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CATIE
Solutions for Inclusive Green Development
Soluciones para el Desarrollo Verde Inclusivo

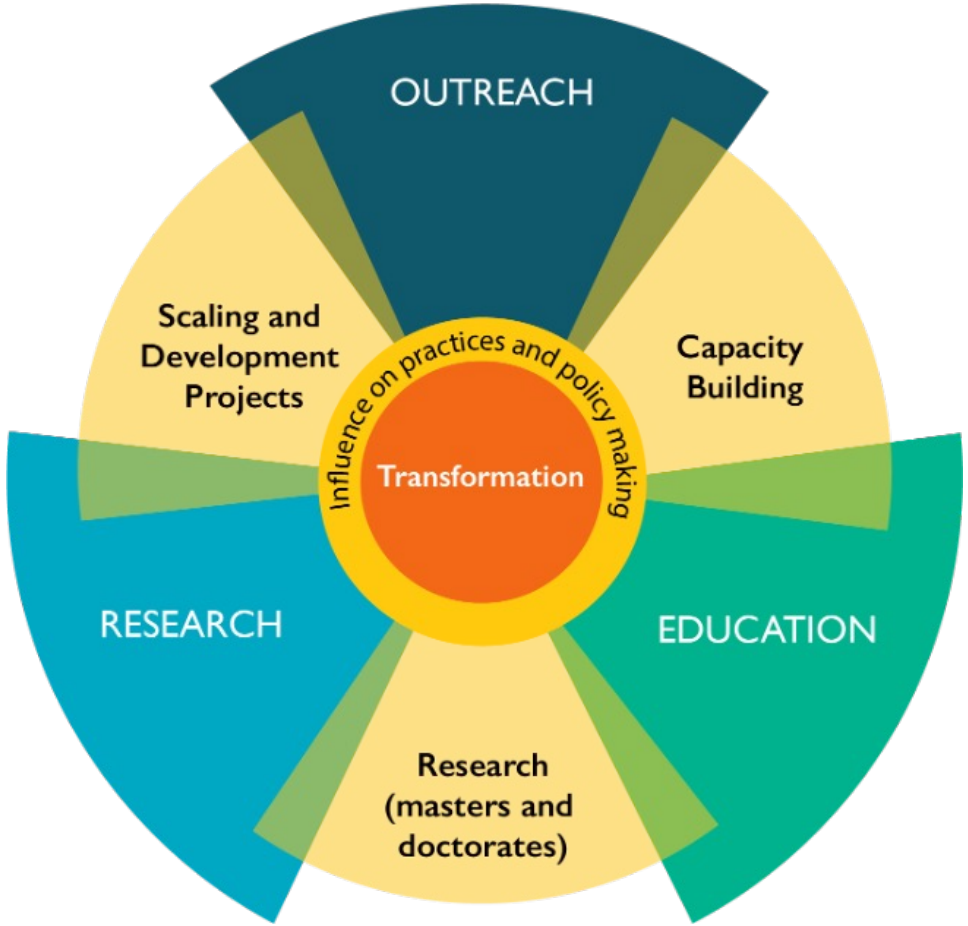
CATIE: A PARTNER IN RESEARCH, EDUCATION AND INCLUSIVE GREEN DEVELOPMENT

Leida Mercado and
Mariela Leandro
September 13th, 2023

Who is CATIE?

CATIE is a regional center, with strong international ties, that seeks to increase sustainable and inclusive human well-being in Latin America and the Caribbean through

1. Graduate education
2. Impact-oriented research
3. Technical cooperation and dissemination of knowledge



REGIONAL MANDATE

- 13 member countries
- National offices

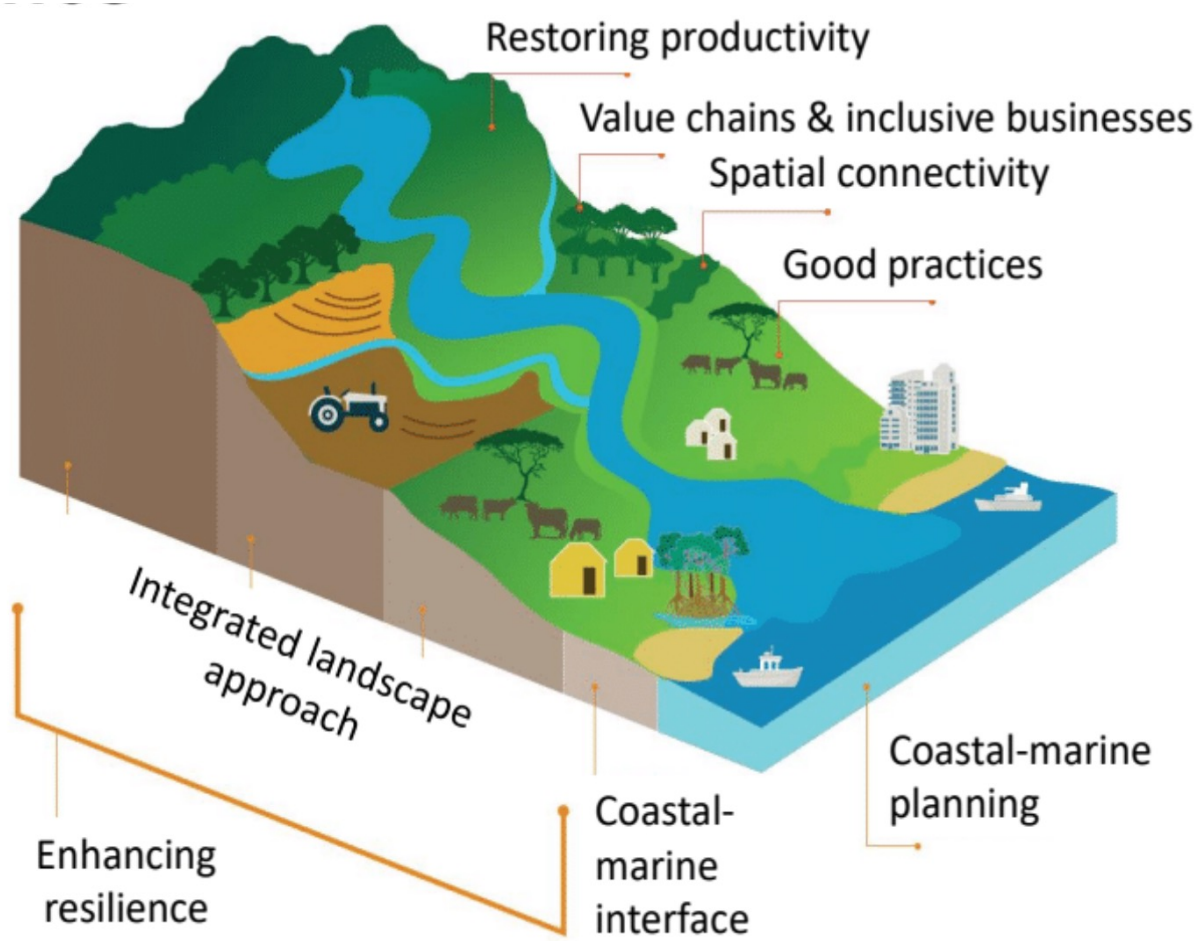
CATIE'S GOVERNANCE

Three governance bodies

1. Inter-American Board of Agriculture
2. Superior Council of Ministers (Agriculture Ministers of member countries)
3. Board of Directors.

SYSTEMS APPROACH TO TACKLE COMPLEX PROBLEMS

- **Integrates**
  - Biophysical
  - Social
  - Economic
  - Cultural
  - Local and global issues
  - Sustainable- Climate Smart agriculture
  - Climate action
  - Initiatives on a Landscape/Territorial Scale
  - Governance



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Education

GRADUATE PROGRAMS

The main GOAL is to train leaders with strong social responsibility, awareness and the tools and abilities to solve problems in a complex world.

We use a connected research education approach, meaning that our students learn through participation and research. Most of them are linked to research initiatives at the beginning of their studies, where they have the opportunity to apply what they learn in the classroom.

GRADUATE PROGRAMS

Academic Master Programs:

1. Agroforestry & Sustainable Agriculture
2. Tropical Forests & Biodiversity
3. Watershed management & Water Resources
4. Economics, Development & Climate Change

Professional Master Programs:

1. Watershed Management (Virtual)
2. Agribusiness & Sustainable Markets Management (Virtual)
3. Agroecological Intensification & Nutritional Food Security (Virtual)
4. Sustainable Tourism (Joint Program with UNT)

STRONG GENDER AND EQUITY APPROACH TO EDUCATION

MASTER´S PROGRAMME

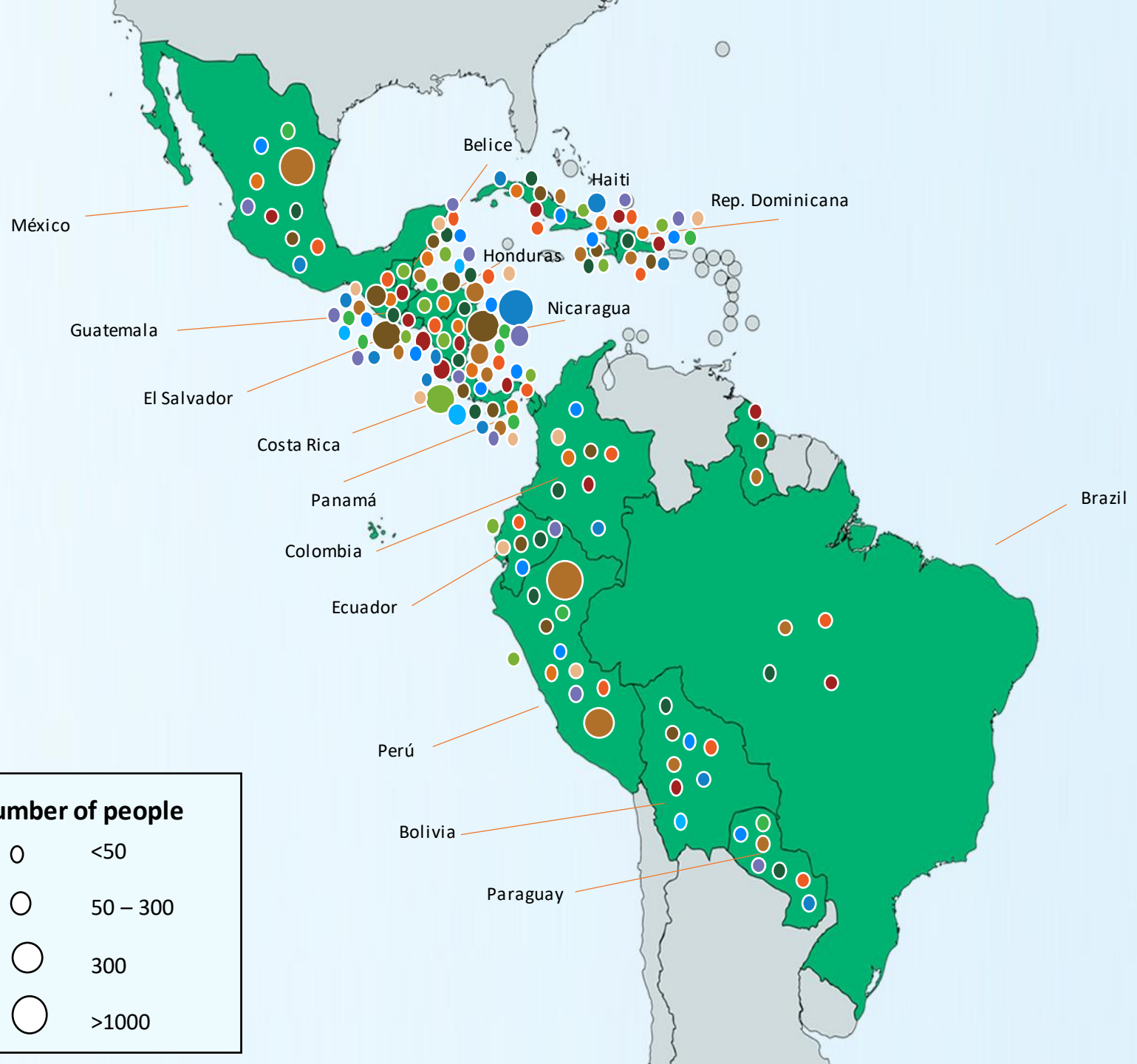
Gender	1947-1995		1996-2020	
	Students	%	Students	%
Men	1130	90%	765	53%
Women	133	10%	667	47%
Total	**1263**	**100%**	**1432**	**100%**

Training 2022

Total: 14386

8488 5898

- Genetic improvement and Cacao AF systems
- Genetic improvement and Coffee AF systems
- Multi-strata agroforestry and food security system
- Circular agroforest small ruminat systems
- Silvopastoral based low carbon livestock systems
- Sustainable forest management
- Forest and mangrove restoration
- Environmental economics
- Climate finance
- Gender sensitive Incubators and agibusiness
- Sustainable water harvest systems
- Tools for water management
- Forest seed systems



Study Abroad Program 2023

University	Total women	Total men	Total participants	Income in USD
Nebraska State University	5	19	24	**$3.898**
Georgia University	6	1	7	**$1.007**
Colorado State University	6	12	18	**$5.414**
Nicholls University	12	7	19	**$480**
Austin High School-Global Studies	46	108	154	**$8.654**
Agnes Scott College	22	0	22	**$2.706**
Ohio State University	13	1	14	**$1.954**
Prairie View A&M University, Texas	12	0	12	**$2.185**
Duke University	13	0	13	**$1.735**
Verto Education Spring 23	20	3	23	**$89.355**
Abeline Christian University	6	4	10	**$1.962**
Amigos de las Americas	40	20	60	**$10.569**
Offbeat Travel	5	4	9	**$24.900**
Verto Education Fall 23	170	30	200	**$777.000**
Verto Education Spring 24	40	10	50	**$194.250**
Total	**416**	**219**	**635**	**$1.126.068**

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Generation of knowledge from research and development initiatives

SCIENTIFIC PLATFORM

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Examples of CATIE Collaborators from EEUU (Universities and Institutions)

Universities / other institutions in US	
University of Wisconsin	CALS Global COLLEGE OF AGRICULTURAL & LIFE SCIENCES UNIVERSITY OF WISCONSIN-MADISON
University of Vermont	The UNIVERSITY of VERMONT
Texas Tech University	TEXAS TECH UNIVERSITY Office of the Provost International Affairs
University of Idaho	University of Idaho
World Resource Institute	WORLD RESOURCES INSTITUTE

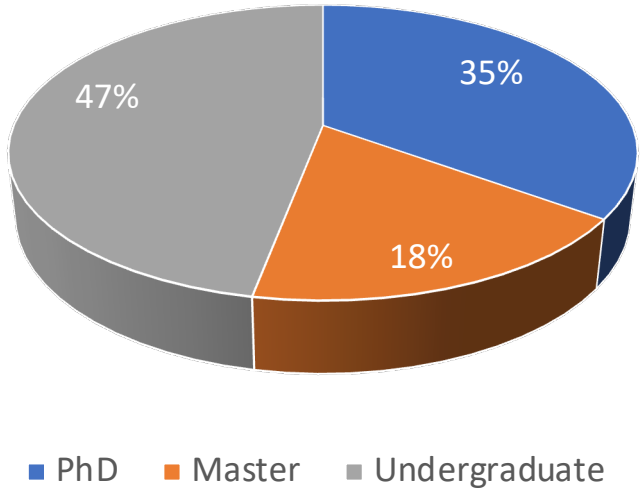
RESEARCH FOR INCLUSIVE GREEN DEVELOPMENT DIVISION DIDVI

Our objective:

To convert discoveries into significant and measurable impacts that contribute to the advancement of sustainable development goals in the Latin American and Caribbean region.

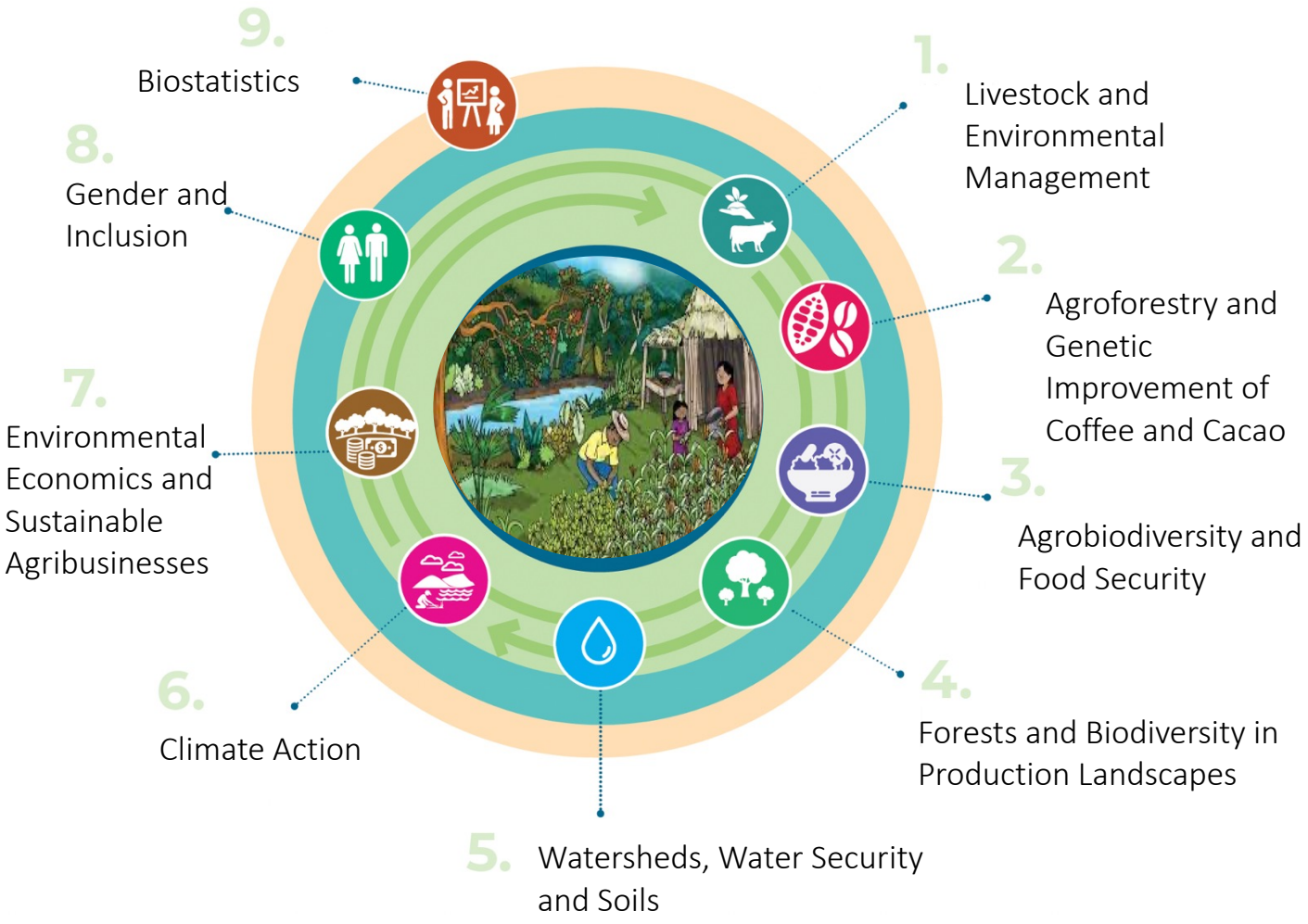
Our approach

Transdisciplinary and participatory approach to research, allows for direct interaction with external actors to collaboratively create and apply knowledge for the development of innovative solutions that respond to the needs and priorities of society.



DIDVI

HOW DO WE WORK?



Who are we?

Leida Mercado, PhD
Director, Research for Green and
Inclusive Development Division
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Dr. Leida Mercado is a Venezuelan Agronomist engineer with a s M.P.S. and PhD at Cornell University. Dr. Mercado is . Previously she was leader of the Mesoamerican Agroenvironmental Program (MAP) also at CATIE, her work with MAP was focused on increasing the resilience to climate change at several scales in two Central American territories using the Climate-Smart Territories approach. She received

Research Gate: https://www.researchgate.net/profile/Leida-Mercado
Google Scholar: https://scholar.google.es/citations?user=yMAXsicAAAAJ&hl=en

Rolando Cerda, PhD
Coordinator, Agroforestry and Breeding
of Coffee and Cacao Unit
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Agronomist engineer (UMSA, Bolivia), with a master in Ecological Agriculture and Agroforestry (CATIE, Costa Rica), and Ph.D. in Ecological and Agronomic Sciences (SupAgro, France). Dr. Cerda is specialist in agroforestry systems with perennial crops (coffee, cocoa, homegardens and others). He has worked in several projects of research and development at regional levels. He coordinated the development of farmer field schools, aiming to reach more than 10.000 rural families in Central America. He developed research on the assessment of multiple ecosystem services (provisioning, regulation of pests and diseases, soil quality, carbon sequestration) for the design/management of sustainable agroforestry systems.

Research Gate: https://www.researchgate.net/profile/Rolando-Cerda-2
Google Scholar:

Gretel Guerra, MSc
Coordinator, Gender and Inclusion Unit
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Coordinator of the Inclusion and Gender Unit. Previously she was Gender Focal Point and National Consultant on Gender and Economic Empowerment of Rural Women for the FAO Representation in Guatemala, her work in FAO Guatemala focused mainly on promoting and implementing the FAO Gender Equality Policy 2020-2030 and its Regional Gender Strategy for Latin America and the Caribbean 2019-2023, in field programs and institutional actions included in the FAO MPP in Guatemala 2021-2022. Advise and assist teams to support mainly the economic empowerment of rural women in order to achieve equality between men and women in sustainable agricultural production and rural development, to eradicate hunger and poverty. She teaches at the Rafael Landívar University in Guatemala on Interculturality, Decentralization and social management. She obtained her Bachelor's degree in Social Work at the San Carlos University in Guatemala and her Master's degree in Gender and Development at the Complutense University of Madrid

Research Gate:
Google Scholar:

Research for Inclusive Green Development Division - DIDVI

Who are we?

Pablo Imbach, PhD
Coordinator, Climate Action Unit
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Graduate of Agronomy at the University of Costa Rica, with a Masters in Integrated Watershed Management CATIE. His doctoral thesis is on the impacts of climate change on the hydrological functions of ecosystems in Mesoamerica. He has experience in issues related to CDM forestry projects and in recent years in large-scale modeling of ecosystem services in climate and land use change scenarios.

Research Gate: https://www.researchgate.net/profile/Imbach-Pablo
Google Scholar: https://scholar.google.com.ar/citations?hl=es&user=CJGx0aUAAAAJ

Alejandra Martínez, PhD
Coordinator, Forests and Biodiversity in Productive Landscapes Unit
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A tropical applied ecologist broadly interested in biodiversity conservation in human-modified landscapes. Most of her work focuses on understanding the conservation value of agricultural land uses using bird communities as proxies of biodiversity. She is particularly interested in experimental methods that allow measurement and quantification of ecosystem services and in understanding the trade-offs between biodiversity conservation, ecosystem service provisioning and food production.

Research Gate: https://www.researchgate.net/profile/Alejandra-Martinez-Salinas
Google Scholar: https://scholar.google.com.ar/citations?hl=es&user=dqAKWMcAAAAJ

Róger Madrigal, PhD
Coordinator, Environmental Economics and Sustainable Agribusinesses Unit
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He is an environmental economist and received his Ph.D. from the University of Freiburg, in Germany. Hi is Director and Senior Research Fellow at EfD-CA. Dr. Madrigal specializes on governance and community-based approaches mostly for water resources management and coastal resources, design and implementation of financial mechanisms for the provision of terrestrial and marine ecosystem services, economics of climate change and water economics.

Research Gate: https://www.researchgate.net/profile/Roger-Madrigal-Ballestero
Google Scholar: https://scholar.google.com.ar/citations?hl=es&user=EZRKFAMAAAAJ

Laura Benegas, PhD
Coordinator, Watersheds, Water Security and Soils Unit
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Dr. Laura Benegas Negri is Paraguayan, Agronomist Engineer from the National University of Asuncion; Magister Scientiae in Integrated Watershed Management, from the Tropical Agricultural Research and Higher Education Center (CATIE), PhD in Soil Sciences, from Swedish University of Agricultural Sciences (SLU). Her lines of work include both academic and developing approaches, as well implementing project´s in topics such as watershed management, co-management, and planning, adaptation and resilience to climate change, biophysical processes of the soil-plant-atmosphere relationship using water stable isotopes, and analysis of nature-based solutions in urban watersheds.

Research Gate: https://www.researchgate.net/profile/Laura-Benegas
Google Scholar:

Research for Inclusive Green Development Division - DIDVI

Who are we?

Claudia Sepúlveda, MSc
Coordinator, Livestock and
Environmental Management Unit
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Ms. Sepulveda is a Colombian-Costa Rican, researcher, and teacher, with a Bachelor's degree in Agricultural Business Administration from the University of Santa Rosa de Cabal and a master's degree in Tropical Agroecology from the same university. She has been working as the leader of the Livestock and Environmental Management Unit since 2002. She has experience in coordinating and implementing research, training, and development activities aimed at designing agroecological production systems for sustainable livestock development. Additionally, she has expertise in value chain approaches and the generation of environmental services for the adoption of various innovative market mechanisms. She also provides postgraduate teaching and student advising for master's programs and formulates proposals for resource management and research.

Research Gate: https://www.researchgate.net/scientific-contributions/Claudia-Sepulveda-20549452
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Sergio Vilchez, PhD
Coordinator, Biostatistics Unit
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Sergio Vilchez Mendoza is a Nicaraguan ecologist with more than 15 years of experience in numerical ecology and statistical modeling. Based at CATIE, Costa Rica, as the Coordinator of the Biostatistics Unit, Sergio is involved in projects related to biodiversity conservation in agricultural landscapes. Sergio received his M.Sc. in Management and Conservation of Tropical Forests and Biodiversity at CATIE, and is currently enrolled in the Ph.D. program in Agricultural Sciences at the University of Montpellier, France, focusing on developing a multi-agent model of coffee berry borer, to understand the role of landscape configuration, plantation characteristics and agricultural management on coffee berry borer infestation, and to explore the role of a cooperative management that considers different spatial scales.

Research Gate: https://www.researchgate.net/profile/Sergio-Vilchez-Mendoza
Google Scholar: https://scholar.google.com/citations?user=VWGyeYsAAAAJ

Reinhold Muschler, PhD
Coordinator, Agrobiodiversity and Food
Security Unit
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Prof. Muschler is a trained Geo-ecologist (University of Bayreuth, Germany: 1984-1988) with an M.Sc. (1991) and Ph.D. (1998) in Agroforestry and Farming Systems from the University of Florida. His area of expertise is on redesigning tropical smallholder agroecosystems and livelihoods towards improved environmental sustainability and food security under climatic stress. In order to reconcile production and protection goals, he applies principles of agroecology and agroforestry to increase ecosystem health and resilience, to augment soil carbon sequestration, and to promote a wider use of agrobiodiversity for climate-smart production systems and landscapes. The species for diversification include underutilized trees and crops that are locally adapted, stress-tolerant and nutrient-dense.

Research Gate: https://www.researchgate.net/profile/Reinhold-Muschler
Google Scholar:

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SOME EXAMPLES OF OUR WORK

Agroforestry and Breeding of Coffee and Cacao

LINES OF WORK

- Breeding of coffee and cacao

  Highly productive varieties, tolerant/resistant to pests, High quality

- Design and management of sustainable agroforestry systems

  Good agronomic and agroforestry practices; adaptation and mitigation

- Provision of ecosystem services and balance of *trade-offs*

  Provision (cacao, coffee, timber, fruits); regulation (carbon sequestration, pests and diseases)
  Support (polinization, soils)

COUNTRIES:

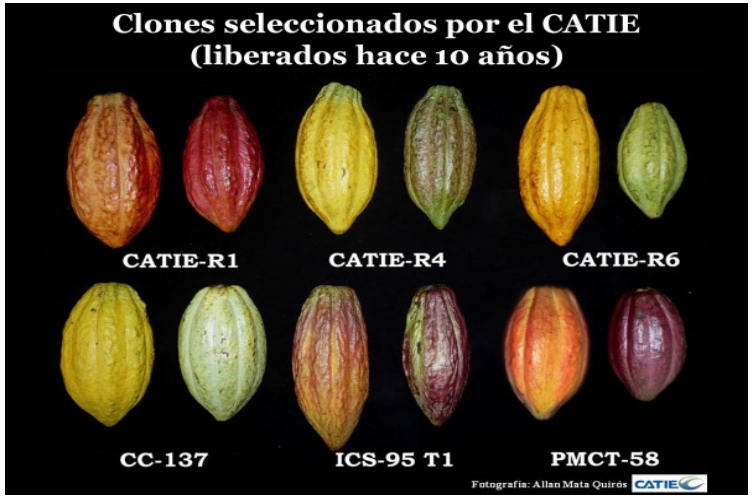
Costa Rica, Panama, Nicaragua, Honduras, Guatemala, Belize, El Salvador, Mexico, Brazil

CONSERVATION/BREEDING OF COFFEE AND COCOA

COLLECTIONS
- ≈ 2000 coffee accessions (35% wild)
- ≈ 1250 cocoa accessions (10% wild)
- Public domain

IMPROVED MATERIALS (RELEASED)
- 5 coffee hybrids
- 6 cocoa clones

FUTURE MATERIALS: at least 4 new cocoa clones; 50 families of coffee hybrids



ALLIANCES:

Cocoa, we work with **Cocoa Research Center in Trinidad & Tobago** for genetics analysis

Coffee, we work with **World Coffee Research** for global breeding programs

CATIE is a key partner of the Global Coffee Breeding Network (INNOVEA)

WCR = Global Coordination
- Create populations in breeding factory at CATIE in Costa Rica
- Distribute populations to partners
- Facilitate low-cost central genotyping
- Lead genomic/phenomic selection
- Rapid cycling recurrent selection

Network = Governance
(Partners working together)
- Protocols
- Governance issues
- Capacity building

Partners = Trialing + Cultivars
- Field trials + phenotyping
- Independent genetic analyses (as desired)
- Cultivar development

Meeting held in CATIE campus/Place of the future breeding factory. Nov 2022.

- Renewed MOU with World Coffee Research/New office of WCR in CATIE with a breeder expert
- CATIE-WCR will distribute seeds of hundreds of improved varieties to LAC, Asia, Africa
- Expected research results: new protocols for seed and plant-in vitro distribution; genotype and phenotype results of new promising varieties; performance of new varieties in field trials across LAC

TRANSFORMA-INNOVA (2022-2026; IKI/EU): multi-unit collaboration

It supports the climate-smart transformation of the coffee, beef/milk, and banana sectors in Costa Rica through:

- The development and implementation of **Good Agricultural and Manufacturing Practices**
- Leverage of **green financing**
- Support for **model farms** / operations
- Innovative products for **emerging markets**
- **Upscaling** for impact
- Evolution of **MRV** systems (landscape level)

The program generates benefits for mitigation + adaptation + biodiversity

IMPLEMENTADO POR:

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

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CONSERVACIÓN INTERNACIONAL Costa Rica

CRUSA

FUNBAM

PNUD

New Initiatives KoLFACI

- Two new projects on cocoa and coffee 2023-2026

Geographic areas: 10 countries covering LAC: Bolivia, Perú, Colombia, Panamá, Costa Rica, Nicaragua, Honduras, El Salvador, Guatemala, Dominican Republic

Cocoa project will continue research and dissemination of CSA practices

Coffee project will continue research on varieties*pruning, dissemination, support to breeding

Amount for CATIE ≈ 1 million USD (+ 1 million UDS for the countries)
Key partners: institutes of coffee, institutes of research/technology, departments of coffee/cocoa of the ministry of agriculture of the countries

Expected results: coffee/cocoa yields are at least tripled thanks to the technologies in study; 40 technicians apply new knowledge and skills; >1000 farmers trained on the new technologies

Livestock and Environmental Management

We work on the Sustainable Intensification of Livestock Production Systems

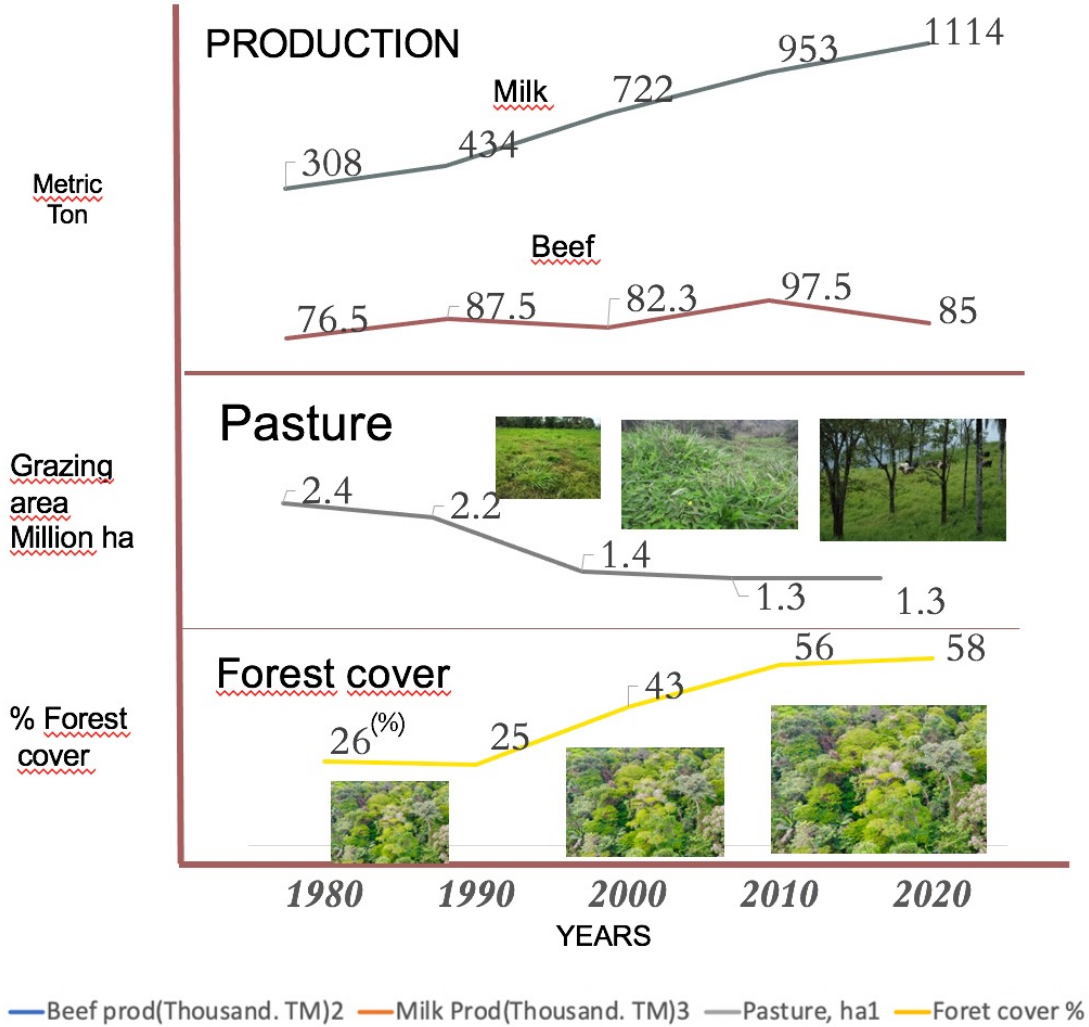
- Rehabilitation of degraded pastures for productivity
- Climate Change: Resilience and Carbon Flows – Greenhouse Gas Emissions
- Conservation of biodiversity and ecosystem services in landscapes dominated by livestock
- Intelligent integration to the market and responsible consumption and productive efficiency.
- Incentives and financial mechanisms for the adoption of technology that allow the transformation of the livestock sector
- Support for the development of public policies for the sustainable management of livestock systems

EVOLUTION OF LIVESTOCK SUSTAINABLE INTENSIFICATION IN COSTA RICA

PRODUCTION has increased due to higher milk and meat productivity

GRAZING AREA decreased from 2.4-1.3 million ha due to intensification

FOREST COVER increased due to Policies of PES and the Private sector engagement



1Sepsa, MAG, CATIE, CORFORGA; 2CORFORGA, CNP, IICA, 3 CNPL, CNP, 4. FAOSTAT, 5. FONAFIFO- Database

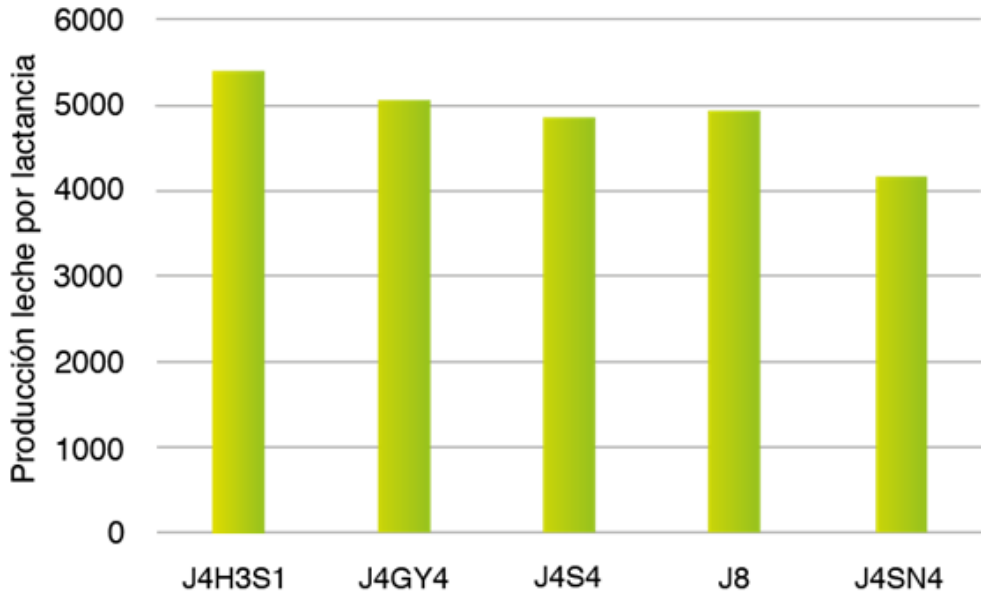
SYNERGIES BETWEEN ADAPTATION AND MITIGATION

- Genetic improvement-tropical dairy breeds: > 5000 kg/lactation

- Shade trees in pastures- reduce temperatures- 4 to 8 ^{o}C, and heat stress to animals
- Milk yields improved by 10 to 15%
- Compared to open pastures

- Decrease emission intensities:
- 2.2 vs 1.5 kg CO2/kg milk (traditional vs agro-silvopastoral)

- Increase Carbon sequestration in system: 1.5 to 5 tCO2/ha/year (Ibrahim et al. 2018, Andrade et al., 2019)



J: Jersey; H: Holstain; S: Sahiwal; GY: Gyr; SN: Senepol

Fuente: base de datos Finca de CATIE (2016)

Impact of Mitigation practices on Enteric Methane, productivity and emissions

Improve pasture and good management

-50

600 Cardoso et al. (2016)

Strategic suplementation in dry season

-48

300 Vega (2016)

Crossbreeding

-19

30 Villanueva et al. In press

Reduction of emission intensity Relative to base line %

Change in production Relative to base line %

Agrobiodiversity and Food Security

Supporting food and nutritional security for local communities in the Dry Corridor

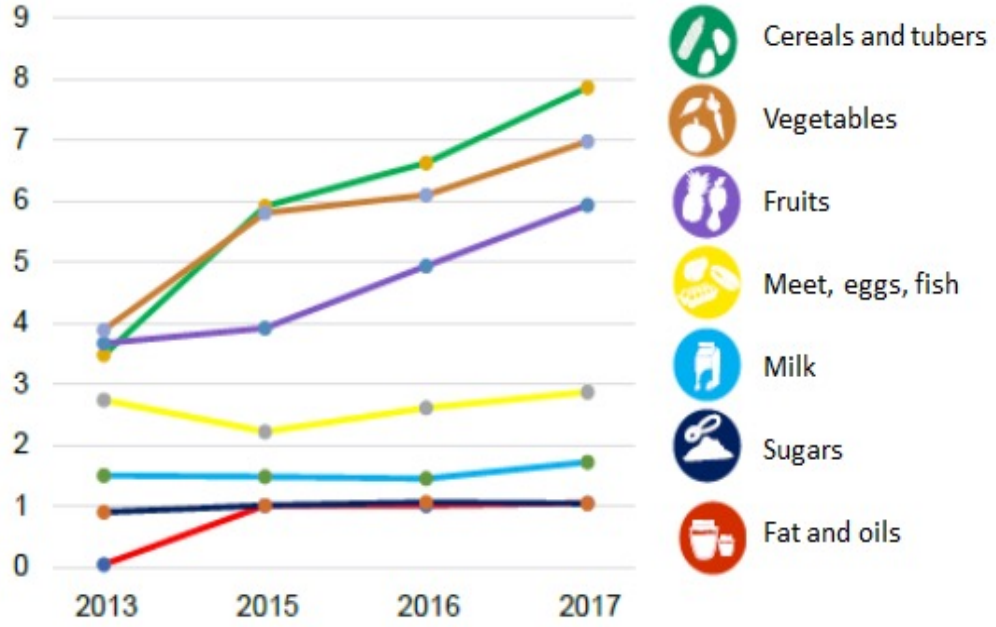
MAP-NORWAY (2013–2017)

- Population particularly vulnerable to the impacts of climate vulnerability and change
- Addressed poverty, food and nutrition insecurity, gender inequality, degradation of ecosystem services and vulnerability to climate change.
- Focused its interventions on nutritional education and sustainable diversification and intensification of home garden and farm production to improve food nutrition and income.
- Promoted the use of agroecological/agroforestry systems incorporating local biodiversity.

THE MESOAMERICAN AGROENVIRONMENTAL PROGRAM (MAP)

Home garden plans with women-family approach

MAP successfully improved the relation between production diversity and dietary diversity and increased both the farm based and purchased based parts of dietary diversity.



+ The participation of women in household decisions also increased

Adaptation of agriculture to climate change through water harvesting and agroecological intensification

- Establishing productive systems that are more resilient to climate change and improve food and nutritional security.
- **2,500** families benefited
- Productivity increased by near 20% compared to traditional systems

Unión Europea

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IICA

PARTNERS

DNEA, MAG, CONAC-4S, CTP La Suiza, CTP 27 de Abril, Verto-Education etc.

MÓDULO AGRO-SILVOPASTORIL 2600 m²

GOAT MODULE 65 m²

Production in two years of 5 goats

6156 liters of milk

MILK

944 l Yogurt
148 kg Cheese
91 l Eggnog
13 kg sweet milk
786 kg Jellies

SUB-PRODUCTS

615 liters of whey
Used as a biostimulant

WHEY

4360 kg manure
9600 l urine
6240 kg compost

MANURE/ URINE/ COMPOST

PRODUCTS

SUSTAINABLE HOME GARDEN 1792 m²

CROPS 503.1 m²

254 kg Lettuce
212 kg Cabbage
302.4 kg Garlic
990 kg Radishes
2203 kg Banana
600 kg Plantain
622 Vainica
360 kg Beans
558 kg Corn
233 kg Hot pepper

FODDER BANK 767 m²

18200 kg Tithonia/366 m²
1800 kg Morera/107 m²
9570 *kg Cuba-22* /294 m²
Fresh biomass/two years

TIMBER

220 PMT

CROP RESIDUES /SILAGE

820 kg crop residuals
1228 kg silaje/100 m²
by corn cicle

PRODUCTS

SERVICES

RESEARCH

TRAINING

TOURISM

TWO MASTER'S THESES / ONE UNDERGRADUATE WORK

1. Analysis of a prototype of agrosilvopastoral gardens through circular economy.
2. Evaluation of the financial and commercial viability of a prototype of agrosilvopastoral orchards through circular economy.
3. Dairy market research
Goats in Turrialba and Jimenez, Costa Rica

TWO FIELD SCHOOLS with 58 members:
24 farmers
7 technicians
21 students,
3 professors
3 farmer leaders

980 PEDAGOGICAL VISITS

18 Countries
12 Governmental and international organizations
15 Farmer organizations
10 Costarican colleges
14 National and international universities

Forests and Biodiversity in Productive Landscapes

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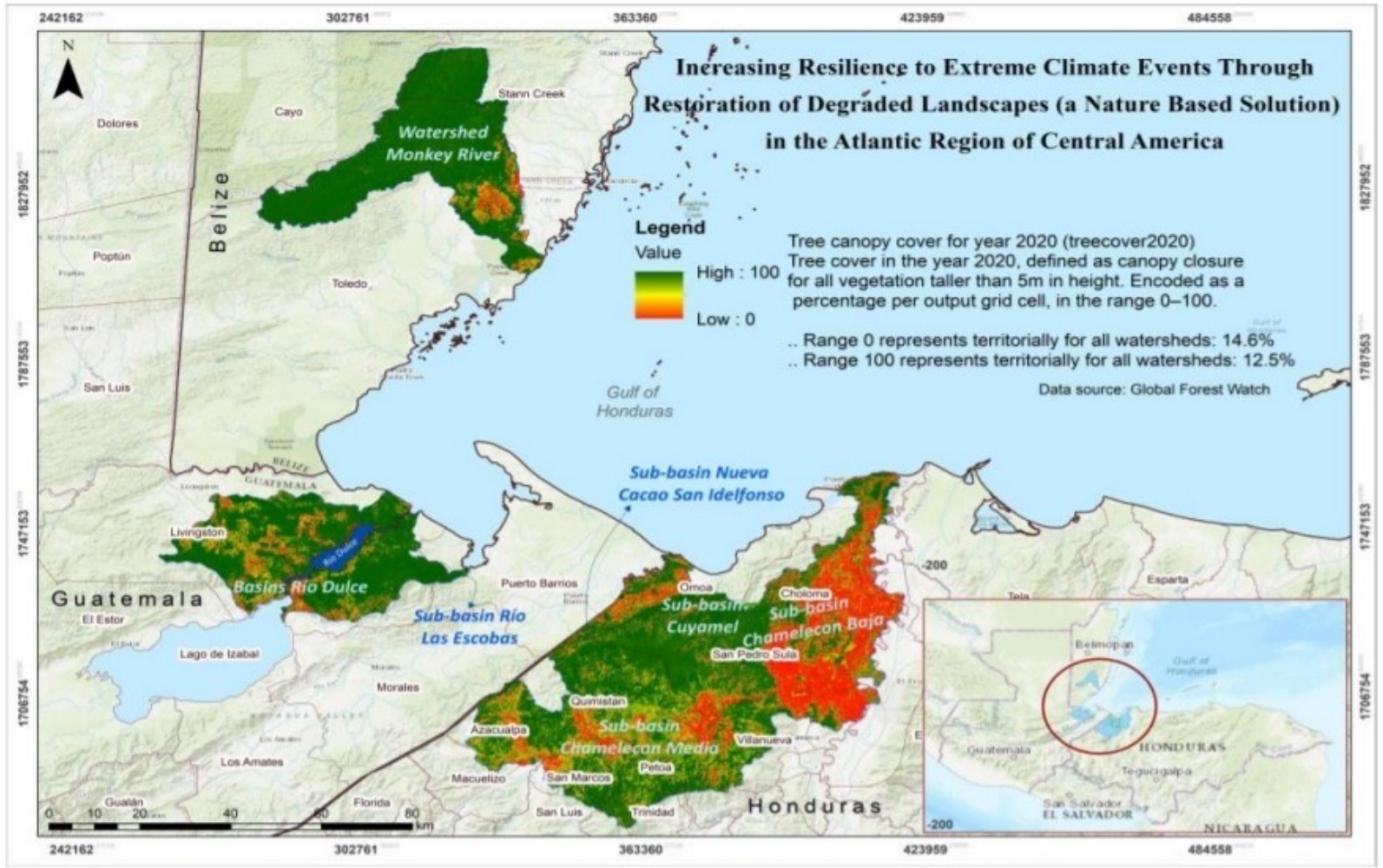
Use of Nature-based Solutions to Increase Resilience to Extreme Climate Events in the Atlantic Region of Central America



- Actions to strengthen climate resilience of communities and ecosystems in the coastal Atlantic region of **Belize**, Guatemala and Honduras
- Three key components
  - ✓ Mainstreaming restoration in regulatory frameworks and land use planning
  - ✓ Implementing adaptation measures in selected landscapes
  - ✓ Investing in capacity building, knowledge generation and information dissemination

BCIE Banco Centroamericano de Integración Económica

WORLD RESOURCES INSTITUTE

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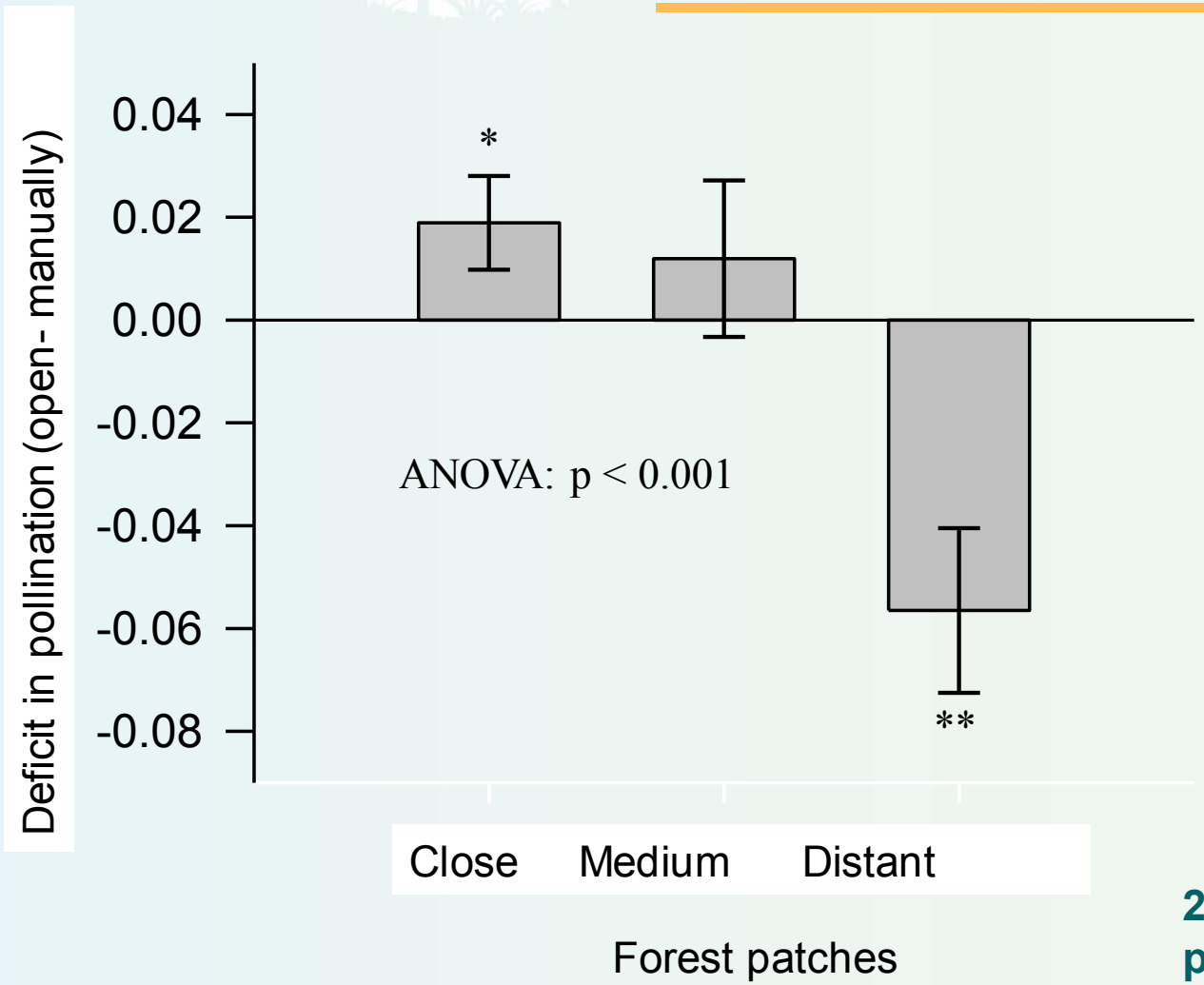
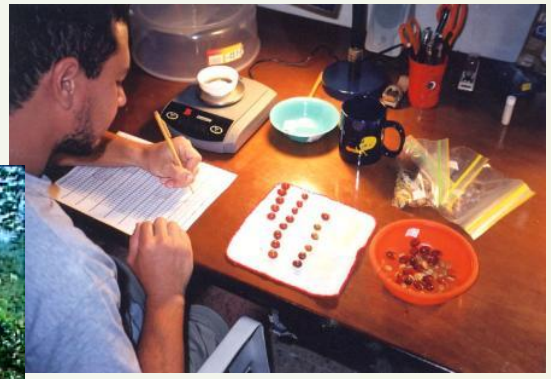
Impacts of forest patches on pollinators

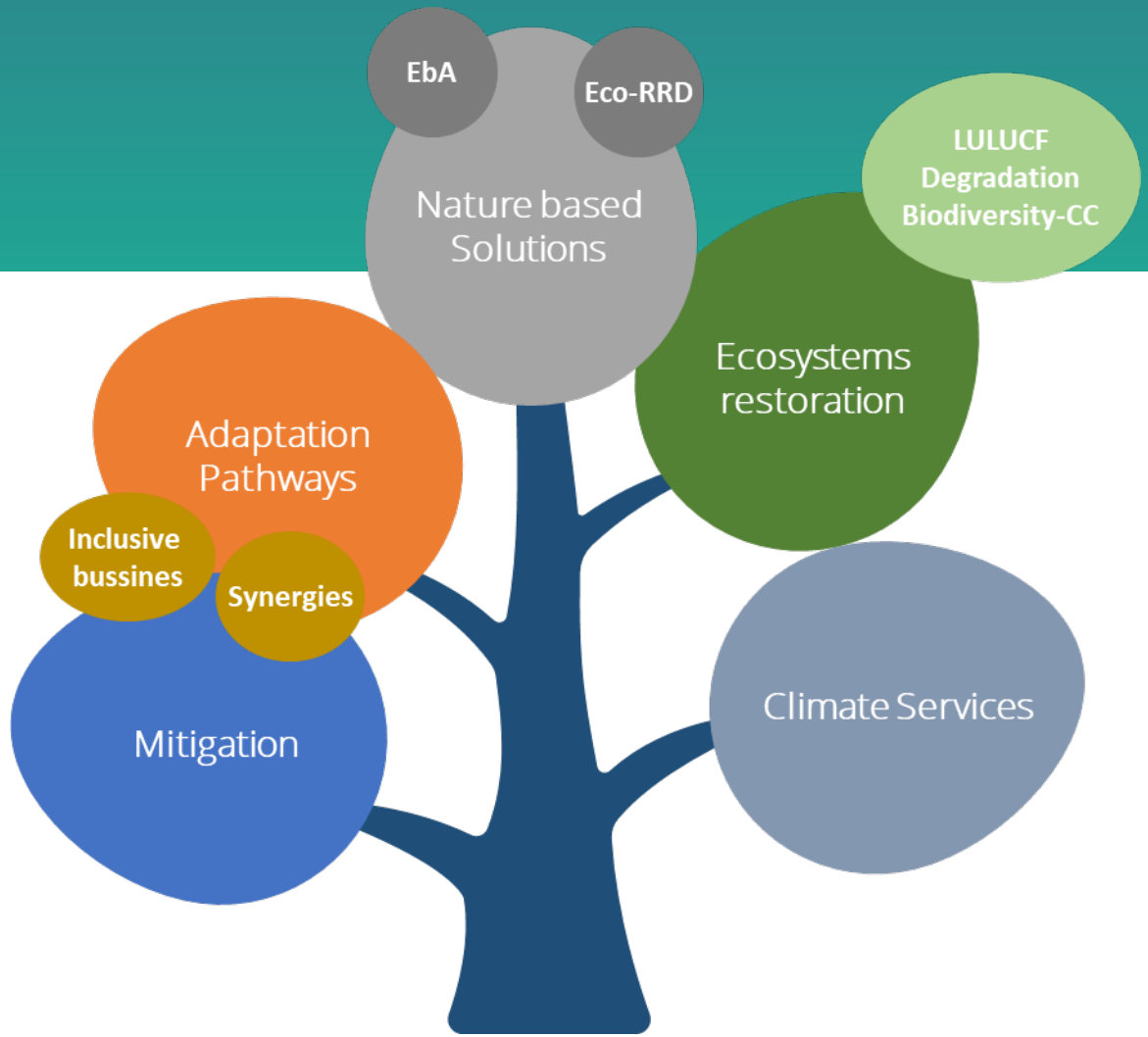
Impacts of forest patches on bee pollination and coffee production





20% reduction- more distance from forest patches

Climate Action







Pathways for climate action: adaptation, mitigation and synergies with risk reduction and sustainability goals

Risk and vulnerability assessments

- Bottom-up participatory assessments at national level
- Adaptation strategies
- Finance strategies (i.e. agricultural sector)

Investment portfolio for agricultural risk management in Rwanda

Blueprint group	Blueprint	Risk groups	Systems/Value chains
1. Resilient practices for livestock	1.1 Supplementary food and water	Water deficit	Cattle, goat
	1.2 Livestock health management practices	Pest and diseases	Cattle, goat, poultry
	1.3 Meat value chains	Water deficit, P&D	Meat
2. Nature-based solutions and supporting practices	2.1 Technologies to prevent water logging, erosion and nutrients leaching	Loss of soil properties	Avocado, beans, cattle, maize, potato
	2.2 Conservation agriculture	Pest and diseases Loss of soil properties	Beans, maize, potato
	2.3 Nature-based solutions	Water deficit Loss of soil properties	Beans, cattle, goat, maize, potato
	2.4 Value chains	Precipitation excess, P&D, Loss of soil properties	Meat, potato*, bean leaves, maize flour, maize grain, banana feed
3. Sustainable on-farm practices for smallholders	3.1 Crop and breed choices	Water deficit, Pest and diseases	Cattle, goat, maize
	3.2 P&D management for crops	Pest and diseases	Banana, maize
	3.3 On-farm practices for value chains	Precipitation excess, Water deficit, P&D	Maize flour*, banana feed, bean grains, meat, potato
4. Water technologies	4.1 Irrigation for crops	Water deficit	Beans, maize
	4.2 Water technologies for livestock	Water deficit	Cattle, goat
	4.3 Water technologies for value chains	Precipitation excess, Water deficit, Loss of soil properties	Banana feed, cassava, coffee, potato, meat
5. Climate and weather services	5.1 Weather advisories	Winds, hail	Beans
	5.2 Hydrometeorological warnings	Loss of soil properties	Avocado, banana, beans*, cattle, maize, potato
	5.3 Seasonal forecast	Water deficit	Beans, cattle*, goat, maize, poultry
	5.4 Pest and disease	Pest and diseases	Banana, beans, cattle*, goat, maize, poultry
6. Value chains	6.1 Rice value chains	P&D, Loss of soil properties	Rice
	6.2 Postharvest infrastructure and	Precipitation excess, Water deficit, P&D, Loss of soil properties, Hail	Banana feed, cassava, potato, maize flour,

BLUEPRINT 2.1: Technologies for preventing water logging, erosion and nutrients leaching





Pathways for climate action: adaptation, mitigation and synergies with risk reduction and sustainability goals

Risk and vulnerability assessments

- Bottom-up participatory assessments at national level
- Adaptation strategies
- Finance strategies (i.e. agricultural sector)

Transitioning to adaptation

- Climate and Weather Services
  - Translation, dissemination
  - Access and use of information
- Information systems

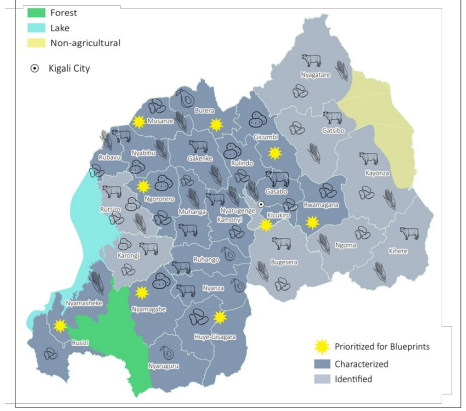
Investment portfolio for agricultural risk management in Rwanda

Blueprint group	Blueprint	Risk groups	Systems/Value chains
1. Resilient practices for livestock	1.1 Supplementary food and water	Water deficit	Cattle, goat
	1.2 Livestock health management practices	Pest and diseases	Cattle, goat, poultry
	1.3 Meat value chains	Water deficit, P&D	Meat
2. Nature-based solutions and supporting practices	2.1 Technologies to prevent water logging, erosion and nutrients leaching	Loss of soil properties	Avocado, beans, cattle, maize, potato
	2.2 Conservation agriculture	Pest and diseases Loss of soil properties	Beans, maize, potato
	2.3 Nature-based solutions	Water deficit Loss of soil properties	Beans, cattle, goat, maize, potato
	2.4 Value chains	Precipitation excess, P&D, Loss of soil properties	Meat, potato*, bean leaves, maize flour, maize grain, banana feed
3. Sustainable on-farm practices for smallholders	3.1 Crop and breed choices	Water deficit, Pest and diseases	Cattle, goat, maize
	3.2 P&D management for crops	Pest and diseases	Banana, maize
	3.3 On-farm practices for value chains	Precipitation excess, Water deficit, P&D	Maize flour*, banana feed, bean grains, meat, potato
4. Water technologies	4.1 Irrigation for crops	Water deficit	Beans, maize
	4.2 Water technologies for livestock	Water deficit	Cattle, goat
	4.3 Water technologies for value chains	Precipitation excess, Water deficit, Loss of soil properties	Banana feed, cassava, coffee, potato, meat
5. Climate and weather services	5.1 Weather advisories	Winds, hail	Beans
	5.2 Hydrometeorological warnings	Loss of soil properties	Avocado, banana, beans*, cattle, maize, potato
	5.3 Seasonal forecast	Water deficit	Beans, cattle*, goat, maize, poultry
	5.4 Pest and disease	Pest and diseases	Banana, beans, cattle*, goat, maize, poultry
6. Value chains	6.1 Rice value chains	P&D, Loss of soil properties	Rice
	6.2 Postharvest infrastructure and technologies for value chains	Precipitation excess, Water deficit, P& D, Loss of soil properties, Hail	Banana feed, cassava, potato, maize flour, maize grain

BLUEPRINT 2.1: Technologies for preventing water logging, erosion and nutrients leaching

High-value systems:	avocado, beans, cattle, maize
High impact climate risks:	Loss of soil properties
Non-climate risks types:	Institutional - services

Geographic focus



Prioritized practices

✓ climate risks responses ✓ non-climate risk responses

Category	prioritized practices	cattle	avocado	beans	maize	potato
crop/breeds choices	multiplication systems					✓
prevention of water logging, erosion and nutrients leaching	drainage systems			✓		
	erosion control	✓	✓	✓	✓	
	radical & progressive terraces	✓	✓	✓	✓	✓
	terracing			✓	✓	✓
research & development	research facilities			✓		
	experts training & scholarships			✓		

Region	District	livestock	annual crops				Dominant farm size and tenure
		cattle	maize		beans	potato	
		BN INN ACT	BN INN ACT		BN INN ACT	BN INN ACT	
Northern	Gicumbi						Small, private
	Musanze						Mix, mix
	Gakenke						Small, mix/ Small private
	Burera						Small, private
Southern	Huye-Gisagara						Small, private
East - Central	Rwamagana						Mix, mix
	Kicukiro						Mix, mix
Western	Nyamagabe						Small, private
	Nyamasheke						Small, private
	Ngororero						Small, private

SCALING PROBED AGRICULTURE INNOVATIONS TO BUILD RESILIENCE IN THE CENTRAL AMERICAN DRY CORRIDOR - TRIFINIO

- This four-year project (2022-2026) funded by Sweden, will address the negative impacts of climate change – drought aggravation and other extreme events - on the most vulnerable CADC communities
- This will be achieved using two main pathways and a cross-cutting inclusion and equity approach:
  - PATHWAY 1. Scaling Agricultural Innovations for Adaptation (rainwater harvesting and agroecology) using attractive business opportunities for rural youth as scaling mechanism.
  - PATHWAY 2. Ensuring an enabling environment (capacity development, governance and finance)

Environmental Economics and Sustainable Agribusinesses

Multidisciplinary team that uses environmental economics and the promotion of sustainable agribusiness management to promote the achievement of sustainable development goals in the Latin American and Caribbean region.

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Design of Payment for Ecosystem Services (PES) in Yallahs and Hope River Watershed Management Units in Jamaica

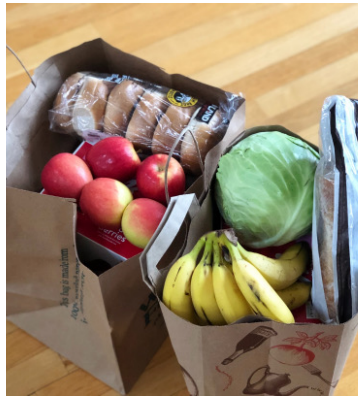
Funded by Interamerican Development Bank (IADB)

Objective: To provide financial incentives to small-scale farmers to improve land use practices that:

i. Benefit water quality and availability to households and industries
ii. Increase resilience to climate change impacts

Highlight: CATIE designed the PES from scratch, and after years of consultation and political debate, it is closer to being included in Jamaica´s new watersheds law.

Sustainable Consumption and Production (SCOPE)



SCOPE is funded by the **Environment for Development (EfD)**: CATIE has been part of this global network on environmental economics since 2007.

Goal: Promote the use of **economic incentives** to:

- ✓Minimize food loss and waste.
- ✓Reduce, reuse, and recycle in production processes.
- ✓Encourage sustainable and efficient food production systems.

Countries/regions: Central America, Chile, Vietnam, China, India, Nigeria, South Africa, Tanzania.

Time frame: 2022 – 2026.

Expected outputs:

8 peer-reviewed papers

Participation in international conferences

Policy engagement

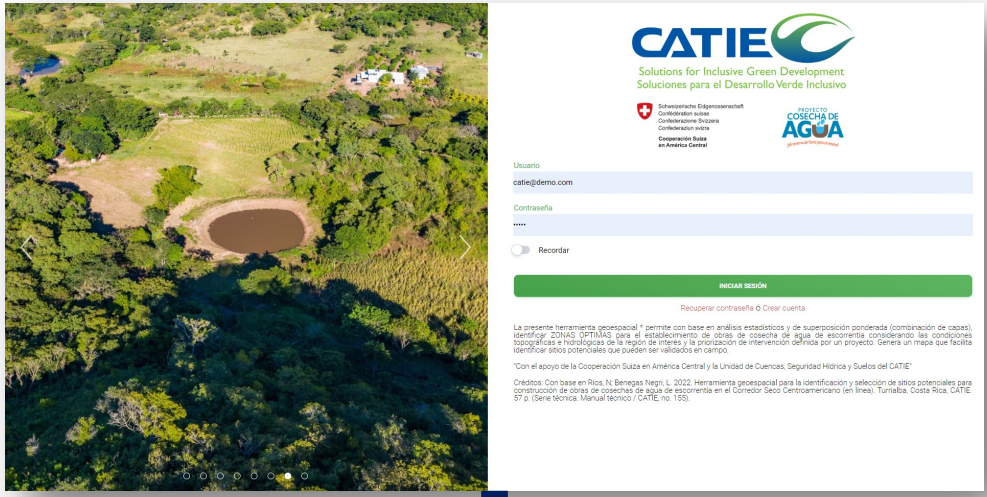
Watersheds, Water Security and Soils

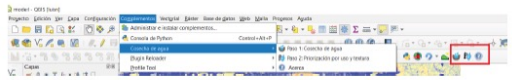
Water is the basis of life, the main component of living beings and there is a continuous water-soil-plant-atmosphere system, based on the water cycle. Furthermore, it is a scarce resource. The increase in water scarcity globally and strongly affects ecosystems, human health, and food security.

Methodological tool to support development of Water harvesting solutions

DESIGNING A WEB-APP PLATAFORMA

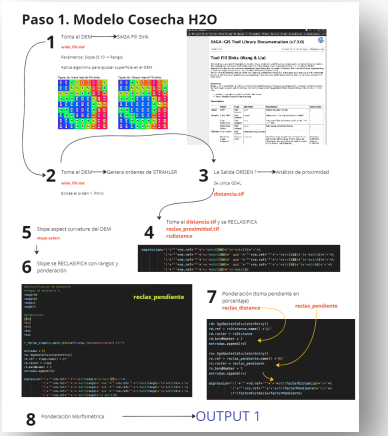
https://cosechah2o.web.app/



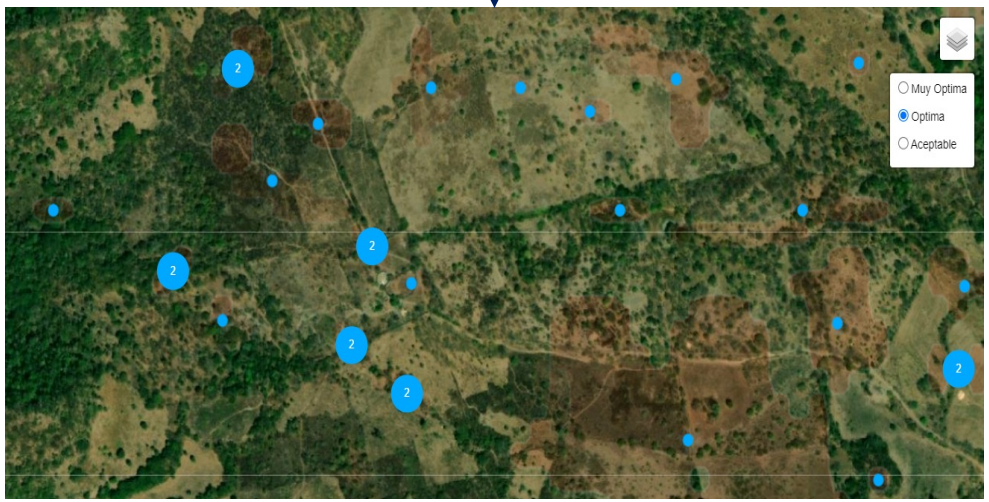


Cada botón o menú despliega una caja de diálogo. Las dos primeras opciones –cuyos nombres comienzan con Paso 1 y Paso 2, respectivamente– despliegan asistentes para la introducción de los parámetros que permitirán realizar el respectivo análisis.

Created a Qgis complement Qgis (plugin)

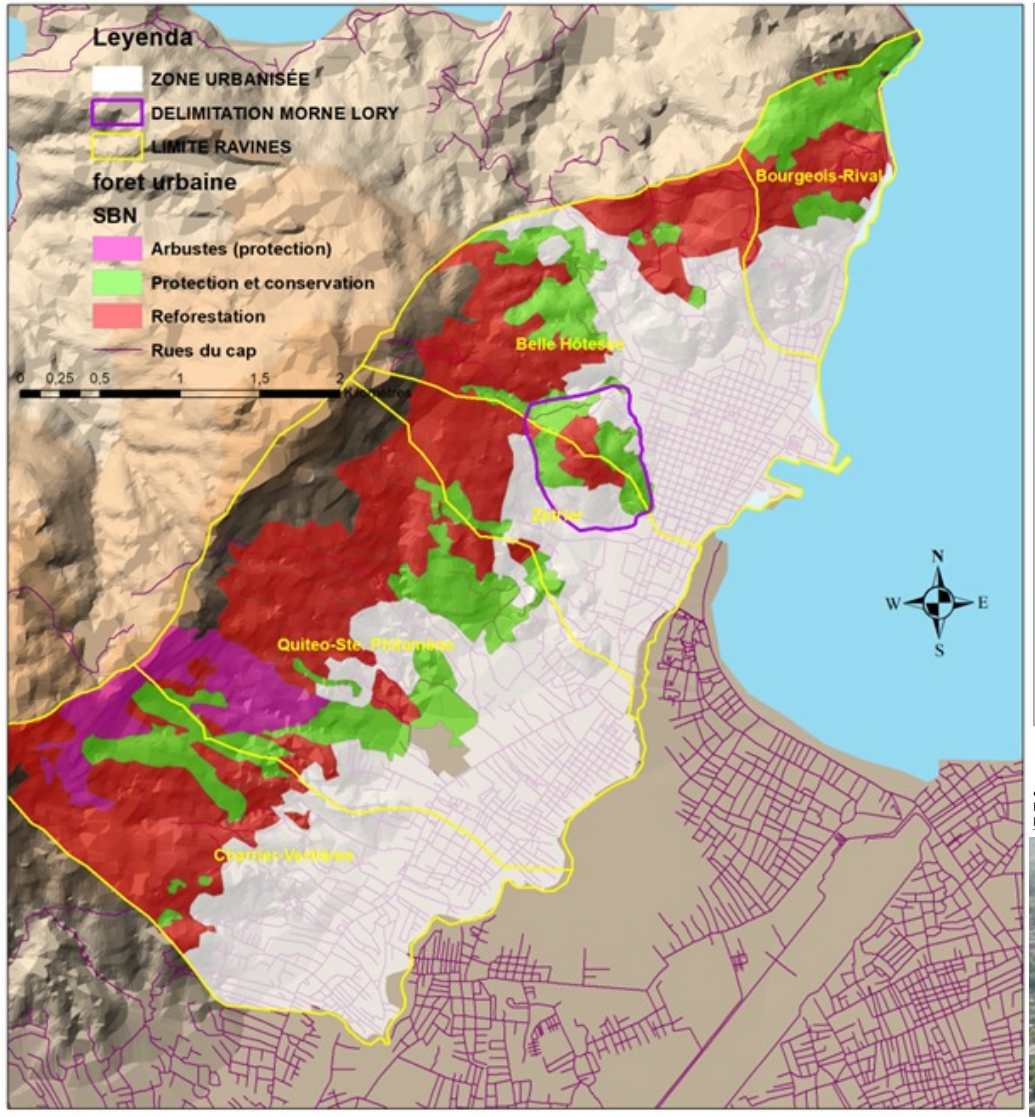


PUBLICACION TÉCNICA DEL PROYECTO



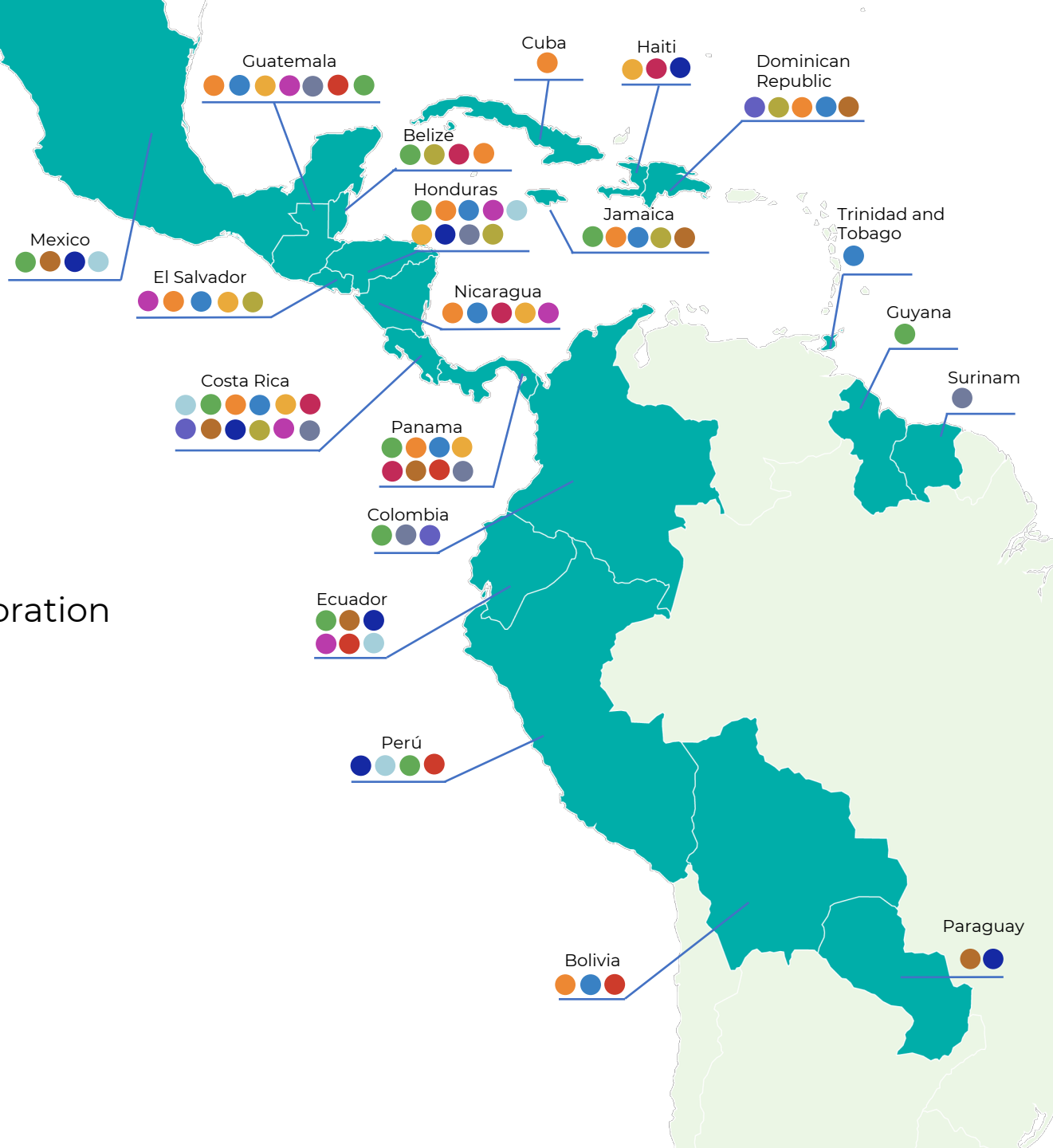
Nature based solutions in urban watershed: Cap Haitïen

“Building resilience under disaster risk management approach”



Strategic projects focused on the SDGs

- Sustainable livestock intensification
- Coffee and agroforestry
- Cocoa and agroforestry
- Food security
- Watershed management and security restoration
- Agribusiness
- Ecosystem based adaptation
- NAMAS mitigation
- Biodiversity in landscapes
- Indigenous-inclusion
- Environmental economics
- Mangroves and blue carbon



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Inclusive green development competitive research fund

Established in 2023 to support the research ideas of junior researchers.

INCLUSIVE GREEN DEVELOPMENT COMPETITIVE RESEARCH FUND: Progress to May 2022

Project	Amount (USD)	Co-financing	Comments
Biodiversity, ecosystem services, and human well-being in the Trifinio region: the role of secondary forests.	30 000	6 000 +	Asdi-ESCALAR Adaptation Fund Proje (CATIE and WRI) -TBC
Determination of the productive and socioeconomic impact of the dispersal and arrival of *Moniliophthora roreri* (moniliasis) in cocoa-producing Caribbean countries and proposal of prevention, diagnosis, and control strategies	30 000	100 000	FFAR (Foundation for Food & Agriculture Research)
Economic valuation of native pollinators of pitahaya (*Hylocereus spp., Cactaceae*) in Costa Rica for the adaptation of dry tropics food systems to global challenges (PoliPitahaya).	24 400	14 000	In-kind contribution fr personnel Universidad Nacional, Costa Rica
Generational integration in the sustainable agri-food value chain of coffee as a strategy to reduce youth migration in rural areas of Costa Rica, Guatemala, and Honduras.	15 000	12 000	In-kind contribution personnel from CIRAD
TOTAL	**94 000**	**132 000**	

Activa

CATIE

Innovation and technology for rural development

Unit of Forests and Biodiversity in Productive Landscapes (UBBPP) of CATIE

Activa

CATIE

Laboratory that supports **entrepreneurship and innovation** for rural development and sustainable management of natural resources in Latin America and the Caribbean (LAC).

We integrate **advanced methodologies** for the development of innovations available to rural people.

We **facilitate networking** between actors interested in the rural sector, such as development banks, international cooperation, productive value chain actors, and investors, among others.

Innovation and technology
for rural development

Activa CATIE

Banca para el Desarrollo SBD

Semillas de TRANSFORMACIÓN

Accredited since 2020

- Rural enterprises
- Nature-Based Solutions
- Gender and inclusion approach
- Descarbonización
- Bioeconomy Strategy

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Services and Solutio

Activa CATIE

Training and advice	Development of experiments and prototypes	Promotion of Innovation
Business Education	Net working	Added value

SOMOS Activa CATIE

52

Costa Rican Rural Enterprises

+de 30%

Women-led entrepreneurship

+ de USD 550.000

In seed capital leveraged with the Development Banking System (SBD) of Costa Rica

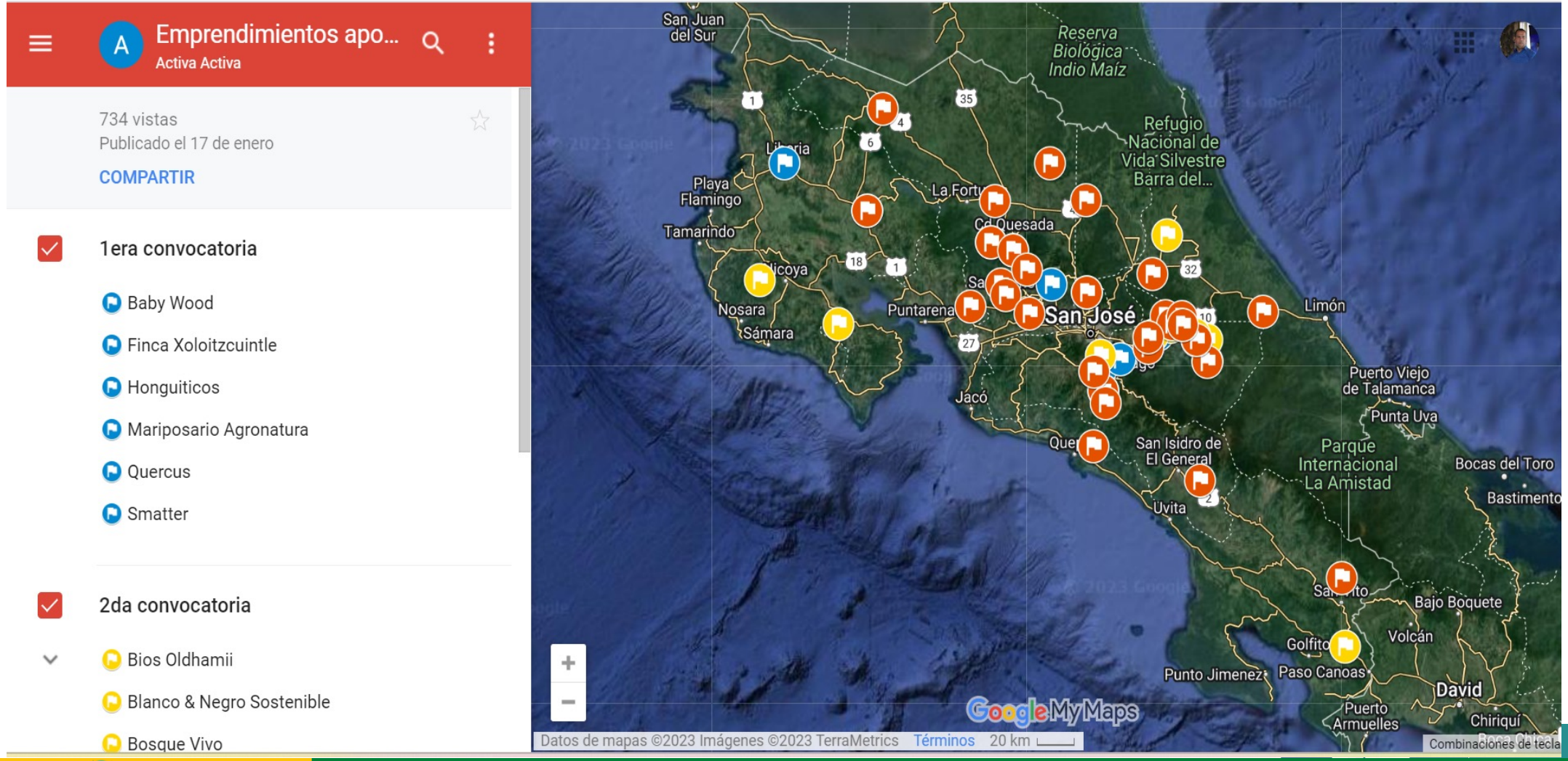
Agricultural

Forest

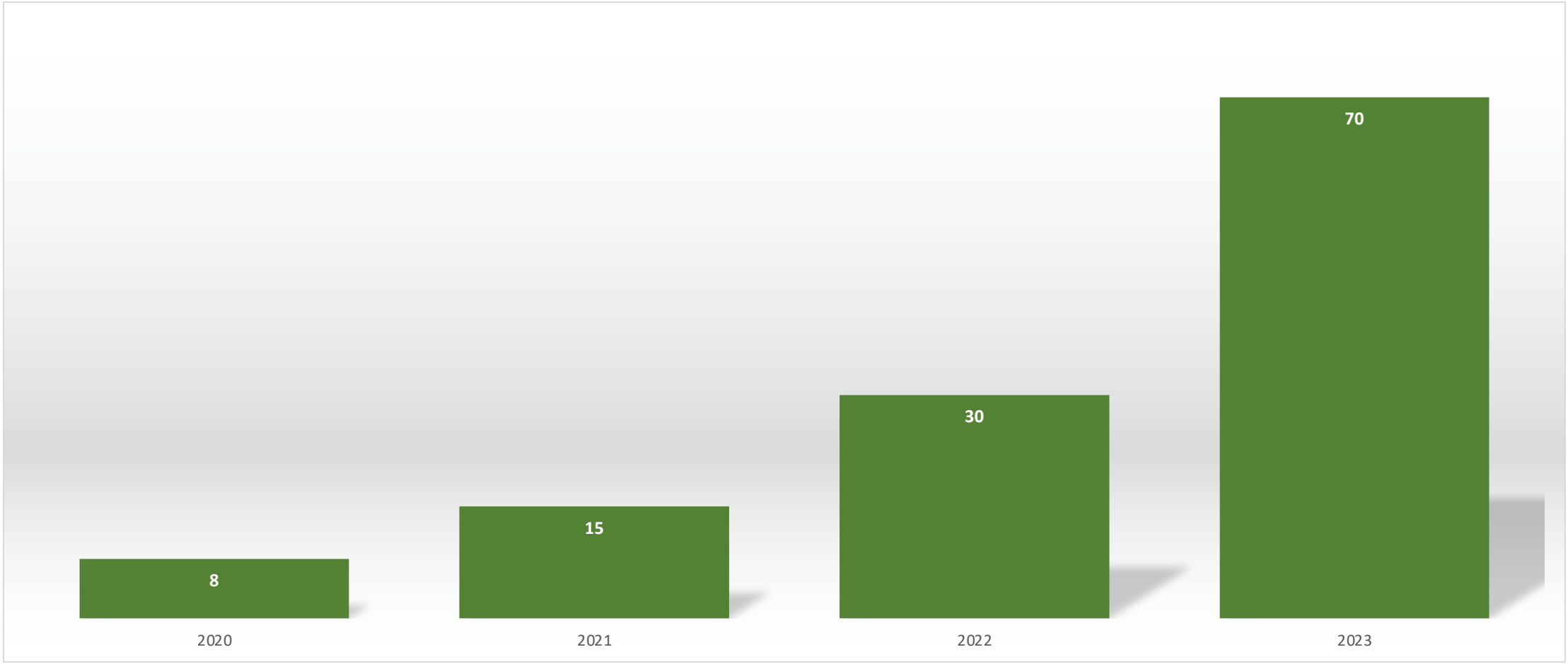
Ecotourism

Technology and innovations for the rural sector

Location of our portfolio



Supported ventures



Conecta

Comunidad de líderes de incubación en Centroamérica

Activa CATIE

Laboratorio de innovación y emprendimiento del CATIE

Activa

CATIE

Innovation, livelihoods, inclusion

Supporting sustainable ventures

POTENTIAL COLLABORATION IDEAS

OUTCOME: Apply computer science theory and software development fundamentals to produce computing-based solutions – for improving agriculture processes, precision agriculture, robotics use in agriculture

- Undergraduate students can execute research or graduate projects at CATIE
- Develop collaborative research projects
- Develop joint initiatives within ACTIVA

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WE LOOK FORWARD TO DISCUSSING POTENTIAL COLLABORATION THANKS!