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# Introduction

- The Orinoquia region in Colombia is home to diverse ecosystems, including forests and various agroecological zones, but extensive cattle ranching poses a significant challenge as it contributes to deforestation and threatens the region's valuable forest resources.
- Climate-smart cattle farming (CSCF) aims to increase productivity and income while enhancing resilience and reducing GHG emissions from cattle ranching.

# **Prioritizing climate-smart cattle farming practices and technologies** for sustainable livestock production in Colombia's Orinoquia region

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# Results

Farmers assign more weight to the pillars which impact the most in their particular context as follows. Productivity (22%), mitigation (11%), adaptation, (26%), ease of implementation (18%) and, economic viability (23%).

Scoring and final ranking of promising technologies by farmers were:

Table 2. List of prioritized CSCF practices and technologies.

- The assessment of CSCF integrates various variables including productivity, mitigation, adaptation, economic feasibility and ease of implementation in the Orinoquía.
- CSCF practices and technologies were evaluated and prioritized based on quantitative data collected from literature and consultation's with local producers and experts.

# Methodology

The CSCF prioritization framework consisted of two phases:

Phase 1: Identification and evaluation of CSCF practices and technologies based on the literature and indicators definition.

CSCF practices and technologies were ranked based on nine indicators grouped into five pillars: productivity, mitigation, adaptation, economic feasibility, and ease of implementation.

### Table 1. Indicators evaluated by pillar

Pillar



Score	Ranking	CSCF practices and technologies
2.7	1	Intensive silvopastoral systems for browsing
2.7	2	Improved pastures plus rotational grazing
2.6	3	Grazing management based on sward height
2.4	4	Silvopastoral Systems - Fodder Banks
2.3	5	Strategic supplementation - Multinutritional block and silages

The intensive silvopastoral systems for browsing and the improved pastures plus rotational grazing represented the CSCF practices with the greatest productive, environmental, and economic benefits (Figure 1 and 2).



Traditional livestock management in the Orinoquía region (Figure 3), which is characterized by extensive grazing management with low stocking rates (0.5 -1 AU/ha), resulted in the most easily accessible and economical alternative for small producers but represents medium-low levels of productivity, higher GHG emissions and low adaptation to climate change. Score: 1.8, Ranking: 11.

	Animal stocking rate	AU/ha
Productivity	Weight gain	kg/day
	Duration of practice evidence	yr
Mitigation	Enteric methane emission intensity	kg CH₄/kg WG /day
mitigation	Soil carbon stock	Ton C/ha/day
Adaptation	Forage production in high and low precipitation seasons	Kg DM/ha
Economic feasibility	Establishment costs	US\$/ha
	Difficult implementation	_
Ease of implementation	Producers' interest in specific practice/technology adoption.	_

AU: Animal unit of 450 kg. WG: weight gain. Evidence time: time that elapses between the adoption of a practice or technology and its impact on productive indicators such as daily weight gain and stocking rate. Carbon stock: first 50 cm of depth. Establishment costs: includes adaptation and preparation of soils, the establishment of pastures and legumes, tree planting, division of paddocks with stripes, installation of a livestock aqueduct, and replanting of trees. **TRM:** COP/US\$ 4,104 - Fx January-October 2022 according to Colombia's Central Bank. The scoring criteria for ease of implementation were based on two indicators: a) difficult implementation from 1 to 3: 1-2 difficult implementation, >2 and 3< intermediate ease of implementation, >3 easy implementation; and b) Level of interest assessed on a 1 to 3 scale: 1 little interest, >2 and 3< intermediate interest, >3 high interest.

#### Phase 2: Stakeholders' participatory prioritization.

The assessment of practices and technologies was validated through local



Figure 3. Traditional livestock management

# Conclusions

- The assessment conducted under a stakeholder participation approach facilitates alignment of these results with local policies, and priorities of stakeholders including public and private actors and representatives of the civil society.
- This ranking exercise aims to allow local producers to take better informed decisions related to their technology adoption cycle.
- Promoting CSCF practices and technologies in the Orinoquía region of Colombia is paramount to ensure a sustainable livestock activity

### stakeholders consultation.

- Detailed characterization of promising CSCF practices and technologies.
- Ranking scale for CSCF practices and technologies: Low 1 to <1.5,</p> medium-low 1.5 - <2, medium-high 2 - <2.5, and high 2.5 - 3. Assessments based on average value for each indicator.
- Identification of barriers and opportunities for scaled adoption.

### References

Enciso, K., Charry, A., Castillo, Á. R., & Burkart, S. (2021). Ex-ante evaluation of economic impacts of adopting improved forages in the Colombian Orinoquía. Frontiers in Environmental Science, 9, 673481.

Tapasco, J., LeCoq, J. F., Ruden, A., Rivas, J. S., & Ortiz, J. (2019). The livestock sector in Colombia: toward a program to facilitate large-scale adoption of mitigation and adaptation practices. Frontiers in Sustainable Food Systems, 61.

Herrero, M., Henderson, B., Havlík, P., Thornton, P. K., Conant, R. T., Smith, P., ... & Stehfest, E. (2016). Greenhouse gas mitigation potentials in the livestock sector. Nature Climate Change, 6(5), 452-461.

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