

Info Note

Challenges and opportunities for the development of the Nationally Appropriate Mitigation Actions (NAMAs) in the livestock sector in Colombia and Costa Rica

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Key messages

- Livestock NAMAs seek to transform livestock production in Colombia and Costa Rica.
- To achieve proposed climate action and food security goals, it is necessary to overcome barriers and take advantage of the opportunities in the livestock sector.
- There is increasing demand in the market of better quality beef and milk; implementation of NAMAs is the first step to reach new markets.

Abstract

Livestock production plays an important role in the economies of Colombia and Costa Rica; livestock production creates direct and indirect jobs and accounts for 32% and 21% of the land used. From an environmental point of view, livestock production contributes to the biological connectivity and forest cover, but it is also a major emitter of greenhouse gases (GHGs). Within the context of the United Nations Framework Convention on Climate Change (UNFCCC) and with the purpose of achieving the proposed Nationally Determined Contributions (NDCs) in the Paris Agreement, both countries pledged to reduce emissions from livestock production activities. To achieve this goal, they committed to develop Nationally Appropriate Mitigation Actions (NAMAs) that seek to transform livestock production by increasing production levels and improving the carbon balance.

LivestockPlus is one of four strategic initiatives designed at the International Center for Tropical Agriculture (CIAT) under CIAT's new strategy for the period 2014-2020 to open new paths to improve the development and impact of CGIAR's research. LivestockPlus specifically aims to improve sustainable intensification of livestock production, based on the use of improved forages (Rao et al., 2015). The LivestockPlus project is challenged to support, study, and test field strategies proposed by the NAMA to reach competitiveness levels.

Thus far, both countries have faced challenges and opportunities during the conceptualization and piloting of the NAMAs. It is necessary to address and overcome limitations and take advantage of the opportunities the livestock sector offers to achieve the proposed livestock goals in both countries.

What NAMAs are and their importance

NAMAs commit to reductions in greenhouse gas emissions (GHG) below 'business as usual' levels, as projected by the countries implementing them, and are framed in the context of sustainable development. They emerged from a combination of the institutional crisis resulting from the non-compliance with the Kyoto Protocol, increasing GHG emissions from developing countries (UNEP, 2016), and as a way to conceptualize the mitigation contributions developing countries could make with the support of developed countries (Carbon Market Watch, 2015).

The term NAMA was first introduced in 2007 in Bali, within the framework of the Thirteenth Meeting of the Conference of the Parties (Lutken, Dransfeld, & Wehner, 2013). It was established that NAMAs should be tailored

to the needs and conditions of each country, and they should also be measurable, reportable and verifiable, as well as supported and facilitated by technology transfer, funding, and capacity building (Mendieta, 2013).

At the national level, NAMAs must be framed within national climate change policies. Colombia and Costa Rica are excellent case studies for analyzing climate change programs in the land use, land-use change, and forestry (LULUCF) sector, which includes the transformation of rural soils, agriculture, and livestock production (Tubiello, 2014). Both countries have expressed to the international community their intentions to develop NAMAs in the livestock production sector to reduce adverse effects to the environment and contribute to economic development, particularly in rural areas.

The LivestockPlus project, which is aligned with CGIAR strategy to improve productivity and sustainability of the livestock sector in the tropics, aims to support the aforementioned NAMA-related initiatives in the field through research to validate and share technologies that are both profitable for farmers and lower GHG emissions.

Role of agriculture and livestock production in Colombia and Costa Rica

In 2012, the LULUCF sector, also referred to as the agriculture, forestry and other land use (AFOLU) sector, accounted for 43% of Colombia's total GHG emissions (70 MtCO₂). In the LULUCF sector, methane from bovine enteric fermentation accounted for 28%, transformation of land to pastures accounted for 36.1%, and urine and manure in grasslands, which covers emissions associated with nitrous oxide from managed soils, accounted for 17% (IDEAM, 2016).

In Costa Rica in 2012, emissions from the LULUCF sector were 1.1 MtCO₂, only 10% of the total annual emissions in the Central American country. Emissions were balanced by significant reforestation dynamics that generated net emissions of -2.07 MtCO₂. In Costa Rica, emissions from enteric fermentation were 0.1 MtCO₂ and transformation of land to pastures resulted in emissions of approximately 3 MtCO₂ (IMN, 2015).

In both countries, livestock production is significant in rural areas. Colombia has 23,000,000 heads of cattle, or 0.47 animals per capita (Fedegan, 2010), and Costa Rica has 1,300,000 heads of cattle, or 0.26 animals per capita (Corfoga, 2014). In Colombia livestock production represents 950,000 direct and indirect jobs, while in Costa Rica livestock production represents 180,000 jobs. In terms of demand, Colombian citizens consume approximately 20 kg of beef and 153 liters of milk per capita per year (Fedegan, 2010). In Costa Rica, consumption is 15.5 kg of beef and 200 liters of milk per capita per year (MAG, 2015).

Livestock production in Colombia accounts for 32% of the national territory, equivalent to approximately 37,000,000 ha of pasture. Costa Rica has approximately 1,100,000 ha of pasture, representing 21.5% of the national territory. Colombia's stocking rate is 0.61 animals per ha, while in Costa Rica it is 1.1 animals per hectare. Other production parameters of this activity can be found in Table 1.

Table 1. Livestock production parameters for Colombia and Costa Rica

Parameter	Colombia	Costa Rica
Birth rate (%)	0.58	0.64
Calving interval (days)	627	600
Weight gain (g/day)	350	325
Dual-purpose: Productivity (liters/head/year)	931	810
Specialized: Productivity (liters/head/year)	3000	3950

Source: FEDEGAN (2006); CORFOGA (2000); Barrientos & Villegas (2010)

The importance of livestock production in both countries is evident. However, at the government level, livestock production tends to be regarded as having high environmental impact and not meeting its economic potential. Rural and environmental policy planning documents from the two countries indicate the intention of improving productivity and environmental indicators.

In Colombia, the Strategic Plan for the Colombian Cattle Industry, the National Development Plan for 2014-2018, and studies backing the country's commitments to the Paris Agreement document intentions in the livestock sector. Costa Rica's intentions are documented in the Ministry of Agriculture and Livestock's Strategic Plan for 2015-2018, the 2015-2034 Strategy, and the Action Plan for Low-Carbon Livestock Production.)

Strategies to implement low emissions initiatives

Both Colombia and Costa Rica have developed packages of livestock production techniques that aim to reduce emissions, while improving climate change adaptation and promoting growth in production. Such packages of measures were developed in order to reduce emissions and improve the competitiveness of the sector. In order to do so, they must improve the digestibility of diets, increase carbon sequestration in soils and plant biomass, and increase the efficiency of the nitrogen cycle in the system. If this is accomplished, they will increase carbon sequestration and make better use of the animals' urine and dung).

Both countries have proposed strategies in their NAMAs, such as implementation of silvopastoral systems, improvement of pastures, establishment of fodder banks, pasture rotation, reduced use of nitrogen fertilizers, and better use of urine and dung. Remarkable aspects of the national proposals are the intention of disengaging

livestock production from deforestation in Colombia, and a clear commitment to improving cattle breeds in Costa Rica focusing on productivity and sustainability.

An example of a pasture rotation strategy is shown in Figure 1. The strategy is the use of a system of cattle fattening located in a low area of the tropics at CIAT Headquarters in Colombia.



Figure 1. Pasture rotation in a silvopastoral system.
Source: Tropical Forages Program CIAT HQ

Challenges and limitations

Currently, livestock production faces significant constraints in both Colombia and Costa Rica; both countries must transition to more equitable, competitive, and sustainable livestock production.

The context is complicated in Colombia, where additional limitations such as concentration of land ownership, armed conflict, and informal land tenancy hinder access to credit and government services or subsidies, and discourage investment. It is thus difficult to promote technological transformations that could help reaching the goal of reducing emissions and increase production.

Human capital is an additional constraint. In Colombia, only an estimated 20.6% of the rural working-age population has completed elementary school, and there is an increasing lack of interest of the young population to take over livestock production activities. Additionally, the average age of producers is 53.9 years in Costa Rica (INEC, 2015) and 47 years in Colombia, which further limits the adoption of measures and technological innovations.

The challenge concerning the impact on emissions and carbon sequestration is to develop sound systems that will ensure transparent accounting with a reasonable level of uncertainty and at a cost that enables its operation. Many methods that monitor emission reductions from technical changes present cost-effectiveness or reliability issues. Alternatives that have received greater efforts are those associated with survey data collection through representative samples and with remote sensing that

provides information about changes in livestock landscapes. However, the scientific evidence and cost-effectiveness of such estimating alternatives is not clear yet, and so constitutes fertile ground to conduct applied research.

On the other hand, the calculation of national GHG emissions is carried out following the methodological guidelines developed by the International Panel on Climate Change (IPCC), and is based on activity data or factors (magnitude of the emission-generating activity) multiplied by an emission factor, which is the amount of gas emitted into the atmosphere with such activity. This approximation presents technical weaknesses when applied to the tropics, where default values might over- or underestimate emissions and reductions due to the application of a particular technique.

Research conducted by different entities – CIAT IDEAM in Colombia, and INTA/MAG in Costa Rica (including through the LivestockPlus Project) was generated last year to obtain specific factors (second-level methodology). Further research is necessary to improve the estimation of emissions, particularly to obtain sequestration factors.

Opportunities

Research has shown that there are six key enabling components that facilitate development of mitigation projects in the livestock production sector in tropical countries. Together, they create a positive environment for making such structural adjustments to livestock production.

First of all, consumption patterns today show that consumers are increasingly demanding greater environmental and social responsibility from products, as evidenced by the proliferation of green seals providing traceability to production methods. Consumers in Colombia and Costa Rica are aware of such dynamics, and, the increasing demand of internal and external markets for products that are more environmentally responsible becomes an incentive for producers and producers' associations to accept technical transformations.

The political scene for climate change in 2017 is complex, especially given skepticism about climate change expressed by high officials in the new United States government. However, the Paris Agreement signed at the end of 2016 represents a window of opportunity to foster national processes related to climate change. This international treaty entails a global consensus on the need to face climate change. In addition, Colombian and Costa Rican NDCs are international commitments that convey importance to climate change public policy associated to the reduction of emissions from cattle farming.

Table 2. Climate change mitigation and adaptation policies and regulatory measures from 1980 to 2016.

Country:	Regulatory measure and / or Policy								
	GHG mitigation framework	Climate change adaptation framework	Carbon price fixing	Promotion of low-carbon energy (inc. renewable energies)	Energy demand	Transport sector	Land use, land-use change and forestry (LULUCF)	Agriculture and livestock production	Regulation of REDD+ activities
Colombia	Institutional Strategy for the Articulation of Climate Change Policies and Actions (established by CONPES 3700) (2011)	National Plan for Adaptation to Climate Change (2012)	CONPES document 3242 introduces the National Strategy of Payments for Environmental Services through the Clean Development Mechanism (2003).	Law 1715 regulates the integration and promotion of non-conventional renewable energy for the national energy system (2014). -Colombian Strategy for Low-Carbon Development	National Energy Plan 2006-2025 (2006) -Law 697 encourages the rational and efficient use of energy and promotes the use of alternative energies (2001)	None presently exists	National Strategy to Reduce Emissions from Deforestation and Forest Degradation (2013) -National Plan for Forest Development (PNDF) (CONPES 2135 from 2001).	None presently exists	None presently exists
Costa Rica	National Climate Change Strategy (2008)	National Climate Change Strategy (2008)	Ministerial Decree 37296 (MINAE). Creates the Voluntary Carbon Market (2013)	Law 7447/1994. Regulation on Efficient Use of Energy. -National Energy Plan 2008-2021 (2008)	Law 7447/1994. Regulation on the Efficient Use of Energy. -Law 7200. Energy Law (1990) -Decree No. 36481-MINAET - Incentive to promote the organization of local committees and their unity.	Executive Order 35091. Regulation of Biofuels (2009)	Law 7575/1996. Forestry Law -Executive Order 37352/2012 (MINAE). Creates the Executive Support Agency for the Development and Implementation of the REDD Strategy for Costa Rica. -National strategy addressing illegal logging (2002). -PES that subsequently includes carbon as an environmental service	National Strategy for Low-Carbon Livestock Production Decree # 39482. 2016	-Executive Order 37352/2012 (MINAET). Creates the Executive Support Agency for the Development and Implementation of the REDD Strategy for Costa Rica.

Source: taken from González, et al. (2015)

Another key component and an opportunity to implement NAMAs is the rapid penetration of digital technologies into rural areas. Connectivity in both Colombia and Costa Rica is increasingly facilitating the dissemination of technologies, management of farms, and surveillance of landscapes by authorities. Similarly, regulatory developments in these countries are regarded an opportunity; such is the case of bills related to climate change, the creation of payment schemes for environmental services, subsidies and credits for the transformation of agricultural practices into more sustainable ways to produce, and the creation of agencies to work exclusively on climate change issues in the agro-environmental sector, as evidenced in Table 2. All of the conditions described above create an enabling institutional framework to manage large-scale projects aiming at the reduction of GHG emissions.

As seen in the previous table, an opportunity is also presented through the development of policies or regulatory measures governing the activities of the agricultural and livestock sectors in both countries, and in Colombia, Transport and REDD. Additionally, the creation and strengthening of support, training, and extension programs have pulled together public and private efforts to reach the proposed goals concerning agriculture and livestock production.

A major opportunity to foster the replacement of productive techniques is based on better use of other resources, such as ecotourism, which renders another form of business from tropical agricultural landscapes. Resources from tourism are becoming more common in activities that take advantage of the smooth interaction

between farming operations and protection of the environment.

Finally, a great opportunity for these NAMAs lies in the experience both countries have implementing projects related to this topic. Between 2000 and 2015, Colombia developed 19 pilot projects involving the Forest Carbon Partnership Facility (FCPF) and 7 mitigation projects focused on the livestock production sector, mainly financed by CIAT-CCAFS, the World Bank, GEF, FEDEGAN, TNC, FINAGRO, and ICF, and three of which were jointly submitted with Costa Rica and financed by LEAD and the Embassy of The Netherlands. Costa Rica has 6 FCPF projects and 2 mitigation projects focusing on the livestock production sector financed by FONTAGRO, CATIE, GEF, and JOINT PROJECTS.

Currently, the livestock NAMA for Costa Rica is in the stage of searching for support to scale it up, and the livestock NAMA for Colombia is the stage of searching for support to design it. It is hoped that these critical projects will go through the processes of raising funds from international sources and the harmonization of existing internal costs, while increasing general awareness that our diet is the foundation of our relationship with the planet.

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This brief is specifically focused on the progress made by the LivestockPlus Project. The LivestockPlus Project works in Costa Rica and Colombia to support the design and implementation of the Livestock NAMA. It is hoped that the concepts presented will facilitate the active participation of policymakers, donors, the private sector, and other actors within the process, who contribute to the design of agricultural NAMAs worldwide. This brief is based on the evaluations and consultations with stakeholders conducted in October, 2015.

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