

Costa Rica

Livestock NAMA Concept

November 2014

Acronyms:

CATIE:	Tropical Agricultural Research and Education Center
CIAT:	International Center for Tropical Agriculture
CNPL:	National Chamber of Milk Producers
CORFOGA:	Livestock Corporation
DCC:	Climate Change Directorate
EARTH:	EARTH University (Escuela de Agricultura de la Región Tropical Húmeda)
ENCC:	National Strategy on Climate Change
ENGBC:	National Strategy on Low-Carbon Livestock Farming
FONAFIFO:	National Forestry Financing Fund
GHG:	Greenhouse gases
GIZ:	Gesellschaft für Internationale Zusammenarbeit
IMN:	National Meteorological Institute
LECB:	Low Emission Capacity Building
MAG:	Ministry of Agriculture and Livestock Farming
MINAE:	Ministry of Environment and Energy
MRV:	Measurement, Reporting and Verification
NAMA:	Nationally Appropriate Mitigation Actions
UNDP:	United Nations Development Program
REDD+:	Reducing Emissions from Deforestation and forest Degradation
SENASA:	National Animal Health Service
UTN:	National Technical University



1. Towards a more eco-competitive livestock sector

The concept of Livestock NAMA in Costa Rica represents the route towards a more eco-competitive livestock sector¹, which promotes the use of technologies and actions aimed at developing climate smart, profitable, productive, and socially sustainable livestock.

In its second version², this document analyzes in depth the concept of this initiative, which comprises the juncture where it is generated and supported, its strengths and opportunities, as well as its vision and structural elements, such as objectives, products, and transformational potential.

¹In this document, eco-competitive livestock farming is understood as the one which economic efficiency allows to compete with its products in the market, while producing minimum GHE per product unit.

²First version, November 2013.

1.1 Economic and social importance of Costa Rican livestock farming

In Costa Rica, there are 45,870 livestock production units³ spread through the country covering 35%⁴ of the entire national territory. The livestock sector generates, at least, 12%⁵ of the national workforce.

The mode of livestock production is based on grazing, with an average farm size of 41 ha and an animal density of 0.9 AU⁶ / ha. Of the total area, 5% is used for silvopastoral uses, 24% is devoted to forests protection, and at least 45,00⁷ ha are devoted to forest plantations. Production systems are mostly meat cattle (34%), dairy cattle (21%) and dual-purpose (38%)⁸. Herd distribution in the farms is asymmetric with two clearly distinctive segments, on one hand, a large number of small producers (50% of farmers have a herd of approximately 16 heads), while a smaller segment of producers (10 %) own most of the cattle herd.⁹

The last national inventory, whose base year is 2010, reported a total gross emission of 14.044.040 tons of CO₂e and a net total of 8.778.840 metric tons of CO₂e, after subtracting carbon sinks nationwide (IMN, 2014). The livestock category is the second largest national subsector in terms of emission generation and it is responsible for approximately 23,6 % (3.317.000 tCO₂e) of national gross emissions.¹⁰

³ CORFOGA, 2013, Livestock Survey.

⁴ Representing 1,863,657 ha.

⁵ INEC, 2013, Continuous Survey on Employment.

⁶ CORFOGA, 2012. AU: Animal Unit is equal to one animal with 450 kg of live weight.

⁷ FONAFIFO, 2012. Reforestation Data.

⁸ CORFOGA, Livestock Survey.

⁹ 10% owns more than 79 cattle heads. Result of clusters, SIDE ENGBC

¹⁰ IMN & MINAET, 2014, Costa Rica 2009: Third National Communication to the United Nations Framework Agreement on Climate Change, San José, Costa Rica.

1.2 A favorable setting for eco-competitiveness

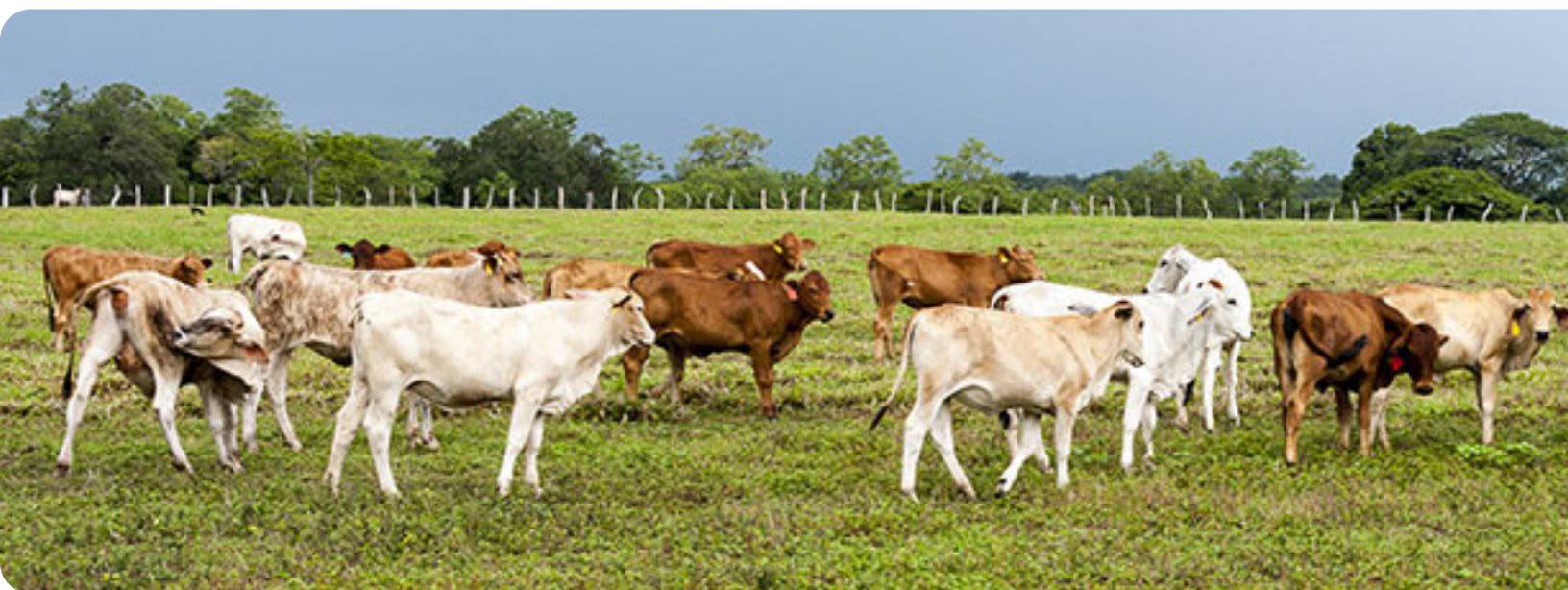
Over the last decade, it has been developed a highly favorable setting for the development of programs aimed at promoting the enhancement of the economic and environmental sector in, at least, three levels: public policy, private sector involvement and greater awareness on economic and social feasibility of eco-competitive livestock farming.

1.2.1 Public policy

In 2007, the Costa Rican government announced its goal of becoming a carbon neutral country by 2021. This commitment of Costa Rica to climate change mitigation and adaptation was stated in several documents detailing this public policy, such as:

- 1) the National Development Plan 2015-2018,
- 2) the National Climate Change Strategy 2009 (ENCC);
- 3) the National Climate Change Program (ENCC Action Plan 2013); and
- 4) the Policy for the Costa Rican Agrifood Sector and Rural Development 2010-2021. In the latter publication, prepared by the Ministry of Agriculture and Livestock Farming (MAG), Climate Change and Agro-environmental Management was established as one of its four pillars of the state policy in line with the national goal of achieving carbon neutrality.

As part of this Strategy, in early 2013, government authorities, with the support of public and private institutions, universities and research centers, with technical and financial support of international cooperation, made the decision to develop a NAMA for the sector in order to achieve a transformational change and make it re eco-competitive.



The synergy between the Ministry of Environment and Energy (MINA E) and the Ministry of Agriculture and Livestock Farming, with institutions such as--among others--Livestock Corporation (CORFOGA) and the National Chamber of Milk Producers (CNLP), allowed in 2013 to begin the following initiatives:

- i) National Strategy for Low Carbon Livestock Farming (ENGBC).
- ii) Capacity building towards the design of a Livestock NAMA,
- iii) First pilot project of Livestock NAMA, and
- iv) First public-private institutional arrangement aimed at strengthening dialogue and joint implementation of both mitigation initiatives.

The importance of the environmental policy in Costa Rica stands out among the priorities of the new ministerial authorities (2014-2018). As a part of the agenda for the development of the agricultural sector, they have publicly committed to donor agencies to maintain the State policy already established and to strengthen not only the agenda of sustainability and climate change, but also the strategy to promote low-emission livestock farming.

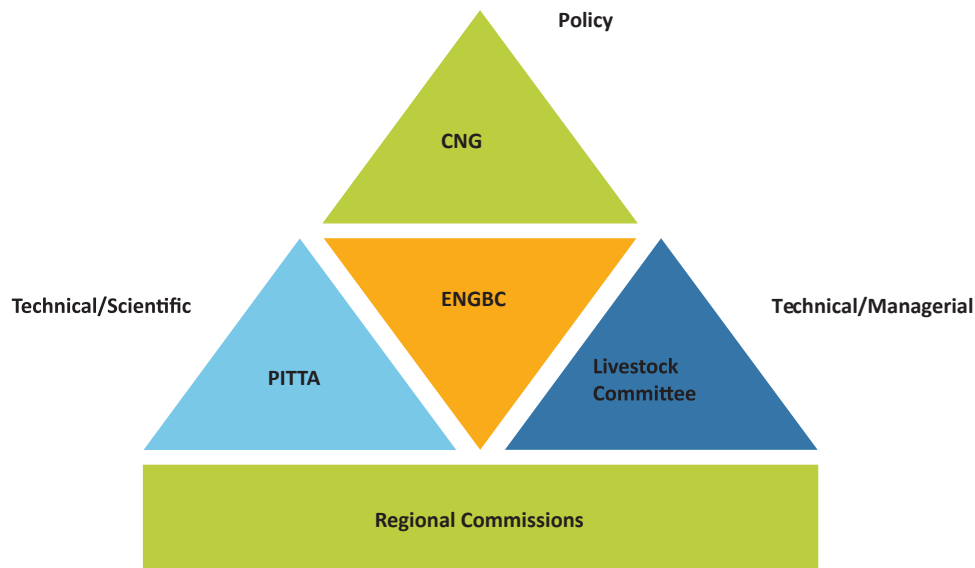
1.2.2 Key stakeholder involvement

Based on the lessons learned over the last year, MAG designed an institutional arrangement to establish an open dialogue among all stakeholders, a space through which public and private research and extension services will be coordinated for the development of the Livestock NAMA.

As shown in Diagram 1, the institutional arrangement consists of four levels: i) **Policy**, consisting of the National Livestock Commission (CNG), which includes the participation of senior officials of participating public and private institutions. ii) **Management**, consisting of the Livestock Committee, which includes representatives of public and private organizations and international cooperating agencies. iii) **Technical**, the Program on Agricultural Research and Technology Transfer (PITTA) comprising researchers from universities, NGOs and public and private institutions. iv) **Operational** consisting of the Regional Commissions¹¹ comprising the participation of extension agents of public and private institutions, as well as representatives of livestock producers.

¹¹ There are five Regional Commissions (Brunca, Huetar, Chorotega, Central Pacific, and Atlantic Huetar) for the entire territory.

Diagram 1: Institutional Arrangement



Around 20 institutions¹² and all cattle producer chambers, at regional commission level, are represented in this institutional arrangement. These institutions invest in farmer training, technical assistance, dissemination and generation of eco-competitive technologies, innovation and transfer of technologies, processes and dissemination of information to consumers.

Likewise, public institutions also generate the political framework for national and sectoral programs and strategies that make up the basis for eco-competitive cattle farming. In this context, the National Strategy REDD+ is developed, under the Fonafifo leadership, to seek the implementation of a landscape restoration strategy. REDD+ and Livestock NAMA work in a coordinated way to restore degraded areas in selected farms with the many co-benefits it entails.

¹² MAG, MINAE, National Institute on Agricultural Technology Transfer (INTA), Rural Development Institute (INDER), National Animal Health Service (Senasa), National Training Institute (INA), Livestock Corporation (Corfoga), National Chamber of Milk Producers (CNPL), Cooperativa Agropecuaria Regional de Productores de Leche R.L (Coopeleche), Cooperativa de Leche Dos Pinos R.L (Dos Pinos), CoopeMontecillos R.L (Montecillos), Indigenous and Peasant Coordinating Association of Central American Community Agroforestry (Acicafoc), Tropical Agricultural Research and Education Center (CATIE), Universidad Técnica Nacional UTN, Universidad de Costa Rica UCR, Escuela de Agricultura de la Región Tropical Húmeda (EARTH), United Nations Development Program (PNUD), Gesellschaft für Internationale Zusammenarbeit (GIZ), International Center for Tropical Agriculture (CIAT).

1.3 Vision of a competitive livestock sector with low greenhouse gas emissions

The National Strategy for Low Carbon Livestock, which is not a government strategy, but a national public policy, is born to address better the challenges of climate change and carbon neutrality. The ENGBC generates a baseline, mitigation scenarios, and a plan for removing barriers that provide the framework need for the implementation of the Livestock Cattle NAMA.

The vision for Costa Rican livestock in the medium term (10-15 years) is to have an intensified, environmentally sustainable, more modernized and more efficient sector in meat and milk production, with an increased dual-purpose system resulting from increased mechanization of this system.

In the long term (15 years and over) a higher herd density is expected, small farms will continue to diversify, with an increase in the number of animals. It is expected to have an even more articulated, more economically and environmentally efficient sector, in addition to a well-established product differentiation established by identifying labels.

Moreover, rather than the emergence of new enterprises in meat industrialization, it is expected an evolution of the livestock industry towards cleaner production. At the same time, it is anticipated that the domestic market of these products will be satisfied, together with specialized (gourmet) exports of final goods. Both the ENGBC and NAMA aim at optimizing this vision for the sector.

Regarding the Livestock NAMA, the objective of the country is to produce a transformational change in the production and processing forms of the livestock sector in Costa Rica in order to generate eco-competitive livestock practices.

It is expected that the planned transformation of the livestock practices in this NAMA will improve the income and quality of life of livestock producers in the country, by reaching a range of at least 60% of the area devoted to livestock, which would allow a sector with limited resources to become more competitive. With the increased capacities of farmers and the technical support of extension agents, a large-scale implementation and maximization of positive associated outcomes would be possible.

1.4 Barriers to mitigation in the Costa Rican livestock sector

The Livestock NAMA is the operational tool that the Costa Rican livestock sector is using for transformational changes towards more eco-competitive processes. For this purpose, four major barriers that prevent the widespread adoption of technologies must be mitigated:

Barrier 1: Quantity and quality of information. The quantity and quality of information available to producers on aspects such as implementation and results of technologies, as well as the opportunities and constraints existing in the value chain is a fundamental precondition for their adoption.

Barrier 2: Financial Resources. Most of the technologies to be disseminated require, to a lesser or greater extent, a financial investment to be adopted by the producer. There are no credit conditions in the market consistent with the reality of the sector, which hampers acceptance in the strata of producers with no economic availability or access to credit. This barrier is further aggravated when, additionally to the initial investment, the benefits are not obtained in the immediate term. This barrier should not be confused with the profitability of technologies, since these are often profitable in the long-run; however, quite often, small farmers can only expect short-term returns, and they find difficulties to get new resources through loans.

Barrier 3: Availability of inputs. This restriction relates to the lack of availability of the materials and inputs needed to use the recommended technology (e.g. improved pasture seeds).

Barrier 4: Market failures. This refers to the lack of a mechanism to provide consumers with information on the environmental attributes associated with the processes of low- emission livestock production.



2. Description and objectives of the Livestock NAMA

Framed within the country's strategies and programs and among its objectives, the livestock NAMA seeks to respond to the global problem of climate change with a strong participation of the different actors and sectors, considering the following strategic areas of work: GHG mitigation, adaptation to change climate, measurement, reporting and verification (MRV), capacity building, technology transfer and public awareness and change of consumer habits.

NAMA expects changes not only in the primary production of meat and milk through the generation, dissemination and adoption of new measures (technologies and processes) of mitigation-adaptation in the livestock sector, but also in the form of processing the product within the Costa Rican agricultural chain. It also seeks to improve the extension service and public and private technical support. Further, the NAMA aims at promoting greater consumer awareness on the importance of reducing GHG emissions in the sector.

To achieve the goal of the livestock NAMA, the following specific objectives are proposed¹³:

1. To transform cattle production chain through sustainable practices to strengthen financial and environmental components.
2. To consolidate the system of measurement, reporting and verification, and the reduction of uncertainty on emission ratios in the Costa Rican agricultural sector.
3. To strengthen the institutional, economic and social capacities of producers, livestock chambers, industry and environmental awareness of consumers.
4. To harmonize interagency coordination for linking Livestock NAMA to the National Strategy REDD+, under the national GHG inventory and under the C-neutrality program.

The NAMA adopts an innovative conceptual framework integrating scientific, institutional, management and economic policy aspects toward greater effectiveness and efficiency to achieve the desired objectives. Additionally, it integrates into the private industrial sector, which plays an important role in the dissemination and support in the adoption

¹³The objectives, results and products have arisen under the framework of an extensive consultation process completed with the presentation of the Cattle Farming NAMA at the NAMA Facility, July 2014.

of technologies and processes for the expected transformation. Finally, the dissemination of successful experiences in competitiveness and profitability of producers who joined the NAMA and the information generated through this process will be available for the exchange of knowledge and best practices.

To develop these objectives, the following results and products are proposed:

Result 1: Technologies and processes aimed at increasing productivity and reducing GHG emissions have been characterized. The products of this result are: i) technologies characterized in terms of their profitability and GHG emissions. ii) Research processes and strengthened technology transfer for the generation-adaptation of win-win technologies. iii) Methodologies adapted and tested for reducing uncertainty in the estimation of GHG emission ratios (CH₄ and N₂O) in Costa Rican livestock systems.

Result 2: The institutional arrangement for the livestock NAMA has been strengthened by involving the matters shown in Diagram 1. This arrangement seeks to improve the dialogue among all stakeholders involved in decision-making for the livestock sector. In addition, it seeks to establish interagency agreements among involved the parties.

Result 3: Eco-competitive technologies and processes implemented by livestock producers. At this stage, pilot farms will be established and funded in the five regions of the country, to develop a training program for farmers and technicians on eco-competitive technologies with the support of public-private extension services.

3. Transformational potential of NAMA

In regard with the high emissions of the sector, these are the result of low efficiency in the digestibility of the livestock during the enteric fermentation process. Therefore, the adoption of technologies and processes

that lead to increase such efficiency is key to increase productivity and reduce sectoral emissions.

In a 15-year period, it is expected to reach at least 70% of the herd and 60% of the area devoted to livestock farming, thus achieving a mitigation potential of approximately **6 million tCO₂e**. Additionally, as a result of the measures taken, it is expected to capture approximately **4 million tCO₂e** by 2030, through the sequestration capacity of the biomass in the farm.

3.1 Co-benefits

The implementation of the livestock NAMA—integrated with a focus on Climate Smart Agriculture (CSA)—is expected to provide the following co-benefits:

- **Soil Conservation and Restoration:** Improvement in the quality of soils and carbon containment is expected as a result of improvement in pastures and rotating pasture sections. This, in turn, contributes to a higher organic content and an increased capacity to retain moisture—which is crucial for the expected reductions in rainfall and increases in temperature—as well as a reduction in runoff and soil erosion.
- **Ecosystem services:** It is expected to have an increase in the capacity to retain moisture in the soil, protection of water sources, protection of biodiversity, improvement of biological connectivity, and landscape improvement, thus benefiting tourism and other services.
- **Profitability:** An increased productivity of economic activity implies an increase in cash flow and income of farmers, sustainability of their income-generating activity and improvement in their livelihoods and their families (better access to education and health). Since this activity is developed in rural areas, these improvements also help secure employment opportunities in deprived areas, and increase rural income.

- **Increased forest cover:** This increase will take place due to the implementation of hedges and scattered trees in farms. Furthermore, an increase in production efficiency will result in isolation and protection of hydric charge zones and larger riparian forests.

Improved fertilization plans: The use of fertilizers is a major source of GHG emissions in dairy farms; therefore, information and capacity building can contribute to implement them more efficiently and to implement other strategies such as organic fertilizers, slurries or new technologies, including slow-release fertilizers.

4. Technologies and processes for eco-competitive cattle farming

The key technologies and processes suggested in the NAMA are:

Hedges-pasture sections: Dividing pasture areas in farms into more pasture sections allows a more efficient use of pasture and space. Hedges consist essentially of planting trees to divide the pasture areas capturing CO₂. They are a source of food for the herd while they reduce production costs, as this type of fence should not be replaced as often as wooden posts.

Rational grazing: It is a management system of livestock farms that allows herd rotation in pasture sections at least every two or three days, increasing animal density and productivity per hectare. Moreover, due to longer recovery times, pastures are healthier as there is an increase in carbon sequestration in soil.

Pasture Improvement-feeding: The incorporation of new pasture species (e.g. the Brachiaria gender) results in a better nutrition of livestock, which increases productivity and reproduction rates. In addition, improved pasture reduces GHG emissions as it allows the herd to digest more efficiently and reduce enteric fermentation. It is worth noting that improved pasture and grazing are rational actions that are more successful when they are implemented together.

Although the measures to be taken are focused on the primary sector of production, the livestock NAMA is considering the incorporation, in 2015, of a number of measures in the processing industry, such as the change toward renewable energy sources and the implementation of more efficient cooling systems.

Additionally, other measures such as genetic improvement of the herd and excreta management are considered for future inclusion in the NAMA.

5. Market incentive and financial mechanisms

The livestock sector has such a level of heterogeneity that for a mass adoption of the proposed measures it is necessary to use a variety of financial instruments to suit the needs and characteristics of each segment of the livestock population.

The Government of Costa Rica is covering the costs involved in the adoption of new technologies and processes in its current startup phase. It is providing important funding to the pilot plan--mainly by means of cooperation--directly assisting farmers in the Brunca Region through LECB. However, once there is more clarity on cash flows and the social and environmental impacts of NAMA components, thanks to the said pilot plan, the direct and increasingly dominant participation of the private sector will be necessary in funding these measures in the farms.

Therefore, they are considering using at least three financial instruments: i) a high level of co-financing (direct payments) for the measures, through



support conditional upon the adoption-verification of technology, which is a measure appropriate for the smaller groups. ii) Credit guarantees for those groups whose access to credit is limited by the lack of collaterals. iii) Prime interest rates for groups that have access to credit. These would be managed by the National Bank of Costa Rica (BNCR), which has accompanied the NAMA since the beginning of 2014, as well as other concerned financial institutions.

Likewise, they are considering establishing legal and institutional conditions for the transparent functioning of a national carbon market to include the agricultural sector. They also propose to include carbon sequestration in soils and biomass of cattle farms in the national carbon market, as an instrument for payment of co-funding to small producers. All the above will be done by linking the reduction-generating eco-competitive livestock sector of the UCC¹⁴ to potential buyers (demanding organizations).

With the support of the livestock NAMA, a label to identify products manufactured with low GHG emissions will be created, as an incentive for producers and industries adopting the aforementioned processes and technologies; this, in turn, will allow consumers to recognize the products easily.

¹⁴ Costa Rican Compensation Unit

6. Measurement, Reporting and Verification (MRV)

The livestock NAMA is performing the first implementation of an MRV system that will allow measuring and monitoring: i) reduction of GHG emissions attributed to these activities and its results. ii) Changes in productivity and profitability of livestock farming. iii) Resilience variation in livestock areas-- according to Climate Smart Agriculture principles-- and in the social component in the ranching families, including gender equity.

The following will be taken into consideration:

- The existing baseline information, results and efforts of national inventories and measurements of pilot projects¹⁵.
- The existing institutional structure and monitoring processes in the field carried out by teams of extension agents of public and private institutions.

¹⁵ Example: a project for measuring methane emissions of Costa Rican cattle, conducted by LECB-INTA-UTN, with the technical support of EPA (Environmental Protection Agency-USA).

- Adaptation and evaluation of international methodologies, including CDM¹⁶ methodologies for the determination of GHG emissions and capture in Costa Rican cattle farming.

Protocols for collecting information on production, socioeconomic and environmental indicators will be adapted. Moreover, the existing information system, the Integrated Agricultural Establishments Registration System (SIREA) will be strengthened. All efforts intended to collect and update information are aimed at improving national and sectoral accounting, which generates more categorized cattle farming.

7. Risks for the success of Livestock NAMA

- **Changes in policy priorities:** A low risk category since the new authorities, whose term runs until 2018, declared the sustainability and climate change agenda as one of their pillars.
- **Extension services fail to disseminate technologies and to cause the desired impact:** Although this risk is considered high, its impact is minimized through training programs and strengthening of extension programs, the thorough selection of win-win technologies and the incentive program considered in the NAMA.
- **Weak governance system:** This risk is low, as the success of the NAMA is subject to interagency coordination among stakeholders (public and private sector). This risk would be minimized through continued strengthening of the institutional arrangement that integrates the parties.

- **Difficulty in getting a clear differentiation of low-carbon products:** Although this is a high-level risk, it is minimized through public awareness campaigns on the effects of climate change and the inclusion of a distinctive label on the final product.

- **Difficulty in obtaining new resources for the implementation of NAMA:** This represents the main risk of this NAMA because there is uncertainty about the ability to leverage additional resources, donations, and loans, which will be instrumental in providing greater strength and sustainability over time to the actions included in the NAMA.

8. Projects to support low-emission livestock farming in Costa Rica

The environmental determination that Costa Rica has shown has attracted international donors and development organizations, and it has increased the counterpart funds of the private sector and the government to the cause.

The most relevant projects for the livestock sector – seeking compatibility to maximize the use of resources and collaboration results--include:

- 1. Low Emission Capacity Building Program (LECB),** implemented by UNDP, works as the “delivery organization” of this NAMA and the main support program for the development of the MRV and the associated quantification methodologies.
- 2. Climate Action Program:** With the support of BMU-GIZ and in collaboration of DCC-MINAE, it seeks to assist Costa Rica in reducing GHG emissions and achieving low carbon development.
- 3. EC-LEDS Initiative:** Led by CATIE, it supports the work on methodologies for measuring GHG and developing strategies on low emission development.

¹⁶ CDM is the Clean Development Mechanism established by the Kyoto Protocol 1997

4. Facilitation of Mitigation Implementation and Readiness (FIRM): It supports the development of National Strategy for Low Carbon Livestock Farming (ENGBC).

5. World Bank-PMR: This Alliance Project for Market Preparation supports the shaping of a domestic offset market through major economic and market mechanisms; it could also leverage future investments in the livestock sector.

6. Livestock Credit Reactivation Program CORFOGA-MAG-BNCR: Banco Nacional (BNCR) is funding the accounting of emission reductions of more sustainable practices in more than 370 cattle farms in order to offset their carbon footprint.

7. Corfoga Livestock Pilot Plan: It includes measurements of GHG in the farms, herd traceability, animal health and welfare, incentives and capacity building. A credit subcomponent aims at promoting sustainable production by issuing a portfolio of loans for up to € 2.940.000 with BNCR.

8. Fodder Network, Chamber of Milk Producers: This is an initiative of the Chamber of Milk Producers, with the participation of IICA and MAG, for the generation of data towards a more accurate livestock farming.

9. Project to Support the Implementation of NAMAs in Costa Rica: This is a project funded by the CIAT-CCFAFS, managed by FITTACORI and implemented by MAG, in order to develop activities contributing to the mitigation and adaptation of the agricultural sector to climate change.

9. Final reflection

The Livestock NAMA, inserted in the political framework generated by EDGBC, is a key tool to advance toward the goal of a carbon neutral country, as this will be the instrument to modernize and transform the livestock and agricultural sector in Costa Rica.

With a holistic and innovative approach, this NAMA also plays a decisive role for biological connectivity, protection of water supplies, increase of resilience of the landscape and vulnerable rural population, by integrating economic and social decisions into environmental policies.

Finally, the implementation of this Livestock NAMA will benefit not only Costa Rica but it would also provide the political and technical course of action for other countries in Latin America, with similar characteristics in terms of agro-ecological zones, type of cattle, and production system, to attain the goal of achieving climate-smart, low-emission, productive, resilient livestock farming that would bring ecosystem benefits to the entire society.





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