



Less methane, more efficiency: local innovations for sustainable livestock farming in LAC

Three technologies will enable the measurement and mitigation of enteric methane emissions, reducing the cost and time required for evaluating intake, forage digestibility, and grazing behavior for decision-making in pastoral livestock systems.

Obtaining accurate and adequate information on forage consumption and digestibility, enteric methane emissions and ingestive behavior in grazing will allow agile decision-making to increase feed efficiency.

Initiative

The objective is to reduce emission intensity in pasture-based beef production systems through three technologies. The first is a remote sensing system for continuous measurement of enteric methane emissions and ingestive behavior in grazing cattle. The second is a set of recommendations for the use of a functional additive that increases weight gain (kg/day) and reduces

enteric methane emissions. The third is fecal NIRS technology, which cuts the cost and time of obtaining information on forage intake and digestibility, key variables for decision-making. Alongside these, the project strengthens technical capacities and generates public knowledge goods to scale up climate mitigation across the region.

The use of additives that manipulate enteric fermentation of the diet has the potential to improve nutrient use efficiency, reduce CH₄ emission and increase productivity

Tech solution

The project is implementing three technological innovations in Colombia and Argentina to reduce enteric methane emissions in grazing cattle. First, a low-cost remote sensor system monitors ingestive behavior (rumination, grazing, resting) in real time and continuously quantifies CH₄ emissions, overcoming the limitations of imported technologies. Second, a functional additive composed of yeast and native oregano essential oil, which studies have shown has reduced

methane emissions by up to 19% and increased daily weight gain. Third, local equations are being adjusted using fecal NIRS technology to predict dry matter intake and digestibility in cattle, offering a fast, accurate, and chemical-free method. The initiative is also strengthening the technical capacities of producers and technical assistants and generating public knowledge goods to scale up climate mitigation in the region.

The main reason for farmers adopting additives in the diet of cattle in the future is the improvement in feed efficiency, followed by the impact on animal production and health.

Innovaciones para reducir emisiones de metano en rumiantes

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Cuando la ciencia, la innovación y la cooperación regional trabajan juntas, la sostenibilidad deja de ser una meta y se convierte en una oportunidad de transformación.

Objetivos



Disminuir un 10% la intensidad de emisión en sistemas de producción bovina a través de la implementación de **innovaciones tecnológicas** desarrolladas en América Latina para la cuantificación y mitigación de emisiones de gases de efecto invernadero.

- 1. Sensoramiento: Monitoreo CH₄
Comportamiento Ingestivo
- 2. Validación: Aditivo Funcional
- 3. Predicción: NIRS Fecal
Consumo-Digestibilidad
- 4. Transferencia: Conocimiento Generado

Componentes

1

- 1. Desarrollo de un sistema con sensores
Medición CH₄ y Comportamiento Ingestivo en Bovinos
- 2. Validación de un aditivo funcional
Reducción de CH₄ en Bovinos
- 3. Ajuste de ecuaciones
 $y = a(x-h)^2 + k$
Predicción Consumo y Digestibilidad en Bovinos con NIRS fecal
- 4. Gestión y comunicación
Del conocimiento generado

Actividades por componente

2

- Componente 1**
1. Diseñar el sistema basado en sensores para CH₄ y Comportamiento Ingestivo. 2. Evaluar en campo del sistema basado en sensores.
- Componente 2**
1. Evaluar el efecto del aditivo en la reducción de CH₄ entérico con diferentes condiciones de alimentación en sistemas bovinos de Colombia y 2. Argentina.
- Componente 3**
1. Calibrar ecuaciones de NIRS fecal para estimar Consumo y Digestibilidad en bovinos. 2. Comparar metodologías para cuantificar Titano en heces.
- Componente 4**
1. Implementar estrategias para la capacitación y difusión de las tecnologías. 2. Fortalecer las capacidades técnico-científicas.

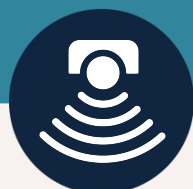
Resultados y Productos

3

- 4 Artículos científicos sometidos
- 5 Notas técnicas
- 2 Monografías
- 2 Bases de datos
- 20 Personas de la academia e investigación capacitadas
- 12 Eventos para los beneficiarios

Sistema basado en sensores

Para el monitoreo de emisiones de Metano y Comportamiento Ingestivo de Bovinos en Pastoreo



Recomendaciones para el uso de un aditivo

Para una reducción esperada del 10% de las emisiones de Metano entérico



Tecnología NIRS Fecal

Para cuantificar Consumo y Digestibilidad emisiones de Metano en bovinos en pastoreo



+19 In-person events with beneficiaries



+27 Members of the platform strengthened



+2366 People trained



-125 g CH₄/animal/d Methane emissions



+1 Validated Fecal NIRS Technology



~49 % Trained women



-74 %OPG Parasitic load



+4 Ponencias Scientific event results

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MORE INFO



Impacts and Results

The remote sensor prototype monitors the behavior of grazing cattle with an accuracy above 90% and detects belches and methane concentrations over periods of up to 8 continuous hours. Reductions of 123.5 grams of methane per day were achieved for every 1% increase in additive intake (p=0.002; R²=0.63), without affecting dietary intake or digestibility. NIRS equations were developed for the rapid determination of TiO₂ in

feces, with R² of about 0.85 in cross-validation, allowing large numbers of samples to be analyzed. Twenty-two events trained 519 direct beneficiaries, with 49.1% female participation. Virtual strategies and the Alimentro course (337 participants passing, 45.4% women) reached 1,887 beneficiaries in Argentina, Brazil, Colombia, Ecuador, Guatemala, Mexico, Panama and Venezuela.

