

Climate-Smart Agriculture in Costa Rica

Climate-smart agriculture (CSA) considerations

- A** **P** Efficient irrigation and drainage systems are essential responses to increasingly irregular rainfall patterns over large parts of the country.
- A** **P** The provision of improved weather information services will facilitate informed decision making by producers.
- A** **M** A growing public concern is the high rates of agrochemical usage by Costa Rican farmers. Efficient use of agrochemicals can reduce costs, improve farmers' responses to unpredictable weather patterns, and contribute to mitigation efforts by reducing nitrogen emissions.
- A** **M** Rotational grazing and forage banks increase the resilience of livestock production systems to drought. They can help improve efficiency, thereby reducing methane emissions per unit of production.
- A** **M** Agroforestry is already well established in the coffee sector. Carbon-capture coffee agroforestry systems can improve resilience to drought and disease, while increasing incomes through product diversification and payments for environmental services (PES).
- I** Nationally Appropriate Mitigation Actions (NAMAs) for the different agricultural subsectors are an effective means of operationalizing Costa Rica's climate change policy instruments and help promote inter-agency collaboration.
- I** Producers organizations play an important role in promoting CSA among their members and enabling cross-sectoral collaboration. They also play a leading role in ongoing research on climate trends, drought- and pest-resistant crop variety development, and new agricultural practices adapted to changing climate conditions.
- I** The identification of suitable adaptation and mitigation options can be enhanced by development and access to Integrated Decision Support Systems that compile and analyze weather, agronomic, and market information, and deliver results to a range of stakeholders and decision makers.
- \$** The established PES program provides an incentive for the development of agroforestry and silvopastoral systems. In addition, there are opportunities to build on Costa Rica's experience of participating in emissions-trading schemes by developing initiatives that explicitly promote the adoption of CSA practices by small-scale producers.
- \$** The family farm sector is currently underperforming in comparison with industrial agriculture, making it a priority to expand support for CSA development on small farms by replicating existing pilot projects and accessing new sources of funding. Reinvigoration of the small-farm sector can also make a significant contribution to the country's food security, which at present relies heavily on imports to meet basic needs.

A Adaptation
 M Mitigation
 P Productivity
 I Institutions
 \$ Finance

The climate-smart agriculture (CSA) concept reflects an ambition to improve the integration of agriculture development and climate responsiveness. It aims to achieve food security and broader development goals under a changing climate and increasing food demand. CSA initiatives sustainably increase productivity, enhance resilience, and reduce/remove greenhouse gases (GHGs), and require planning to address tradeoffs and synergies between these three pillars: **productivity, adaptation, and mitigation** [1]. The priorities of different countries and stakeholders are reflected to achieve more efficient, effective, and equitable food systems

that address challenges in environmental, social, and economic dimensions across productive landscapes. While the concept is new, and still evolving, many of the practices that make up CSA already exist worldwide and are used by farmers to cope with various production risks [2]. Mainstreaming CSA requires critical stocktaking of ongoing and promising practices for the future, and of institutional and financial enablers for CSA adoption. This country profile provides a snapshot of a developing baseline created to initiate discussion, both within countries and globally, about entry points for investing in CSA at scale.



National context: Key facts on agriculture and climate change

Economic relevance of agriculture

Agriculture is a key sector in the Costa Rican economy; however, the steady development of manufacturing and service industries means that the country's economy is no longer as reliant on agriculture as it was in the past. Services, including tourism, are the largest economic sector in Costa Rica, accounting for more than 70% of the gross domestic product (GDP) [3]. The manufacturing sector accounts for just over 20%. Principal industries include microprocessors and medical equipment. Much of this economic activity takes place in the free-trade zones (FTZs).

Agriculture still makes a substantial contribution to the country's export earnings and, together with tourism and electronic products, is one of the country's top three export earners [4]. The value of primary agricultural exports accounts for 22% of the country's total exports (2009–2013) [4]. While Costa Rica exports several hundred different agricultural products [5], the most important sources of export earnings are the products of large-scale monoculture, notably pineapples and bananas [4]. The other principal export crop, coffee, is typically grown by small-scale producers under traditional shade systems [6].

The agricultural sector is the second largest source of employment in the country, employing 13% of the economically active population [3, 7]. Primary agriculture accounts for just 7% of GDP [3, 8] but, if agribusiness is considered, the total contribution of the agricultural sector to GDP rises to 14% [7].

Costa Rica imports large quantities of fresh and processed foods, accounting for 13% of the total value of imports. In particular, the country relies heavily on imports for the majority of its staple foods, including maize, soybean, wheat, rice, and beans [8].¹

Economic Relevance of Agriculture

7%
of total GDP
from agriculture [3]

Total agricultural
imports [4]
US\$1,206 million

13% Maize
9% Soybean
7% Wheat
4% Rice
3% Beans



Total agricultural
exports [4]
US\$3,061 million

21% Banana
20% Pineapple
10% Coffee (green)
4% Oil palm
2% Melon and
Cantaloupe

People and Agriculture

4.3 million
people are living in
Costa Rica [9]

27% of the population
is living in rural areas [9]

Shared Prosperity [4]

0.9 million (20%)
live on less than US\$4/day

52% are in rural
areas

Jobs [9]

0.25 million people actively
employed in primary
production agriculture

The prevalence of people
undernourished is

13% 
90%  10% 

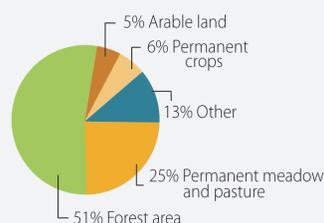
8% 

Land use

During the last five decades, cultivated lands in Costa Rica have not shifted geographically, but the location and type of crops have changed. Grazing land once covered almost half the country. In recent years, less productive pastures have been abandoned and replaced by forestry plantations or naturally regenerating tree cover. The largest protected areas are located in mountainous areas, which play an important role in providing water and other ecosystem services. Principal land uses are forests (51%), pastures (25%), and permanent crops (6%) [3]², mainly coffee and fruit trees.

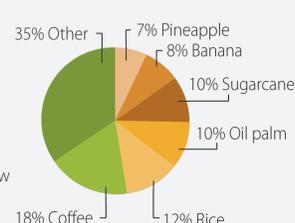
Land Use [4]

% of total land area



Main Crops [4]

% of total harvested area



Agricultural production systems

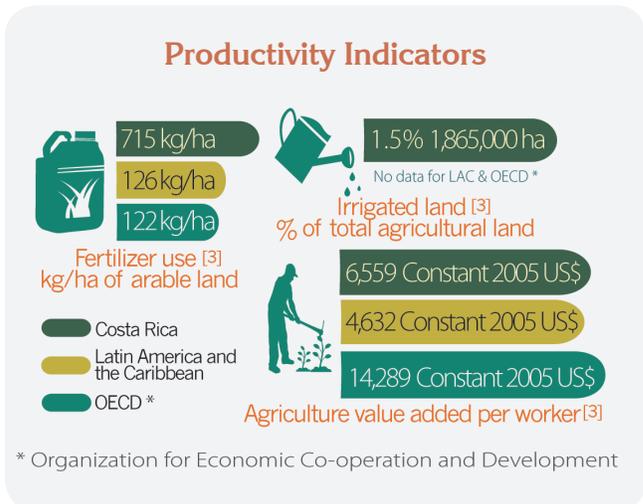
Coastal zones are mainly dedicated to industrial scale production of sugarcane and rice, alongside pineapple, bananas, and oil palm. While all these crops are also grown by small-scale producers, these often find it challenging to meet increasingly stringent quality standards and other criteria for participation in export trade [5]. Multinational companies, such as Dole and Chiquita, have a growing

¹ See Annex II.

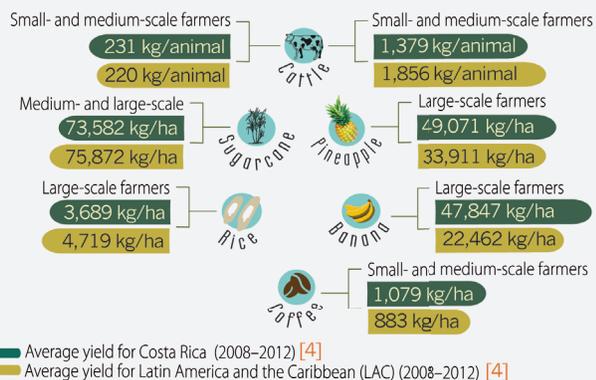
² See Annex III.

presence as land-owners and producers, particularly of pineapples and bananas. Pineapple is the most dynamic sub-sector, having overtaken bananas as the country's highest value crop at the start of the decade [10].

Highland areas are dedicated in large part to the production of livestock, together with coffee, fruits, and vegetables [11]. Over 50,000 families in highland areas depend on coffee production: 90% of these are small- and medium-scale producers owning an average area of 2.2 hectares [6]. Small- and medium-sized farms in highland areas also produce a variety of flowers, fruits, and vegetables, both for home consumption and export. The need for high yields in relatively small areas is one of the main reasons for the high use of agrochemicals.



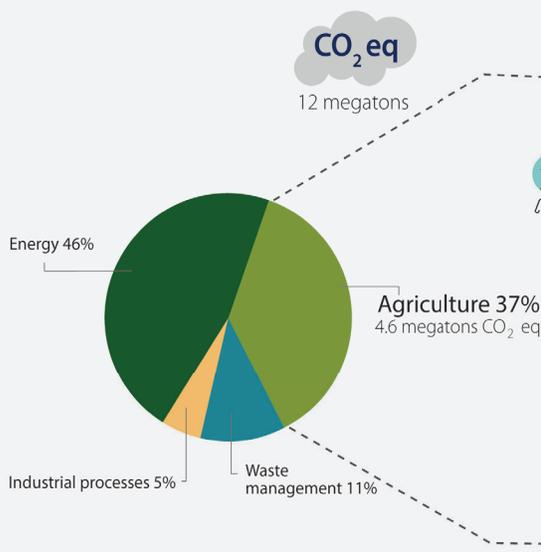
Important Agricultural Production Systems



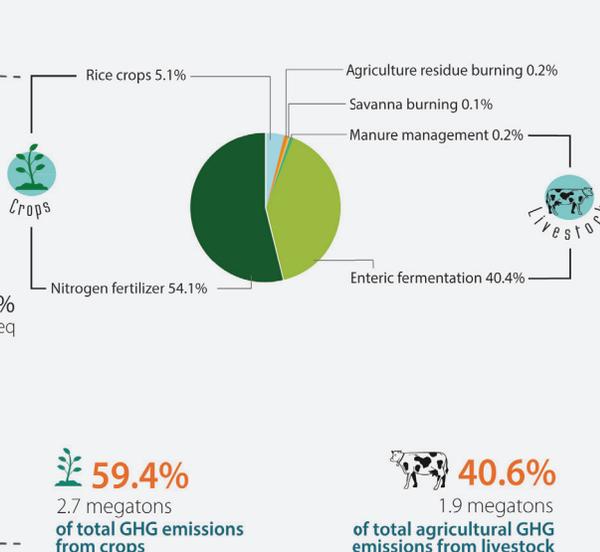
Agricultural GHG emissions

The agricultural sector is an important contributor to Costa Rica's GHG emissions, accounting for 37% of the total GHG emissions. According to national data used to prepare the latest National Communication to the United Nations Framework Convention on Climate Change (UNFCCC) [12, 13], methane emissions in Costa Rica are derived mainly from livestock (representing 15% of total national GHG emissions, and 40.6% of total emissions from agriculture). Nitrous oxide emissions result mainly from the use of nitrogen fertilizers (representing 20% of total national GHG emissions, and 54.1% of total emissions from agriculture). Minor emissions sources include irrigated rice (5.1% of agriculture emissions), manure management (0.2% of agriculture emissions), and burning of agricultural residues and pastures (0.3% of agriculture emissions).

GHG Emissions [14]



Agriculture GHG Emissions [14]



However, agricultural GHG emissions are offset to a significant extent by carbon sequestration in forest biomass and through change of land use from pastures to secondary forests, equivalent to at least 28.5% of total national emissions [12, 13].

Challenges for the agricultural sector

Despite an overall positive trajectory, the agriculture sector in Costa Rica faces a number of social, economic, and environmental challenges.

- Small-scale farmers have not shared in the prosperity enjoyed by larger agricultural producers over the past few years [15]. While the industrial sector has experienced progress in terms of market access and technology, small-scale farmers have been faced with intense price competition from industrially produced and imported food, thus impacting their agricultural income and well-being. Employment in the small-farm sector is declining due to rural-to-urban migration, driven by both the expansion of the urban economy and the economic hardships that small-scale farmers have been experiencing. The advance of urbanization has also led to a reduction in the area of agricultural land in areas that traditionally supplied food to urban markets [15].
- The Costa Rican banana and coffee subsectors have been seriously affected by black sigatoka and coffee rust, diseases whose recent spread has been associated with climate change [16].
- The agricultural sector (small-, medium-, and large-scale producers) relies heavily on the use of agrochemicals; usage rates in Costa Rica are among the highest in the world. Growing public concern revolves around the negative impacts of these practices on public health, biodiversity, and ecosystem resilience [17].

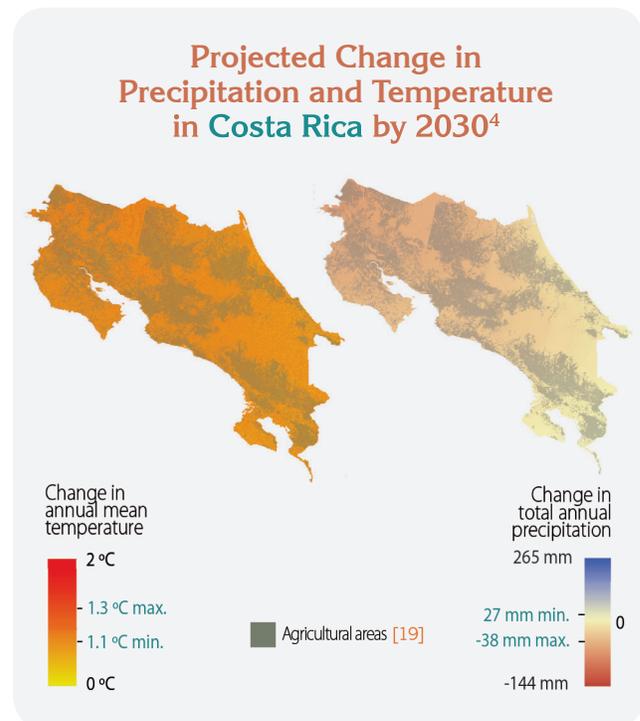
Agriculture and climate change

Global climate change is already a reality throughout most of Central America. However, compared to other countries in the region, Costa Rica is relatively less exposed to drought and extreme weather events. Only the North Pacific Coast is located within the Central America Dry Corridor – the region most exposed to drought – and the country as a whole is located just south of the hurricane belt.

Nevertheless, the country faces immediate risks from climate change, including increased frequency of extreme weather events, rising temperatures, and abnormal weather patterns. Of particular concern for agriculture are the increasingly erratic and unpredictable patterns of seasonal rainfall [15].³ As noted above, the spread of pests and diseases associated with long-term climate warming is a problem for all agricultural sectors.

Moreover, Costa Rica's reliance on food imports exposes the country to indirect threats to its food security. Like other countries in the region, Costa Rican consumers were severely affected by the rise in global food prices in 2008 [15, 18]. The threat of further rises in the cost of imported foodstuffs could become more severe as the impacts of climate change on global agriculture become more severe. In particular, Costa Rica relies on beans imported from other Central American countries that are forecasted to be much more severely affected by climate change (drought and rising temperatures) than Costa Rica itself.

The adoption of CSA practices by all sectors will be a key element in the successful response to these direct and indirect threats from climate change.



³ See Annex IV.

⁴ Projections based on RCP 4.5 emissions scenario [20] and downscaled using the Delta Method [21].

CSA technologies and practices

CSA technologies and practices present opportunities for addressing climate change challenges, as well as for economic growth and development of agriculture sectors. For this profile, practices are considered CSA if they maintain or achieve increases in productivity as well as at least one of the other objectives of CSA (adaptation and/or mitigation). Hundreds of technologies and approaches around the world fall under the heading of CSA [2].

Costa Rica's agricultural strategy prioritizes mitigation, in line with the overarching goal of achieving carbon neutrality by 2021 as laid out in the National Climate Change Policy. Becoming carbon neutral by 2021 is a strategic goal for Costa Rica. Notwithstanding uncertainty surrounding the exact definition of the goal and how it is to be achieved [22], the concept of carbon neutrality has become part of the national identity and is also seen as key generator of foreign exchange revenues through tourism and participation in carbon-trading schemes.

Farmers in Costa Rica have a number of incentives to adopt mitigation practices, including:

- Requirements for compliance with environment legislation.
- Opportunities to receive PES (especially for carbon capture) under the national scheme run by the Ministry of Environment and Energy (MINAE).
- Economic incentives to meet mitigation requirements for export product certification.

Adoption of mitigation practices (nitrogen smart and carbon smart) has already seen advancement in all the principal industrial sectors. In 2011, the Coffee Growers Cooperative of Dota (Coopedota) became the first coffee producer in the world to be certified as carbon neutral [23]. In the livestock sector, the dairy producers cooperative Dos Pinos is among the eight companies in the private sector recognized by the government for their outstanding progress towards carbon neutrality. The banana [24] and pineapple [25] producers associations have adopted the goal of achieving sector-wide carbon neutrality by 2021.

According to World Bank data, the use of nitrogen-based fertilizers per hectare fell by half between 2006 and 2010, and can be expected to have fallen further

since then. However, key subsectors, such as coffee, bananas, and vegetables, traditionally rely on very high inputs of chemical fertilizers, and overall usage in Costa Rica is still much higher than in other countries in the region. For example, in 2010, fertilizer use per hectare of arable land in Costa Rica was 2.6 times greater than in El Salvador and 12 times greater than in Argentina [3].

Farmers are also taking measures to adapt to changing climate conditions that are already being experienced, particularly the occurrence of unseasonal droughts and shorter and more intense periods of rainfall.

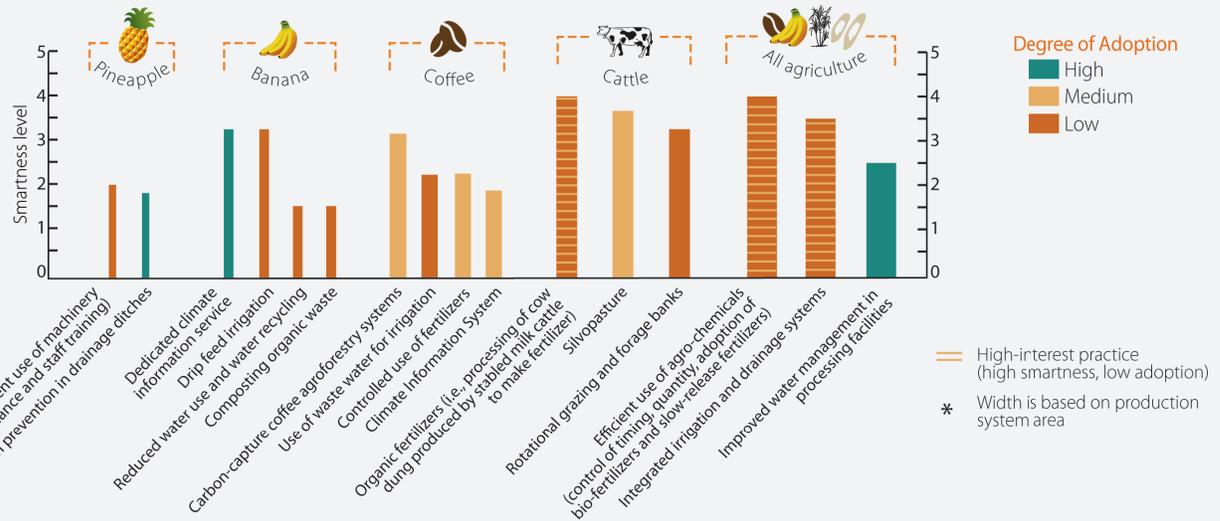
In all sectors, adaptation is mainly focused on irrigation, drainage, and improved management of water resources in response to drought and, to a lesser extent, erosion. Irrigation is becoming necessary even in sectors that traditionally did not require it, such as the banana sector. There are also a number of sectoral initiatives aimed at providing improved weather information services to facilitate informed decision making by producers.

However, practices that increase farmers' resilience show relatively much lower adoption levels than mitigation efforts. For example, at national level, there has been only limited progress towards expanding the area of land under irrigation [15]. Small-scale farmers in particular are still highly vulnerable to drought conditions, such as those that occurred recently in 2014 [26].

In the agro-industrial sector, the costs of adopting CSA practices are incurred by growers, while technical advice is provided by autonomous public or private organizations that represent the different subsectors. Notably, the practices adopted by the industrial sector affect not only agricultural production but also industrial processing, for example, through the efficient use of machinery and water, and waste disposal.

Among small-scale farmers, advice is provided by public extension and support services. Credit availability from commercial banks is limited [27], and the state-run development bank (Banca de Desarrollo) is still not fully operational. Lack of information and market access are the other principal barriers to adoption of CSA practices by small-scale farmers.

Selected Practices for each Production System with high Climate Smartness



This graph displays the smartest CSA practices for each of the key production systems in Costa Rica. Both ongoing and potentially applicable practices are displayed, and practices of high interest for further investigation or scaling out are visualized. Climate smartness is ranked from 1 (very low positive impact in category) to 5 (very high positive impact in category).

Table 1. Detailed smartness assessment for top ongoing CSA practices by production system as implemented in Costa Rica.⁵

The assessment of a practice's climate smartness uses the average of the rankings for each of six smartness categories: weather; water; carbon; nitrogen; energy; and knowledge. Categories emphasize the integrated components related to achieving increased adaptation, mitigation, and productivity.

Production System	CSA Practice	Climate Smartness	Adaptation	Mitigation	Productivity
Pineapple 7% harvested area	Efficient use of machinery (maintenance and staff training) ■ High adoption		Efficient use of energy reduced vulnerability to price rises.	Reduction of CO ₂ emissions from machinery.	Reduced costs.
	Erosion prevention in drainage ditches ■ High adoption		Increased resilience to extreme rainfall events.	Carbon capture through soil conservation.	Sustainable land use.
Banana 8% harvested area	Dedicated climate information service ■ Information widely available		Improved preparedness and response to unpredictable weather patterns and extreme weather events.	Some impact on nitrogen emissions by enabling timely fertilizer application.	Increased product quality and/or quantity of through informed decision making.
	Drip-feed irrigation ■ Low adoption		Increased resilience to drought, efficient use of scarce water resources.	No direct impacts.	Increased quality and quantity of product.
Coffee 18% harvested area	Carbon-capture coffee agroforestry systems ■ Medium adoption		Selection and maintenance of shade species improved resilience to drought, climatic variability, and disease.	Carbon capture through increased tree cover, soil conservation.	Increased incomes through product diversification, certification, PES.

Carbon smart Water smart Weather smart Nitrogen smart Energy smart Knowledge smart

⁵ See Annex V.

Production System	CSA Practice	Climate Smartness	Adaptation	Mitigation	Productivity
Cattle 25% land use area	Rotational grazing and forage banks ■ Low adoption		Increased resilience to drought.	Increased efficiency reduces NH ₄ emissions per unit of production.	Continuity of production.
	Silvopastoral systems ■ Medium adoption		Shade for cattle.	Carbon capture through increased tree cover.	Eligible for PES.
Industrial agriculture At least 50% harvested area	Improved water management in processing facilities ■ High adoption		Efficient use of scarce water resources.	No direct benefits.	Reduced costs through efficient use of water.
All agriculture 100% harvested area	Efficient use of agro-chemicals (control of timing, quantity, adoption of bio-fertilizers and slow-release fertilizers) ■ Medium adoption		Increased responsiveness to unpredictable weather patterns.	Reduced nitrogen emissions through efficient use of fertilizers, carbon capture (compost), reduced CO ₂ emissions (transport of fertilizers).	Reduced costs, improved production.
	Integrated irrigation and drainage systems. ■ Low adoption		Increased responsiveness to extreme weather events and unpredictable weather patterns. Efficient use of scarce water resources.	No direct benefits.	Increased productivity by maintaining optimum conditions for plant development.

Case Study: The Coffee NAMA

The Coffee NAMA is a program on integrated climate change mitigation that targets 93,000 ha of coffee plantations in Costa Rica. This area is responsible for around 25% of the total GHG emissions in the agricultural sector.

The program is coordinated by a multi-sectoral working group that brings together MINAE, the Ministry of Agriculture and Livestock (MAG), the Costa Rica Coffee Institute (ICAFE), and the NGO Foundation for Sustainable Development (FUNDECOOPERACIÓN), with the support of national and international strategic partners. Key measures promoted by the Coffee NAMA include:

- Reducing nitrogen emissions by training growers to plan effective fertilizer applications, eliminate wasteful application practices, use slow-release fertilizers, and incorporate nitrogen-fixing species into plantations.
- Discharging coffee-waste water from processing plants onto grassland areas, thereby eliminating the need for anaerobic lagoons that are a significant source of methane emissions.
- Using organic residues (pulp, mucilage, and husk) to produce energy for self-consumption by coffee mills.
- Establishing agroforestry systems that incorporate at least 70 trees of different species per hectare, including legumes and threatened species, with potential to sequester up to 34 t of carbon per hectare.



Coffee crops in Frailes de Desamparados, San José Province (Roberto Azofeifa/MAG).

Taken together, these measures could translate into an annual reduction of national GHG emissions of up to 120,000 t of carbon equivalents (CO₂ eq) – about 6% of total emissions from agriculture and livestock – in addition to other environmental benefits. They are also expected to be cost effective for the 50,000 farmers and dozens of mills, exporters, and roasters that form the coffee sector in Costa Rica.

A key element of the program is the development of a Monitoring, Reporting, and Verification (MRV) system to transparently demonstrate the effectiveness of the measures and enable the resulting emissions reductions to be traded on the carbon markets. Application of this MRV systems could provide useful lessons for other countries interested in establishing NAMA programs.

The initiative is worth US\$30 million, of which two-thirds have been sourced internationally from the German Agency for International Cooperation (GIZ), the Multilateral Investment Fund of the Inter-American Development Bank (IDB-MIF), and other agencies.

Institutions and policies for CSA

Costa Rica has been formally engaged in international climate change policy since ratifying the UNFCCC and the Kyoto Protocol in 1994 and 2002, respectively. It has presented two National Communications to the UNFCCC, in 2000 and 2009.

The key feature of the institutional landscape for CSA development in Costa Rica is the nexus between MINAE's Climate Change Directorate (DCC) and MAG.

The policy instruments of these two organizations are embedded as mutually complementary components of the National Development Plan and the National Climate Change Strategy (ENCC), both of which recognize the key role of agriculture in achieving strategic adaptation and mitigation objectives.

The main policy document of the agricultural sector is the "State Policy for the Agrifood Sector and Rural Development in Costa Rica 2010–2021." Climate change and agro-environmental management represents one of the four pillars of this policy and is expressed in plans to expand irrigation coverage, among others [5]. An earlier policy document, the 2008 National Food Plan [18], was developed with the specific aim to promote domestic production of basic food, in response to worldwide shortages and price rises of that year, thus also addressing the need for adaptation to climate change. More recently, the Action Plan for Climate Change and

Agro-environmental Management 2011–2014 has been developed as a response to the expected climate change threats to agriculture. Key elements of the strategy include risk management, adaptation, mitigation, knowledge management and capacity building, and sustainable production. That is to say, the document provides a vision for CSA at a national level, although the term is not used explicitly [28].

Achieving synergies between DCC's mitigation goals and the vision of increasing agricultural production promoted by MAG and its specialist agencies (such as the National Groundwater, Irrigation and Drainage Service [SENARA]) has been an objective hard to operationalize. However, significant progress is now being made towards integrating the different CSA pillars, due to the increased collaboration of catalyst organizations that provide 'bridges' between agriculture and the environment. These include:

- The National Forestry Finance Fund (FONAFIFO), the agency within MINAE that administers the PES program and has provided opportunities to many farmers to benefit from tree planting and other climate change mitigation conservation activities.
- The Innovation and Agricultural Technology Transfer Institute (INTA), which promotes CSA practices in association with partners, such as FUNDECOOPERACIÓN, the Central American Indigenous and Peasant Coordinator of Communal Agroforestry (ACICAFOC), and the National Biodiversity Institute (INBio).

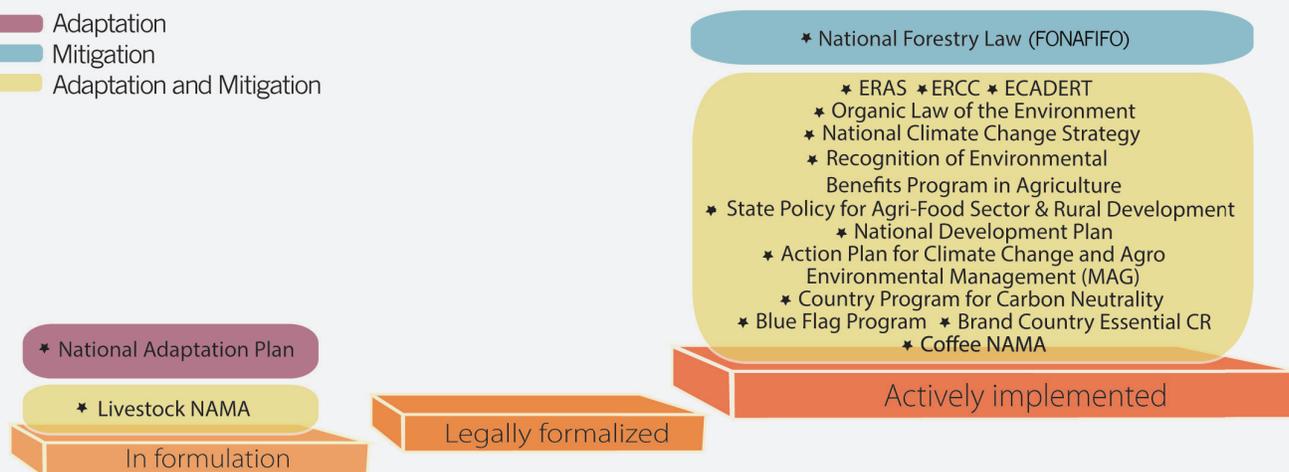
Enabling Policy Environment for CSA

Policies listed are related to enhancing **agricultural productivity** and:

Adaptation

Mitigation

Adaptation and Mitigation



ERAS Regional Agro-environmental and Health Strategy **ERCC** Regional Strategy on Climate Change

ECADERT Central American Strategy for Territorial Rural Development **NAMA** Nationally Appropriate Mitigation Action

- Autonomous public agencies mandated to support specific agricultural subsectors through trade and research and to represent them in public consultations and producers organizations. The agencies, self-financed and not located within MAG, include ICAFE (coffee subsector), the National Banana Corporation (CORBANA, banana), and Costa Rican Cattle Corporation (CORFOGA) (beef cattle). Private producers organizations that play similar role include the Agricultural and Industrial Sugarcane League (LAICA), and the National Chamber of Pineapple Producers and Exporters (CANAPEP).
- Academic and research organizations, such as the Tropical Agricultural Research and Higher Education Center (CATIE).
- The National Extension Program of the MAG, which is intended to promote environmentally positive investments at farm level to increase sustainable production and reduce negative environmental practices.

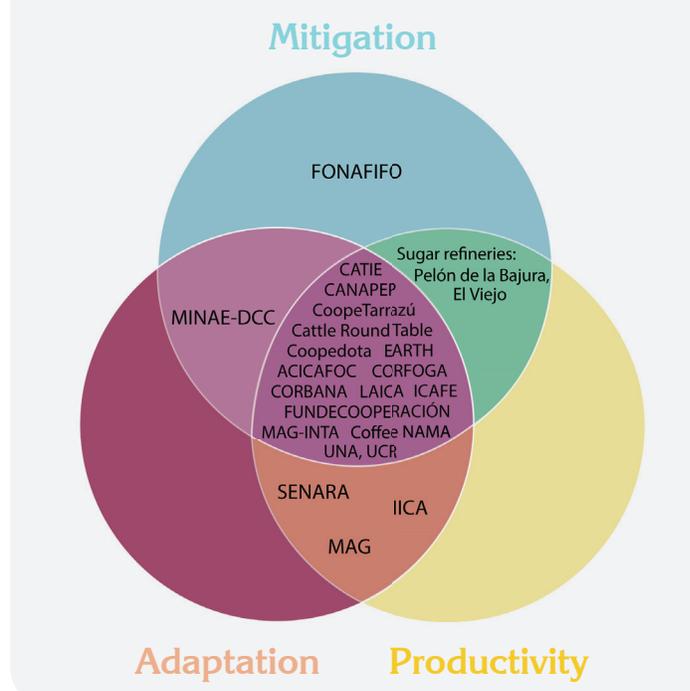
The principal means of operationalizing Costa Rica's climate change policy instruments are the NAMAs being rolled out for the different agricultural subsectors. The first of these is the Coffee NAMA (see case study above). NAMAs for the livestock, sugarcane, rice, and banana sub-sectors are in various stages of development.

NAMAs provide an institutional framework for the integration of production, mitigation, and adaptation objectives. They bring together DCC, MAG, sectoral producers associations, and other key actors from the public and private sectors as members of the coordinating and steering committees (for example, the Cattle Round Table) responsible for their implementation.

For small- and medium-scale producers, MAG is the lead agency promoting CSA in accordance with the National Strategy for Family Farms. MAG promotes the adoption of CSA practices through its Sustainable Production Program (PFPAS), run by its agricultural extension services. The program supports production and incorporates adaptation practices to reduce soil erosion, among others. Further support is provided by INTA, in collaboration with partner NGOs.

Recent demonstration projects are exploring the potential benefits to small-scale farmers of adopting explicitly “carbon-smart” practices. These include “Development of local capabilities in low-carbon and environmentally

Primary Focus of Institutions Engaged in CSA



friendly agricultural technologies,” implemented by INTA in partnership with FUNDECOOPERACIÓN and ACICAFOC, and INTA's Los Diamantes Experimental Station, which aims to develop a model for a carbon-neutral family farm.

Regional links

At the regional level, Costa Rica takes part in organizations aimed at coordinating policy responses to climate change, such as the Central American Commission on Environment and Development (CCAD). Costa Rica, along with other Central American countries, is a signatory to a “Regional Agreement on Climate Change,” which has given rise to a number of policy documents including the 2010 “Regional Climate Change Strategy.”

Costa Rica is also a member of regional coordinating bodies for the agricultural sector, such as the Agricultural Council of Central America (CAC), and a signatory to the Central American Agricultural Policy (PACA) and the Central American Strategy for Territorial Rural Development (ECADERT).

The international research program of the International Center for Tropical Agriculture (CIAT) includes a number of regional studies that contribute to defining options for CSA in Costa Rica.

Financing CSA

National finance

In the agro-industrial sector, CSA activities are financed directly by autonomous public agencies and producers organizations. Financing advice and information services for CSA is ensured by levies on members of producers associations. For example, members of ICAFE pay a levy of US\$0.26 per sack of coffee exported, which is used to fund ICAFE's activities, including CSA research and promotion. Members of CORBANA pay a levy of US\$0.05 on each crate of bananas exported. Private producers organizations, such as CANAPEP, are financed in the same way.

A significant percentage of financing received by autonomous public agencies and producers organizations is used for research on climate trends, drought- and pest-resistant crop variety development, and new agricultural practices adapted to changing climate conditions.

The PES scheme is increasingly seen as a mechanism to support the adoption of CSA practices, especially agroforestry and silvopastoral systems by small-, medium-, and large-scale producers. PES channels government funds received from fuel and water taxes to support mitigation activities, including CSA.

In addition to PES, MAG has its own program of incentives for small-scale farmers known as Recognition of Environmental Benefits. This program is intended to support farm investments that have a positive environmental impact. FUNDECOOPERACIÓN has recently introduced a new credit line for climate change adaptation and mitigation within its established credit program for small

and medium enterprises. A further innovation led by FUNDECOOPERACIÓN in collaboration with DCC is the development of an internal carbon-trading market.

International finance

Costa Rica increasingly relates to international donor agencies as a partner rather than merely a recipient of aid, especially in the case of climate-change-related initiatives.

Costa Rica takes part in the UNFCCC's Forest Carbon Partnership Facility. The national REDD+⁶ strategy, leading to the signing of an Emissions Reduction Payment Agreement (ERPA), is in an advanced state of preparation. Costa Rica is also part of the Low-Emissions Capacity Building Programme (LECBP) of the United Nations Development Programme (UNDP), and was accredited for access to the Adaptation Fund in 2012.

Reflecting international recognition of the country's leading role in global mitigation efforts, an ongoing project funded by GIZ is exploring the potential of Costa Rica's mitigation strategy as a model for low-carbon development.

While the country receives relatively little international aid for general agricultural development, a number of multilateral and bilateral agencies support initiatives that contribute to CSA, including the World Bank and the Inter-American Development Bank (IDB). Specific support for the development of NAMAs in the agricultural sector is provided by UNDP-LECBP, GIZ, and the IDB's Multilateral Investment Fund (MIF).

Funds for Agriculture and Climate Change

AEICD Spanish Agency for International Development Cooperation **CDKN** Climate and Development Knowledge Network **CDM** Clean Development Mechanism **CEPF** Critical Ecosystem Partnership Fund **CIAT** International Center for Tropical Agriculture **CIF** Climate Investment Funds **CORBANA** National Banana Corporation **EU** European Union **FAO** Food and Agriculture Organization of the United Nations **FCPF** UNFCCC Forest Carbon Partnership **FODEMIPYME** Fund for the Development of the Small-, Medium-, and Large-sized Enterprise **FONAFIFO** National Forestry Finance Fund **FONTAGRO** Regional Fund for Agricultural Technology **FUNDECOOPERACIÓN** Foundation for Sustainable Development **GEF** Global Environment Facility **GIZ** German Agency for International Cooperation **ICAFÉ** Costa Rican Coffee Institute **ICF** UK's International Climate Fund **IDB-MIF** Inter-American Development Bank - Multilateral Investment Fund **IFAD ASAP** International Fund for Agricultural Development, Adaptation for Smallholder Agriculture Programme **IKI** German International Climate Initiative **JICA** Japan International Cooperation Agency **KfW** German Development Bank **MAG** Ministry of Agriculture and Livestock **NICFI-NORAD** Norway's International Climate and Forest Initiative **NGOs** Non-governmental Organizations **NORAD** Norwegian Agency for Development and Cooperation **SAI Platform** Sustainable Agriculture Initiative Platform **SIDA** Swedish International Development Cooperation Agency **UNDP** United Nations Development Programme **UNEP** United Nations Environment Programme **USAID** United States Agency for International Development



NGOs

National Funds



CDKN · CIF · ICF · IFAD ASAP · NICFI-NORAD

International Funds

* Accessed Funds * Financing opportunities

6 REDD+: United Nations Programme for Reducing Emissions from Deforestation and Forest Degradation, plus conservation and sustainable management of forests and enhancement of forest carbon stocks.

As a member country of the Regional Fund for Agricultural Technology (FONTAGRO), Costa Rica is also engaged in a number of FONTAGRO-financed regional CSA initiatives as well as a regional CSA project funded by the German International Climate Initiative (IKI).

Product certification (e.g., by the Rainforest Alliance) plays an important role in facilitating CSA by providing financial incentives – especially for coffee producers – to adopt environmentally sustainable practices.

The country also participates actively in the international carbon-trading market. The nine projects registered with the Clean Development Mechanism (CDM) and two voluntary, over-the-counter (OTC) schemes include two initiatives that promote the adoption of CSA practices by small-scale farmers and coffee growers, respectively.

Potential finance

Opportunities to provide additional support for small-scale farmers to adopt CSA exist via extending emissions-trading schemes, building CSA into wider programs to support rural small and medium enterprises (SMEs), as well as incentive structures (PES), and accessing funds

specifically for the small-scale farm sector, such as the Adaptation for Smallholder Agriculture Programme (ASAP) of the International Fund for Agricultural Development (IFAD).

Outlook

Costa Rica has won international recognition for its contribution to global mitigation efforts. The country's overarching climate change strategy provides a favorable policy environment for the development of CSA. Participation in REDD+, emissions-trading schemes, and other global climate change initiatives will provide finance that can be directed towards CSA research and development. NAMAs provide an effective means of operationalizing climate change policy in the agricultural sector and a favorable institutional setting for closer collaboration between environmental and agricultural development agencies. Principal challenges include the need to increase uptake of adaptation measures, such as irrigation, and control the use of agrochemicals; as well as to promote adoption of CSA practices by the small-scale farm sector, as part of a wider strategy to reinvigorate this sector economically so that it can make a greater contribution to the country's food security.

Works Cited

- [1] **FAO. 2010.** "Climate-smart" agriculture. Policies, practices and financing for food security, adaptation and mitigation. Rome: Food and Agriculture Organization of the United Nations (FAO).
- [2] **FAO. 2013.** Climate-smart agriculture sourcebook. Rome: FAO.
- [3] **The World Bank. 2012.** World Development Indicators. Washington, D.C.: The World Bank. Available at <http://data.worldbank.org/data-catalog/world-development-indicators> (Accessed on 2 April 2014).
- [4] **Arguedas I; Calderón JC; Céspedes E; Chacón M; López K; Medaglia C; Mora E; Vargas F. 2014.** Estadísticas de Comercio Exterior Costa Rica, 2013. San José: Foreign Trade Corporation of Costa Rica (PROCOMER).
- [5] **MAG. 2011.** Política de Estado para el Sector Agroalimentario y el Desarrollo Rural Costarricense 2010–2021. San José: Ministry of Agriculture and Livestock (MAG).
- [6] **INEC. 2007.** Censo cafetalero. San José: INEC, Costa Rican Coffee Institute (ICAFE).
- [7] **SEPSA. 2013.** Boletín Estadístico Agropecuario No. 23: Serie cronológica 2009–2012. San José: Executive Secretariat for Agricultural Sector Planning (SEPSA).
- [8] **Ministry of Finance. 2014.** Estadísticas de importación y exportación. Ministry of Finance Website. Available at <http://www.hacienda.go.cr/contenido/370-estadisticas-de-importacion-y-exportacion> (Accessed on 12 September 2014).
- [9] **INEC. 2011.** X Censo Nacional de Población y VI de Vivienda. San José: National Institute of Statistics and Censuses (INEC). Available at <http://www.inec.go.cr/Web/Home/GeneradorPagina.aspx> (Accessed on 2 April 2014).
- [10] **MAG. 2013.** InfoAgro: Estadísticas Agropecuarias. InfoAgro Website. Available at <http://www.infoagro.go.cr/EstadisticasAgropecuarias/>
- [11] **CORFOGA (sd).** Análisis de censo ganadero 2000. CORFOGA Website. Available at <http://www.corfoga.org/pdf/proyecto/censo2000.pdf>
- [12] **MINAET; IMN. 2009.** Segunda Comunicación Nacional a la Convención Marco de las Naciones Unidas sobre Cambio Climático. San José: Ministry of Environment, Energy and Telecommunications (MINAET), National Meteorological Institute (IMN).
- [13] **Chacón AR; Montenegro J; Sasa J. 2009.** Inventario Nacional de Emisión de Gases con Efectos Invernadero y Absorción de Carbono en Costa Rica en el 2000 y 2005. San José: MINAET, IMN.
- [14] **FAOSTAT. 2014.** FAOSTAT database. Rome: FAO Statistics Division. Available at <http://faostat3.fao.org/faostat-gateway/go/to/home/E> (Accessed on 2 September 2014).
- [15] **IICA. 2010.** La agricultura de Costa Rica: Situación al 2010, su evolución y prospectiva. San José: Inter-American Institute for Cooperation on Agriculture (IICA).
- [16] **MAG; CCAFS. 2014.** Estado del arte en cambio climático, agricultura y seguridad alimentaria en Costa Rica. Cali, Colombia: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

- [17] PAHO. 2003. Efectos de los plaguicidas en la salud y el ambiente en Costa Rica. San José: Pan American Health Organization (PAHO), Ministry of Health.
- [18] SEPSA. 2008. Plan Nacional de Alimentos Costa Rica: Oportunidad para la agricultura nacional. San José: Secretaría Ejecutiva de Planificación Sectorial Agropecuaria (SEPSA).
- [19] FONAFIFO. 2005. Mapa de cobertura forestal de Costa Rica. San José: National Forestry Finance Fund (FONAFIFO).
- [20] Collins M; Knutti R; Arblaster J; Dufresne JL; Fichetef T; Friedlingstein P; Gao X; Gutowski WJ; Johns T; Krinner G; Shongwe M; Tebaldi C; Weaver AJ; Wehner M. 2013. Long-term Climate Change: Projections, Commitments and Irreversibility. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker TF; Qin D; Plattner GK; Tignor M; Allen SK; Boschung J; Nauels A; Xia Y; Bex V; Midgley PM. (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1029–1136, doi:10.1017/CBO9781107415324.024.
- [21] Ramírez J; Jarvis A. 2008. High-Resolution Statistically Downscaled Future Climate Surfaces. Cali, Colombia: International Center for Tropical Agriculture (CIAT); CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).
- For further information and online versions of the annexes, visit <http://dapa.ciat.cgiar.org/CSA-profiles/>
- [22] Programa Estado de la Nación. 2013. XIX Informe Estado de la Nación en Desarrollo Humano Sostenible. San José, Programa Estado de la Nación.
- [23] Solís JA. 2011. Coopedota launches world's first carbon neutral coffee. Coopedota Website. Available at http://www.coopedota.com/index.php?option=com_content&view=article&id=79%3Aa.
- [24] CORBANA; Dole. 2013. Thanks to public and private initiative, the banana sector is striving to achieve carbon neutrality. Tropical agriculture gears up for climate change, Costa Rica Carbon Neutral 2021. San José: MAG, MINAET, CATIE, IICA, GIZ.
- [25] Ruiz G. 2013. Tras crecimiento explosivo, piña de Costa Rica busca madurar con proyecto de marca país. El Financiero, 23 July, San José. Available at http://www.elfinancierocr.com/economia-y-politica/pina_golden-pineros-Costa_Rica-Canapep_0_338966136.html
- [26] IMN. 2014. Fase actual: El Niño, informe 5. Boletín del ENOS No. 70. San José: IMN.
- [27] Fernández E. 2014. Crédito se mantiene árido y lejano para pequeños agricultores en Costa Rica. El Financiero. 16 March, San José. Available at: http://www.elfinancierocr.com/economia-y-politica/Banca_para_el_Desarrollo-UPA_Nacional-BCR-Banco_Popular-SBD_0_481751862.html
- [28] MAG. 2011. Plan de Acción para el Cambio Climático y la Gestión Agroambiental 2011–2014. San José: MAG.

For further information and online versions of the Annexes, visit:

<http://dapa.ciat.cgiar.org/CSA-profiles/>

Annex I: Acronyms

Annex II: Agriculture and foreign trade in Costa Rica

Annex III: Land use in Costa Rica

Annex IV: Climate change predictions in Costa Rica

Annex V: CSA practices in Costa Rica: a detailed list

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