



Solutions for environment and development
Soluciones para el ambiente y desarrollo

Annual Report 2019





Maintaining CATIE's foundational spirit in times of change

In 1973, CATIE (Tropical Agricultural Research and Higher Education Center) was established as an autonomous entity dedicated to research, higher education and outreach activities. Since then, CATIE has maintained its unique focus on integrating higher education and holistic research that has led to new approaches, including agroforestry and silvopastoral systems for sustainable agriculture and livestock, model forests, forest concessions, the blue economy and ecosystem services. In the coming years, priority will be given to CATIE's recognition as an international academic center, with the pre- eminence of an international university. This will allow us to ensure that its founding spirit, with which it operates to date, is maintained.

2019 was a year of challenges, opportunities and achievements in all our areas of work. In this report, we present a summary of the main actions developed by the Center to support the countries of the region in finding the solutions they need to achieve sustainable and inclusive development.

The complete 2019 annual report can be found at <https://informe2019.catie.ac.cr/?lang=en>

Muhammad Ibrahim
Director General del CATIE

The background consists of several overlapping, semi-transparent shapes in various shades of blue and teal. The shapes are layered, creating a sense of depth and movement. The colors range from a deep, dark blue to a lighter, almost white-blue, with various shades of teal and green in between. The overall effect is a modern, abstract design.

Summary 2019

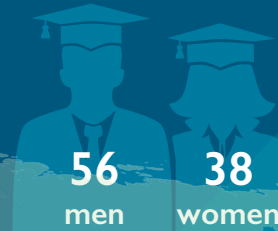
Postgraduate Training of the highest level

Graduate school

New enrollments

94

new students in the 2019
Master's Program



18 countries

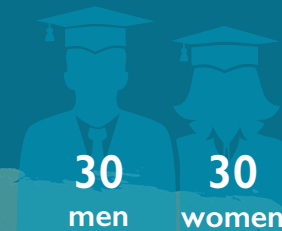
- Belize
- Bolivia
- Brazil
- Colombia
- Costa Rica
- Ecuador
- El Salvador
- United States
- Guatemala
- Haiti
- Honduras
- Mexico
- Nicaragua
- Panama
- Paraguay
- Peru
- Dominican Republic
- Taiwan

1 Mexican student
in the *Doctoral Program*

Graduates

60

graduates from the
Master's Program



20 countries

- Belize
- Brazil
- Chile
- Colombia
- Costa Rica
- Ecuador
- El Salvador
- Spain
- United States
- France
- Guatemala
- Haiti
- Honduras
- Mexico
- Nicaragua
- Panama
- Paraguay
- Peru
- Dominican Republic
- Uganda

1 Costa Rican graduate
from the *Doctoral Program*

Strengthening capacities

CATIE's mandate focuses on supporting countries in the region to develop sustainable and inclusive management of agriculture and natural resources. In 2019, the institution, with the support of various partners and donors has worked on multiple projects and capacity building processes on key issues, which meet the demands of the region. Among the actions developed in the countries, the transfer of technology and knowledge and the impact on policies at different scales stand out, contributing to poverty reduction and the economic, social and environmental development of the region.

Country	Belice	Bolivia	Chile	Colombia	Costa Rica	Ecuador	Guatemala	Honduras	Jamaica	Mexico	Nicaragua	Panama	Peru
Thematic areas													
Climate change (adaptation, mitigation, financing)													
Protected Areas, biodiversity													
Climate-smart Agriculture													
Sustainable silvo-pastoral, and low-emission livestock production													
Natural resource management and administration													
Watershed management													
Geographic information systems													
Coffee and cocoa agroforestry systems													
Value chains													
Alternative conflict resolution													
Forests, restoration													
Sustainable Development Goals													
Biostatistics													
Environmental economics and environmental services													

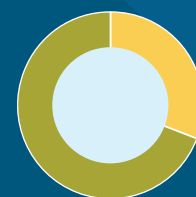
Belice	Bolivia	Chile	Colombia	Costa Rica*
66	46	21	20	1087

Ecuador	Guatemala	Honduras	Jamaica
49	21	69	11

Mexico	Nicaragua	Panama	Peru
4477	88	1598	530

8083

persons trained by CATIE



69% men

31% women

Number of professionals trained per country

* Note: In the case of Costa Rica, the figure reflects the professionals who come to train at CATIE's headquarters in Turrialba, Costa Rica. They represent 26 countries in total.

CATIE aporta a los Objetivos de Desarrollo Sostenible

Con miras a aumentar el impacto de nuestro trabajo en bienestar y sostenibilidad, en 2019 nuestras acciones de investigación y desarrollo respondieron a 15 Objetivos de Desarrollo Sostenible (ODS), con el fin de contribuir al desarrollo de una economía agrícola verde, resiliente e inclusiva y a la conservación de los recursos naturales que requiere la región de América Latina y el Caribe en el Siglo XXI.



137 publications in 2019

- | | |
|---------------------------------------|-----------------------------------|
| 8 libros y monografías | 4 Presentations at congresses |
| 3 Books, book chapters and monographs | 2 Technical series |
| 18 Papers at conferences | 53 Theses |
| 31 Papers in scientific journals | 11 Reports and other publications |
| 7 Papers in technical magazines | |

Research for a sustainable and inclusive development

Strengthening the region's coffee sector

Relevant information:

28 000 plants of new coffee varieties developed in greenhouses and distributed in the region.

84 382 plants were produced by an innovative method of rooting cuttings in the Forest Seed Bank (BSF) and **31 569** by the in vitro process called somatic embryogenesis which was developed in the Biotechnology Laboratory of CATIE.

115 951 plants of hybrids and promising coffee varieties with exceptional characteristics of productivity, quality, resistance to pests and diseases, etc. distributed in the region.

326 coffee seed samples distributed in five countries: Guatemala, Mexico, Nicaragua, Costa Rica and Honduras

200 experimental plots and participatory validation of innovative practices for the integrated management and control of pests and diseases in coffee were established in four Central American countries through joint work with IICA's PROCAGICA-IICA-CATIE-CIRAD project.



Support in policy formulation: In the framework of the Socioeconomic and Environmental Sustainability of Agroforestry Coffee in Central America (SEACAF) project, economic, social and environmental trade-offs of agroforestry systems and coffee monocultures were identified and evaluated to know about the economic and social contribution of coffee agroforestry to agricultural livelihoods. The results will provide evidence to support the formulation of agricultural and environmental policies in the region

New initiatives and financial support: Several institutions such as the Costa Rican Coffee Institute (ICAPE), San Francisco Bay Coffee and the Central American Program for the Integrated Management of Coffee Rust (PROCAGICA–IICA-CATIE-CIRAD) provided support to ensure the maintenance of the International Coffee Collection.

Seed garden of selected coffee varieties: There is a growing interest among coffee companies in certain varieties that are present in CATIE's International Coffee Collection. These varieties have stood out in international competitions due to characteristics that make them attractive for new exclusive coffee markets: ET-47, Geisha, Java, Laurina, Mibirizi, Mokka, Rume Sudan, SL-28, SL-34 and Wush wush. In 2019, a 2-hectare seed garden was created on CATIE's land using materials from all of these varieties with the aim of increasing seed production in the short term in order to meet the growing demand for these promising materials.

CATIE Specialty Coffee

In the exploration of new businesses, the distribution of a CATIE specialty coffee was initiated, taking as a base the main coffee hybrid. This entrepreneurial initiative markets specialty coffees from materials produced by the Coffee Breeding Program and some outstanding varieties from CATIE's International Coffee Collection. In the introduction stage, work was carried out with two of the FI coffee hybrids (Central American and Esperanza) and in 2020 the supply will be increased with four varieties: SL 28, Geisha, ET-47 and Milenio. The process of registering the brand and sanitary permit for the products is already underway.



More and better varieties of coffee and cocoa available in the region

Relevant information:

8 Latin American countries renewed their cocoa farms (with funding from the Korean Cooperation for Food and Agriculture in Latin America - KoLFACI).

4 ha for applied agronomic-agroforestry research with cocoa were established at CATIE's La Montaña farm with medium-long term trials generating concrete technological packages (fertilization, integrated pest management, diversification) to offer to the region's cocoa farmers.



New initiatives and financial support: The Maximizing Coffee and Cocoa Opportunities in the Americas project, known as MOCCA, provided support for the general maintenance of the International Cocoa Collection plantations for the next three years. CATIE is also part of the Cacaonet Task Force initiative where support for cocoa collections worldwide is being managed and where, thanks to this, the World Cocoa Foundation (WCF) will provide support to CATIE's collection and that of Trinidad.

Embryo development: In search of better cocoa clone alternatives for distribution, the Biotechnology Laboratory carried out several investigations for the development of embryos. As a result, two embryos in particular (Jiffy pellets and Ellepots) showed special characteristics (small, light and biodegradable) that offer great possibilities for the production of cocoa clones in a faster, more efficient and environmentally friendly way.

New proposals: In the cocoa research field, efforts were focused on generating proposals for innovations and their further application in development projects. The team worked on topics related to the use of technologies such as drones and shadow-simulation software to make agroforestry diagnoses of cacao crops. The results support decision-making processes to improve the design and management of cocoa plantations as well as combining the Schools of Field (ECA) with virtual teaching (digital animation, monitoring of activities and goals with cell phones). These technologies are already being developed in a cocoa project in Honduras (led by Heifer) and in the short term, they will be used in other agroforestry projects.

Towards sustainable, low-carbon livestock production in the region

Relevant information:

1200 producers in Mexico (Jalisco, Campeche and Chiapas) were trained to establish silvopastoral systems and implement good livestock practices through the BioPaSOS project, which is being developed in conjunction with IICA and the Ministries of Agriculture and Environment.

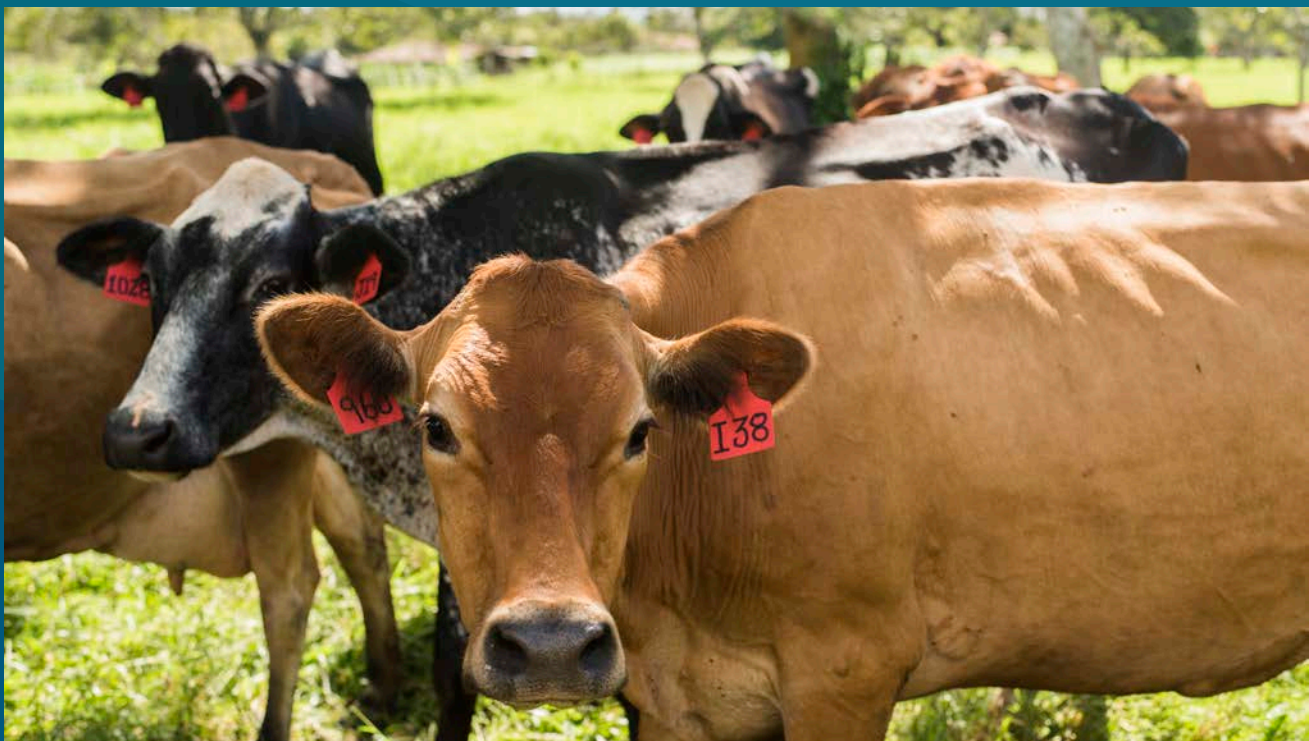
6 Latin American countries have received CATIE's support in the design of public policies.

10 farms in the districts of Cayo and Orange Walk in Belize were characterized for the identification of silvopastoral options for improving resilience to climate change within the Livestock Belize project, which is financed by the Multilateral Investment Fund administered by the Inter-American Development Bank (IDB-MIF).

Support to countries for sustainable livestock: CATIE has supported the livestock sector and the governments of Honduras, Costa Rica, Guatemala, Nicaragua, Cuba and Panama in the design of public policies, through technical inputs and participation in governance spaces in order to achieve sustainable livestock.



- In **Costa Rica**, CATIE provided support for the implementation of the Nationally Appropriate Mitigation Action (NAMA); in the framework of the project Sustainable Futures for the Costa Rican Dairy Sector: Optimization of Environmental and Economic Results (SUSCORIDA). A study was conducted to determine future sustainable scenarios for food production in the tropics, using the Costa Rican dairy sector as a pilot scenario. The study focused on pasture quality, methane and nitrous oxide emissions in tropical systems and the measurement of ammonia emissions and nitrate and phosphate infiltration. The results of the project showed that cow feces deposited on the pasture when leaving the paddocks, generate an ammonia emission of about 10 g/ha/h, which decreases as the hours go by and emissions of 2 g/ha/h at the time of fertilization.
- In **Panama, Guatemala and Cuba**, contributions were directed at designing a national sustainable livestock strategy.
- The greatest achievements were in **Honduras**:
 - With support from the NAMA Facility and in coordination with the Ministry of Agriculture and Livestock and the Ministry of Environment, the banking and private (industry) sectors, academia and trade organizations, will design a national program to transform the livestock sector towards a low-carbon economy.
 - The management of mechanisms to access public finances through a green credit in Honduras was made possible during 2019 through a proposal for a differentiated financial mechanism directed towards the livestock sector.
 - At the same time, other actions were carried out in this country for the generation of an emissions baseline for the development of the livestock NAMA, through the development and monitoring of biodiversity and carbon methodologies, as well as sustainability indicators based on the principles and standards of the Sustainable Agriculture Network (SAN) for livestock.
 - In addition, a strategy was designed with the private sector and associated unions to improve meat and milk value chains. All these actions were carried out through the Productive Landscapes project, which is funded by the Global Environment Facility (GEF) through the United Nations Development Program (UNDP) and in coordination with the Honduran Ministry of the Environment.



Other relevant actions

Mangroves and blue carbon: CATIE's Chair of Ecosystem Management (GECO) conceptualized and designed the interdisciplinary and multisectoral Mangroves for Development project, which will begin in 2020, promoting transformational actions in coastal-marine landscapes of the northwest of the Dominican Republic and promoting the inclusion of blue carbon and mangroves in the National Determined Contributions (NDC). In addition, it contributed to the conceptualization of the regional strategy for the conservation of the mangroves of the Mesoamerican reef, responding to the needs of the Central American Integration System (SICA).

Use of modern technology in projects: the use of drone technology in 2019 allowed better data to be obtained for the management of shade in cocoa plantations and the productive characterization of secondary forests. The Ecosystem Modeling Unit uses the most powerful platform currently available to collect and process geospatial data in real time, contributing to relevant projects such as the Adaptation of Agriculture to Climate Change through Water Harvesting in Nicaragua (2019-2022), which promotes the construction of various water harvesting options, the dissemination and management of efficient irrigation technologies and crop diversification, technologies that together will enable beneficiary producers to establish production systems that are resilient to climate change and generate family income.



The Tropical Agricultural Research and Higher Education Center (CATIE) is a regional center dedicated to research and graduate education in agriculture, and the management, conservation and sustainable use of natural resources. Its members include Belize, Bolivia, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Venezuela and the Inter-American Institute for Cooperation on Agriculture (IICA).



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