
# Ecosystem-based Adaptation

## for Smallholder Subsistence and Coffee Farming Communities in Central America (CASCADE)

## Introduction

In Central America, smallholder farmers are at the heart of the agricultural sector. They represent the majority of the farming population and accounting for a significant portion of regional agricultural production. Many of these smallholder farmers depend directly on natural ecosystems for the provision of water, soil conservation, pest control and other ecological services.

Climate models indicate that Central America will likely experience warmer and drier seasons and increases in the frequency of extreme weather events as a result of climate change. These changes will likely reduce crop yields, change pest and disease outbreaks and have significant negative impacts on farmer livelihoods.

Smallholder farmers are likely to be particularly vulnerable to the expected impacts of climate change due to their high dependence on agriculture for their livelihoods and their limited resources and capacity to cope with shocks. There is therefore an urgent need to identify strategies that help smallholder farmers adapt to climate change. Improving the productivity and resiliency of smallholder farming systems is also critical for alleviating poverty and achieving food security.

Photo: B. Rapidel CIRAD



## What is the CASCADE project?

Conservation International (CI) and the Tropical Agricultural Research and Higher Education Center (CATIE) are working together to identify and test Ecosystem-based Adaptation (EbA) strategies that can help smallholder farming communities adapt to climate change in Central America. The joint research project, CASCADE (Central American Subsistence and Coffee farmer ADaptation based on Ecosystems), is generously funded by the German Federal Ministry of the Environment, Nature Conservation and Nuclear Safety under the framework of the International Climate Initiative (ICI) and will run until 2017. In addition to CI and CATIE, other key partners in the project include CIRAD and Bioversity.

The overall goal of the CASCADE project is to help vulnerable smallholder farming systems adapt to climate change by identifying and testing Ecosystem-based Adaptation strategies that can help farmers, and building local capacity to support the implementation of these strategies in smallholder farming communities. The project will be developed in three countries, **Costa Rica**, **Honduras** and **Guatemala**, and will focus on subsistence farmers and smallholder coffee farmers.



## What is Ecosystem based Adaptation (EbA)?

**Ecosystem-based Adaptation (EbA)** refers to the use of biodiversity and ecosystem services as part of an overall strategy to help people adapt to the adverse effects of climate change. Ecosystem-based Adaptation strategies include activities that conserve, restore or sustainably manage ecosystems to ensure that they continue to provide ecosystem services to people in the face of climate change. Some examples of EbA include the use of shade trees in coffee systems to ameliorate temperatures, the conservation of riparian forests to ensure water availability, the restoration of degraded areas to enhance soil fertility, and the protection of forest areas to prevent erosion and landslides, among others.

# What are the **project** goals?

The CASCADE project has seven specific goals:

1. Understand the vulnerability of Central American ecosystems and smallholder farmers to climate change;
2. Identify which ecosystems, ecosystem services and small scale farming communities in the target countries are more vulnerable to climate change;
3. Document household livelihood strategies used to cope with past climatic variability and local knowledge about expected impacts of climate change across a range of different smallholder communities;
4. Test the effectiveness of existing on-farm activities that are relevant for EbA strategies in a subset of communities;
5. Identify the local and national institutions that could promote EbA strategies among vulnerable smallholder farming communities and define strategies for strengthening the role of these institutions in promoting EbA and smallholder resilience to climate change;
6. Strengthen the capacity of key organizations and institutions to support the implementation of EbA strategies in smallholder farming communities by developing and delivering targeted training courses and extension materials; and
7. Promote the incorporation of EbA strategies in national and regional policies for climate change adaptation through dissemination of project results to a wide set of stakeholders and decision-makers at national, regional and international levels.

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# What activities will the **project** conduct?

The project consists of a combination of research, implementation and outreach activities in Costa Rica, Guatemala and Honduras.
Research activities include:

- modeling of the impacts of climate change on smallholder farming systems and natural ecosystems across Central America,
- analysis of smallholder farmers' vulnerability to climate change,
- detailed household surveys to characterize farmers' vulnerability to climate change, existing adaptation strategies, and adaptation needs,
- identification of appropriate adaptation strategies for subsistence and smallholder coffee farmers,
- field surveys to characterize existing EbA strategies and evaluate their effectiveness in reducing farmer vulnerability to climate change, and
- institutional analyses to identify key institutions and stakeholders who could support the broad-scale adoption of EbA strategies.

Outreach and implementation activities include:

- developing training materials for farmers, extension agents and governments on effective EbA strategies for smallholder farmers,
- building capacity in key institutions on the use of EbA strategies,
- providing targeted training to trainers from key national and local institutions, so that they can promote appropriate and effective EbA strategies with smallholder farmers,
- providing ongoing support to these institutions so that they can replicate training on EbA strategies with a broader set of farmers, and
- working with decision-makers to enhance their understanding and support of EbA strategies, through targeted outreach, media, information sharing and policy briefs.

Photo: Archives IDEA Program

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## What is the expected project impact?

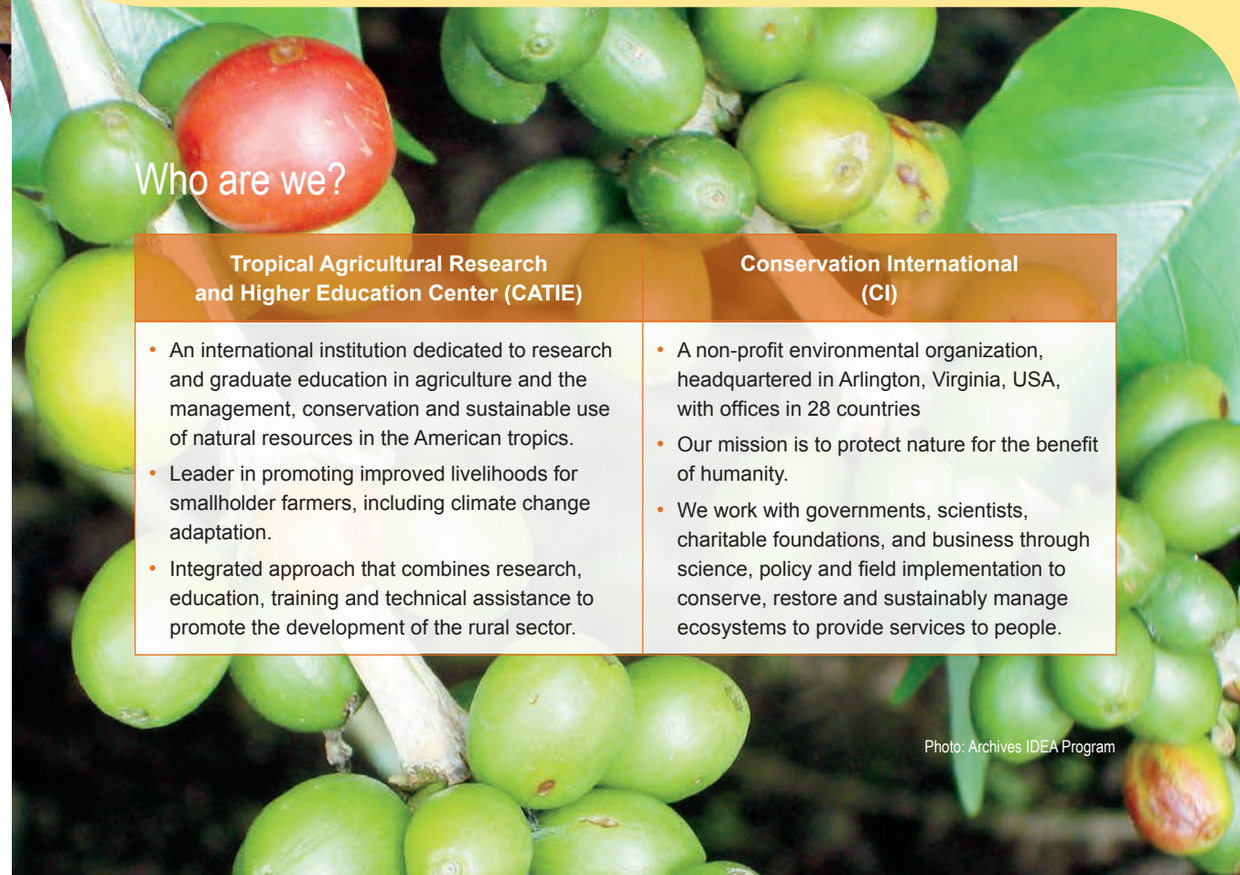
The project will contribute to climate change adaptation, and sustainable development across Central America by:

- identifying vulnerable farming communities and developing adaptation strategies and capacity to reduce this vulnerability,
- identifying effective EbA strategies which can be widely promoted among smallholder farmers and highlighting opportunities for ensuring their widespread adoption,
- demonstrating cost-effective, accessible and appropriate approaches to climate change adaptation,
- developing training materials and building capacity of local and national institutions to support and promote the adoption of EbA strategies among smallholder farmers,
- providing decision-makers with information on the costs and benefits of taking an ecosystem-based approach to adaptation, and the ability of EbA strategies to provide social, economic and environmental co-benefits,
- developing guidelines for effective adaptation options for smallholder farmers and creating and enabling environment for decision-making on adaptation issues,
- collaborating with other adaptation projects (especially other ICI-funded projects) programs and initiatives across Central America to ensure information sharing, promote synergies and distill lessons learnt, and
- widely disseminating results through national and international policy workshops, scientific congresses, scientific papers, policy briefs and white papers.



## Who are the project beneficiaries?

The project will directly benefit smallholder coffee and subsistence farmers across Central America by providing them with Ecosystem-based Adaptation options that can reduce their vulnerability to climate change. The project will also provide valuable support and information to agricultural organizations, coffee institutes, NGO's and other groups working with smallholder farmers on climate change adaptation and food security. Other beneficiaries include policy makers, government institutions, civil society groups, and the donor community working to promote adaptation among smallholder farmers who will have access to detailed information on farmer adaptation needs and appropriate adaptation options.



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## Who are we?

| Tropical Agricultural Research and Higher Education Center (CATIE) | Conservation International (CI) |
|---|---|
| • An international institution dedicated to research and graduate education in agriculture and the management, conservation and sustainable use of natural resources in the American tropics.<br>• Leader in promoting improved livelihoods for smallholder farmers, including climate change adaptation.<br>• Integrated approach that combines research, education, training and technical assistance to promote the development of the rural sector. | • A non-profit environmental organization, headquartered in Arlington, Virginia, USA, with offices in 28 countries<br>• Our mission is to protect nature for the benefit of humanity.<br>• We work with governments, scientists, charitable foundations, and business through science, policy and field implementation to conserve, restore and sustainably manage ecosystems to provide services to people. |


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