LEAVES POLICY BRIEF
FEBRUARY 2019

PROFOR

SILVOPASTORAL SYSTEMS FOR INTENSIFYING CATTLE PRODUCTION AND ENHANCING FOREST COVER: THE CASE OF COSTA RICA

Highlights

- Demand for beef and milk triggered expansion of pasture lands at the expense of Central America's forests.
- The Costa Rican Government's regulatory and incentives scheme reversed the deforestation trend in the country (in many cases at expense of pasturelands) from +0.73 to -0.77% per year in 1990–2000 and 2000–2008 respectively, with only a marginal reduction in beef production and a significant growth in total milk produced.
- Silvopastoral (SP) technologies promoted by CATIE, CIAT, and national partners sustainably integrate pastures and woodlands to improve productivity of livestock systems and restore ecosystem services by enhancing tree cover.
- Suffice to say that slow adoption of SP innovation in other countries is attributed to high invest costs and labor demand., limited government support, and the absence of SP innovations in the agenda of most agricultural and forestry extension services and financial institutions.
- Some enabling conditions for the wider adoption of SP innovations such as payment for ecosystems services (PES), market incentives for certified green-labeled products, and the availability of subsidized credits through the national banking system are not in place.
- National development banks and multilateral and bilateral donors need to support the promotion of SP innovations as relevant strategies for intensifying livestock systems resulting in improved productivity, profitability, and competitiveness while at the same time reducing GHG emissions and increasing Carbon sequestration.
- Strengthen coordination between the ministries of environment and agriculture as most of funds are channeled through the former while agricultural activities are increasingly seen as threats to the environment and biodiversity conservation.

Bulls in Costa Rica by Charles Wollertz

Introduction

Over the last 50 years, Central America has undergone a livestock revolution resulting in significant growth in total demand and per capita consumption of animal source foods such as milk and beef.

For many years, the predominance of extensive cattle production systems resulted in the expansion of pasturelands at the expense of forested areas. In the past 20 years, 19.6 million hectares (ha) of forest were cleared mostly in the Caribbean Basin of Central America. Land was primarily cleared to accommodate growth in the cattle population from 7.0 to 14.1 million. Moreover, the problem of pastureland expansion has been exacerbated by poor soil and pasture management leading to degradation.

It is well accepted that this trend cannot continue. Livestock sector stakeholders in Central America recognize the need for changing paradigms including the promotion of silvopastoral systems to reduce deforestation, to increase productivity, and to improve resilience. Further, sector stakeholders recognize the need to harness mitigation benefits of reducing GHG emissions by increasing carbon sequestration in pasture root systems as well as tree components. Finally, livestock sector stakeholders recognize that the region is highly vulnerable to climate change (Kreft et al. 2017).

In Central America, Costa Rica has pioneered livestock sector reforms involving the use of silvopastoral and improved pasture technologies to increase productivity, reduce GHG emissions and to enhance climate change. This has been a concerted effort between government institutions and private sector organizations with the support of academia as well as national and international research institutions.

Changing Paradigms in Livestock Production

In the early 1980s, the loss of tropical forests in Central America was linked to the expansion of pasturelands, which resulted in a boycott of Costa Rican beef imports to the USA due to the so-called "hamburger connection," which established a link between growing international demand for beef and increasing deforestation in less developed countries[1].

In the late 1980s, the Costa Rican Government put in place a regulatory and incentive scheme to reward natural forest protection and reforestation in areas such as watershed protection and biodiversity conservation sites that were considered a priority for public policy objectives.

This strategy triggered the reversal of the deforestation trend from +0.73% to -0.77% per year between 1990–2000 and 2000-2008 respectively (Szott et al. 2000). This was accompanied by a reduction in the area devoted to pastures from 42.4% to 24.7 % between 1983 to 2013. Currently, forested areas and pastures in Costa Rica cover approximately 55% and 20% of the land respectively.

1 https://www.researchgate.net/publication/263011651_Hamburger_Connection_Fuels_Amazon_Destruction_Cattle_Ranching_and_Deforestation_in_Brazil%27s_Amazon

Although the area devoted to pastures has shrunk over the last 40 years, annual beef production has been only marginally reduced from 80,780 to 72,954 metric tons (MT). Conversely, milk production has significantly increased from 280,170 to 1,137,527 MT. This could be attributed to the fact that livestock farmers who benefited from reforestation incentives used some of those incentives to rehabilitate pasturelands, to improve their management practices, and to implement silvopastoral technologies (Rivera-Céspedes et al. 2016). Additionally, many farmers moved from beef to dual-purpose, dairy-beef cattle systems due to the greater demand and better prices for milk in the local and regional market.

Other interventions that may have contributed to these market changes were the establishment of a payment for ecosystems services (PES) scheme at a pilot scale in the Central Pacific region of Costa Rica (Pagiola et al. 2004). More recently, the implementation of the Costa Rican National Strategy for Low-C Emissions in the Livestock Sector was promoted jointly by the Ministries of Agriculture & Livestock and of Environment & Energy (MAG 2015). The National Strategy has resulted in more focused extension and technical assistance services for the livestock sector.

Technology Innovations and Policies: The Basis for Change

For the last 25 years, CATIE, CIAT, and their national partners in Central America have worked on the design and testing of SP innovations such as the rational use of adapted forages, improved feeding strategies, and new spatial and temporal arrangements of trees and pastures in SP systems among others. Furthermore, efforts were made to strengthen the skills of research and technical staff and to sensitize policy makers to the relevance of changing paradigms of livestock production incorporating woody perennials in the systems.

CATIE 1

Several authors have demonstrated the relevance of such SP innovations for improved productivity, ecosystem restoration, tree cover enhancement, and climate change adaptation and mitigation in tropical America (Ibrahim et al. 2006; Calle et al. 2013; Pezo 2017). However, the adoption of SP technologies has not been as fast and widespread as expected because of (a) the investment costs and labor demand for establishing most SP options, (b) the slow rate of establishment of woody perennials, (c) the absence of SP innovations in the agenda of agricultural and forestry extension services and financial institutions, and (d) limited government support for SP promotion (Murgueitio et al, 2006; Botero and Russo, 2016).

For Costa Rica, relevant SP innovations were highlighted in the National Strategy for Low-C Emissions in the Livestock Sector launched in 2013. The two main livestock farmers associations, The National Dairy Producers Board (CNPL) and the Beef Cattle Promotion Council (CORFOGA), actively supported and monitored their implementation as did the Ministry of Agriculture and Livestock, the National Institute of Agricultural Technologies Innovation and Transference, academia, other participants in the Livestock Production Roundtable *Mesa Ganadera*, and the Advisory Committee. The National Strategy is currently being piloted on 350 dairy, dual purpose, and beef cattle farms across the country. The goal is to cover 70% of the national herd and 60% of the land under livestock use by 2030 (MAG, 2015). Some progress has been made in implementing SP innovations and collecting data from pilot farms, but challenges remain in refining some technical aspects SP innovations and developing/testing the measuring, reporting, and verification (MRV) system. However, the main constraint for scaling up SP innovations is the lack of enabling conditions for wider adoption such as PES, market incentives for certified green-labeled products, and access to subsidized credits through the national banking system among others.

The Climate Change Agenda: A Trigger for Changes in Livestock Systems

Many countries in Latin America and the Caribbean have identified the role of their livestock sectors as part of their Intended Nationally Determined Contributions for Climate Action (FAO 2016). These INDCs have triggered new public-private partnerships to promote structural adjustments to the current livestock production systems including the adoption of silvopastoral innovations that have been launched in Costa Rica, Colombia, and other South American countries.

Cattle in Pasture by Pomidorisgogo.

Some potential enablers for those changes are (a) the 2016 Paris Agreement functions as a window of opportunity to foster national processes on mitigation/adaptation to climate change, (b) increased facilitation of technology dissemination, farm management, and landscape surveillance through rapid penetration of ICTs into rural areas, (c) implementation of PES schemes, subsidies, and credits for the adoption of more sustainable agricultural practices, (d) the creation of agencies exclusively responsible for work on climate change issues in the agro-environmental sector, and (e) the potential for accessing special funds through various climate change initiatives such as REDD+, the Green Climate Fund, and the 20x20 Initiative among others (Serna et al, 2017). A key point is to strengthen coordination between the ministries of environment and agriculture as most of those funds are channeled through the former while agricultural activities are increasingly seen as threats to the environment and biodiversity conservation. Other potential enablers for the adoption of SP innovations are the recognition of the contribution of multipurpose trees for enhancing productivity, improved animal welfare, improved efficiency in farm economics, and increased consumer action to demand environmentally friendly products.

Recommendations

Several governments in Latin America and the Caribbean are keen to promote the sustainable intensification of livestock systems using SP approaches to control deforestation and to enhance tree cover in livestock dominated landscapes. In those countries where progress has already been made at a pilot level, there is a need to scale up the lessons learned as well as a need to pilot innovation in those countries not yet on board. Development partners can play an important role in promoting and facilitating such changes.

However, the key point for SP adoption is to demonstrate that SP approaches are relevant strategies for conserving land and limiting harmful environmental impacts by reducing GHG emissions and increasing carbon sequestration. GHG emission and carbon sequestration can be impacted directly through increased trees and pastures and indirectly by reducing deforestation (Godde et al. 2017). Both are important mechanisms for increasing the productivity, profitability, and competitiveness of intensive livestock systems.

The Program on Forests (PROFOR) multi-donor partnership generates innovative, cutting-edge knowledge and tools to advance sustainable management of forests for poverty reduction, economic growth, climate mitigation and adaptation, and conservation benefits. Through its programs, PROFOR is advancing forest-smart development, which recognizes forests' significance for sustaining growth across many sectors, including agriculture, energy, infrastructure, and water.

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