participated, including 142 children and youth, 157 adults, and 104 seniors from at least 13 different institutions, to provide information on the ecosystem services offered by tree species, the importance of good agricultural practices to tackle climate change, the conservation of biodiversity and natural resources, and the role of pollinators.





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