IMPACT BRIEF SERIES - #1

Assessing the Impact of Silvo-pastoral Systems in the Colombian Amazon piedmont

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ABOUT THE INNOVATION

This study depicts the implementation and assess the impact of **Silvopastoral Systems (SPS)** in the Caquetá region of the Colombian Amazon, which faces challenges of deforestation and unsustainable livestock practices. SPS integrates trees, grass, and livestock, offering a sustainable alternative to traditional farming methods. The study employs a differences-in-differences (DiD) approach to analyze the effects of SPS interventions on both productivity and environmental aspects.

Key findings indicate significant improvements in **livestock production**, including increased cattle herd weight and higher income from animal sales and milk production. Additionally, rural properties with SPS interventions demonstrated lower **deforestation rates** compared to control properties. Producers benefiting from SPS projects also showed higher adoption of SPS practices and increased cattle herd numbers and weights compared to control producers.

The significance of this research lies in providing empirical evidence of the positive impact of SPS interventions on both productivity and environmental conservation. By addressing the dual challenges of enhancing agricultural productivity while mitigating environmental degradation, SPS offers a promising solution for **sustainable livestock management**, particularly in regions like Caquetá facing deforestation pressures.

THE PARTNERS

The **Sustainable Amazonian Landscapes Project** (SAL) was a joint initiative led by the Alliance of Bioversity International and CIAT from 2016 to 2018. SAL aimed to provide scientific evidence to national environmental authorities and farmers in Caquetá, Colombia, regarding the adoption of more sustainable land management practices. These practices were tailored to strengthen both climate change mitigation and adaptation capacities while simultaneously enhancing ecosystem services and socio-economic benefits for farmers.

Through robust collaboration with various partners and stakeholders, the SAL project endeavored to generate high-quality knowledge relevant to the Amazonian context and to foster the development of economically viable, environmentally friendly, and socially equitable production systems. SAL was facilitated by a **consortium of institutions** dedicated to research, education, and environmental conservation:

- Center for Research in Sustainable Agricultural Production Systems (CIPAV): CIPAV provides expertise in sustainable agricultural production systems and environmental services, playing a pivotal role in the development of environmentally friendly and socially equitable production systems.

- Amazon Scientific Research Institute (SINCHI): SINCHI provided scientific research capabilities to the project, facilitating the identification and study of sustainable production systems within the Amazon region.

- University of the Amazon (UNIAMAZ): UNIAMAZ was a crucial part of this collaborative effort, offering academic insights and collaborating on the participatory design and implementation of sustainable land-use alternatives, which proved invaluable to the success of SAL.

- Potsdam Institute for Climate Impact Research (PIK): PIK brought expertise in climate change research to the project, assisting in estimating the potential impacts of climate change on crops and developing adaptation strategies.

METHODOLOGY

The methodologies employed in the research encompass two main levels of analysis: the farm level and the rural property level.

At the **farm level**, data was collected through interviews conducted with cattle farms surveyed by the Sustainable Amazonian Landscape (SAL) project. These interviews occurred at two distinct time points: 2016 (baseline) and 2019. The aim was to assess the impact of Silvopastoral Systems (SPS) projects on various aspects of livestock farming, including productivity and environmental outcomes.

To evaluate the causal impact of SPS-related projects on deforestation rates at the **rural property level**, the Differences-in-Differences regression (DID) model was employed. This model compares changes in deforestation rates before and after the initiation of SPS projects between treated properties (with SPS intervention) and control properties (without intervention).

The key assumption is the presence of parallel trends: without the program, outcomes would have followed similar trajectories between treated and control groups. These methodologies allow for the assessment of the impact of SPS interventions on both farm-level outcomes and deforestation rates at the rural property level, contributing valuable insights into the effectiveness of SPS projects in enhancing productivity and **mitigating environmental impacts** in the Colombian Amazon.

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RESULTS AND EXPECTED OUTCOMES

The study examined the impact of Silvopastoral Systems (SPS) projects on farm practices and deforestation rates. It found that SPS projects led to significant adoption of sustainable practices, including increased **pasture renewal** and **paddock numbers**. However, the adoption rate remained low overall. Participating farms saw higher income from animal sales and improved animal welfare indicators. Additionally, SPS projects significantly reduced deforestation rates compared to control properties. Overall, the study highlights the potential of SPS projects to promote sustainability in livestock farming and mitigate deforestation, emphasizing the need for continued support and investment.

KEY RECOMMENDATIONS

The study demonstrates the significant positive impact of Silvopastoral Systems (SPS) interventions on both productivity and environmental conservation in the Caquetá region. This highlights the potential of SPS as a sustainable alternative to traditional farming methods, addressing the dual challenges of enhancing agricultural productivity and mitigating environmental degradation.

- **Policy Support**: Policymakers should adopt a strategic investment approach to support farmers during the transitional phase to sustainable agriculture. This includes financial assistance, technical support, and training programs to facilitate SPS practices.
- **Addressing Short-term Productivity Gaps:** Recognizing the short-term productivity gaps that may arise during the transition to sustainable agriculture, policymakers should implement targeted policies to bridge these gaps. This could involve subsidies for inputs, incentives for adopting sustainable practices, and access to credit facilities.
- **Promoting Environmental Consciousness**: Emphasizing the value of sustainability initiatives is essential for promoting environmental consciousness among farmers and stakeholders. Policymakers should actively promote the environmental benefits of SPS projects to encourage wider adoption and support.

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- **Ensuring Economic Viability:** While prioritizing environmental conservation, policymakers must also ensure the economic viability of the agricultural sector. Balancing environmental objectives with economic considerations is crucial for the long-term sustainability of SPS initiatives and the livelihoods of farmers.

- **Monitoring and Evaluation:** Continuous monitoring and evaluation of SPS projects are essential to assess their long-term impact and identify areas for improvement. Regular data collection and analysis can help track progress, identify successful strategies, and inform evidence-based decision-making for future interventions.

- **Community Engagement and Participation**: Foster community engagement and participation in decision-making processes related to SPS interventions. Involving local communities, farmers, and stakeholders in project planning and implementation ensures the relevance, effectiveness, and sustainability of SPS initiatives.

By implementing these recommendations, policymakers can pave the way for a more resilient and sustainable farming future in Caquetá, Colombia, contributing to both environmental preservation and economic prosperity in the region.

The credits of all the pictures are given to CIPAV.

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