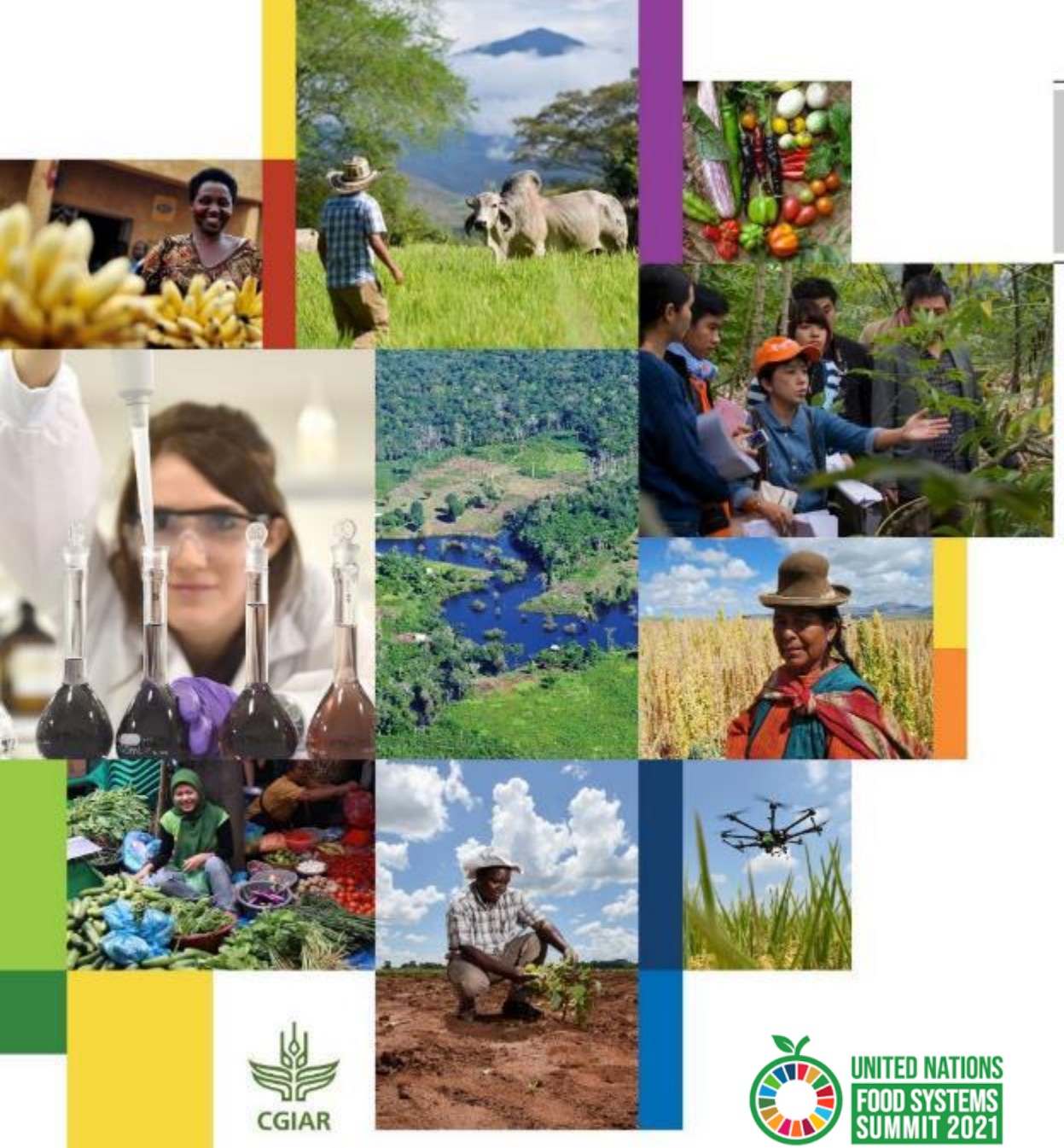


Alliance

Bioversity International

CIAT
International Center for Tropical Agriculture
Since 1967 Science to cultivate change

GANSO: New business model and technical assistance for the professionalization of sustainable livestock farming in Colombia

Jacobo Arango, Alejandro Ruden (Alliance Bioversity and CIAT)

Juan Pablo Castro, Simon Koenig (Climate Focus)

Jhon Freddy Gutierrez (GANSO)

j.arango@cgiar.org

UN Food System Summit Science Days Side Event on *Decision-making for Sustainable Livestock: Capitalizing on Models, Data and Communications* , 7 July 2021

CGIAR

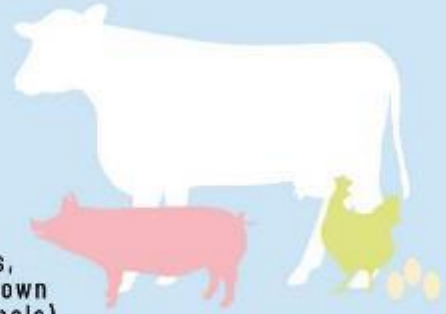
UNITED NATIONS FOOD SYSTEMS SUMMIT 2021

Peters et al., 2013

Why are Livestock and forages important: The facts

17 BILLION

The estimated total number of livestock worldwide (including cattle, sheep, goats, pigs, chickens, and about a dozen lesser known species, like guinea fowl, yaks, and camels).



4.9 Bha About two-thirds of the world's total agricultural area

is used to feed livestock, including **3.3 Bha** of grazing land

25% Total crop area

The value of livestock as a global asset reaches **USD3.1 TRILLION**

that accounts for some

1.3 BILLION JOBS

~200 MHa

In America Latina alone, have been degraded by overgrazing and other unsustainable production practices.

The annual contribution of livestock to climate change, which is about **8.1 BILLION tCO_2eq**

These includes emissions from deforestation to make way to pastures

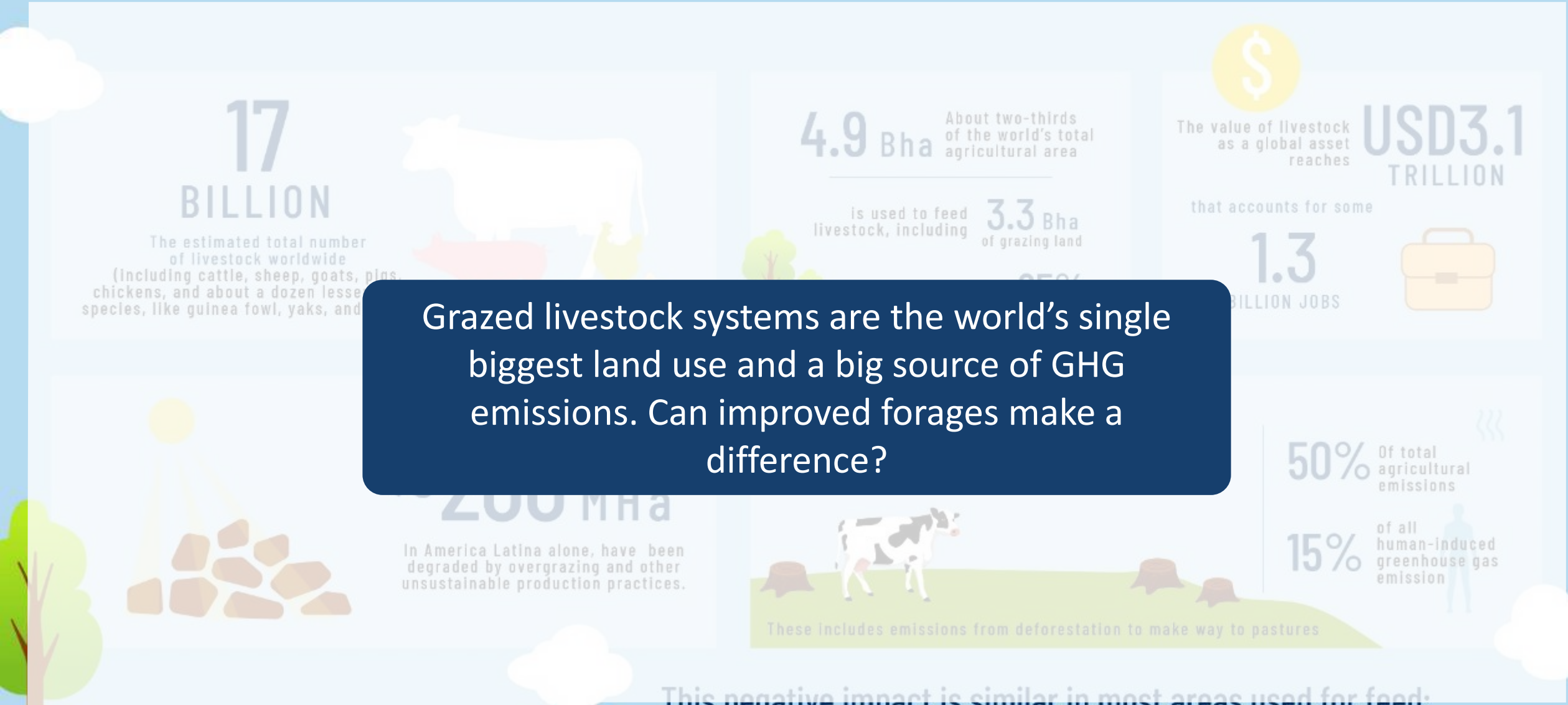
50% Of total agricultural emissions

15% of all human-induced greenhouse gas emission

This negative impact is similar in most areas used for feed; 70% of sweet water to agriculture, 22% to livestock

Peters et al., 2013

Why are Livestock and forages important: The facts



Grazed livestock systems are the world's single biggest land use and a big source of GHG emissions. Can improved forages make a difference?

This negative impact is similar in most areas used for feed;
70% of sweet water to agriculture, **22%** to livestock

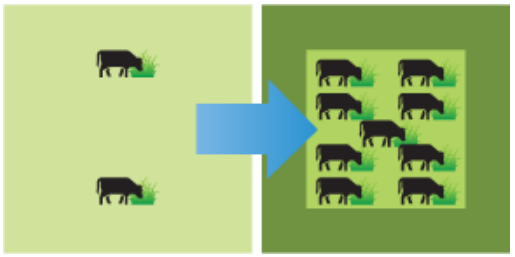
Breeding and germplasm selection of tropical forages

Our goal

Develop **improved pastures** resistant to extreme conditions…

…that contribute to **increase animal (and crop) productivity**

and reduce **environmental impacts**…



…by **reducing the areas** required to respond to livestock demand

as well as reduce the **methane and nitrous oxide emissions**

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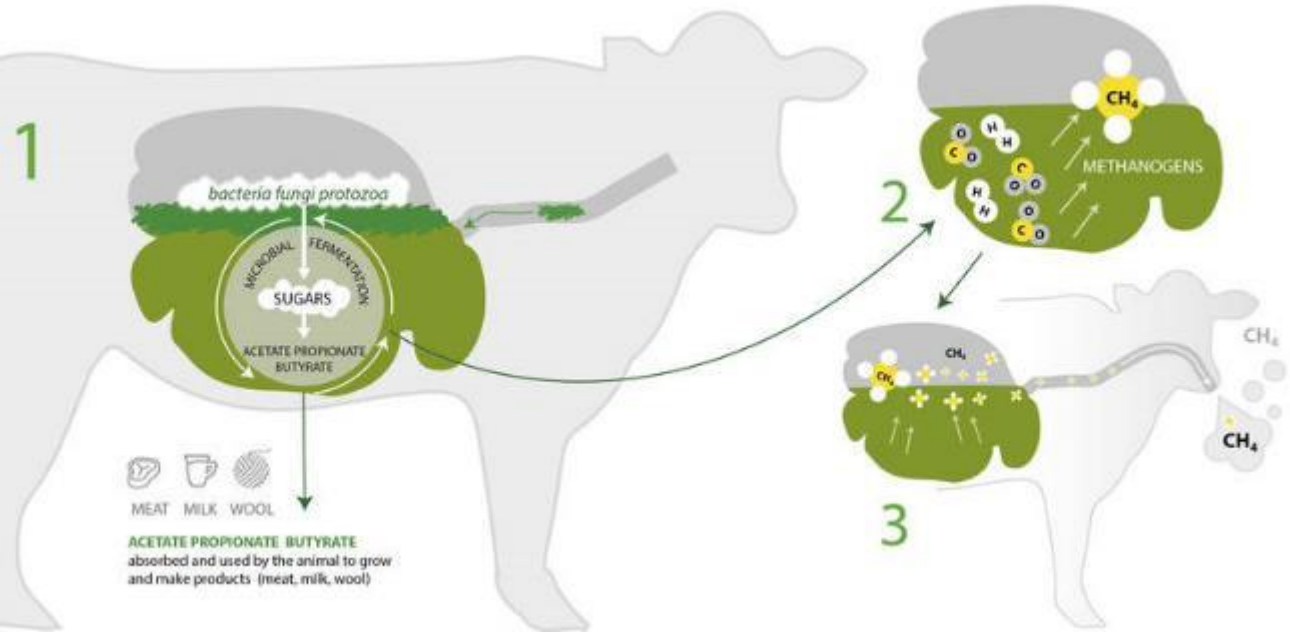
Mitigation of enteric methane emissions with diets based on improved tropical forages (special emphasis on legumes)

Enteric fermentation



1. Methane is produced by enteric fermentation where microbes decompose and ferment celluloses, fiber, starches, and sugars.

2. Enteric methane is one by-product of this digestive process and is expelled by the animal through burping.

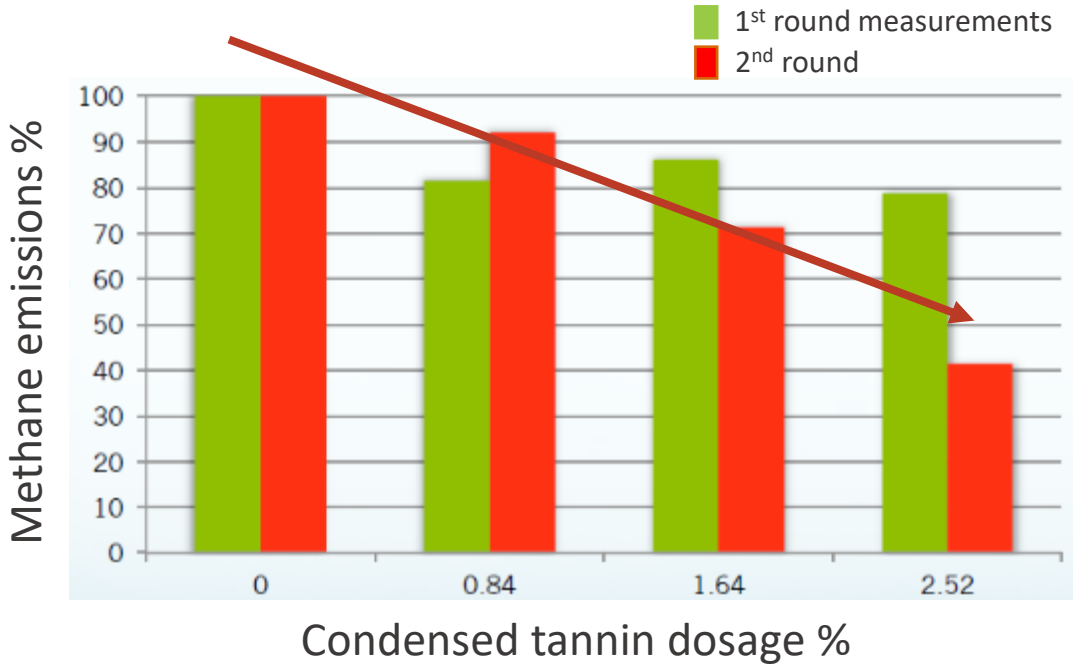
3. While other by-products (acetate, propionate and butyrate) are absorbed by the animal and used as energy precursors to produce milk, meat, leather and wool.

http://www.fao.org/in-action/enteric-methane/background/what-is-enteric-methane/en/

Effect of *Leucaena* on enteric methane emissions

- ✓ The use of this tropical legumes has been widely implemented due to its high protein content.
- ✓ Some legumes (e.g. *Leucaena*) are rich in secondary metabolites such as condensed ***tannins*** and ***saponins***.
- ✓ These compounds promote changes in ruminal microbial populations due to bacteriostatic, bactericidal and enzyme inhibiting effects that modify ruminal fermentation.
- ✓ These compounds are linked to reduction of enteric methane by forming complexes with protein and polysaccharides reducing nutrient degradation in the rumen.

Methane emission production



animals
MDPI
DOI:10.3390/ani10020300

Article

Effect of Dried Leaves of *Leucaena leucocephala* on Rumen Fermentation, Rumen Microbial Population, and Enteric Methane Production in Crossbred Heifers

María Denisse Montoya-Flores [1,2,*], Isabel Cristina Molina-Botero [1,3], Jacobo Arango [3], José Luis Romano-Muñoz [2], Francisco Javier Solorio-Sánchez [1], Carlos Fernando Aguilar-Pérez [1] and Juan Carlos Ku-Vera [1]

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Biological Nitrification Inhibition (BNI)

CIAT-JIRCAS collaboration

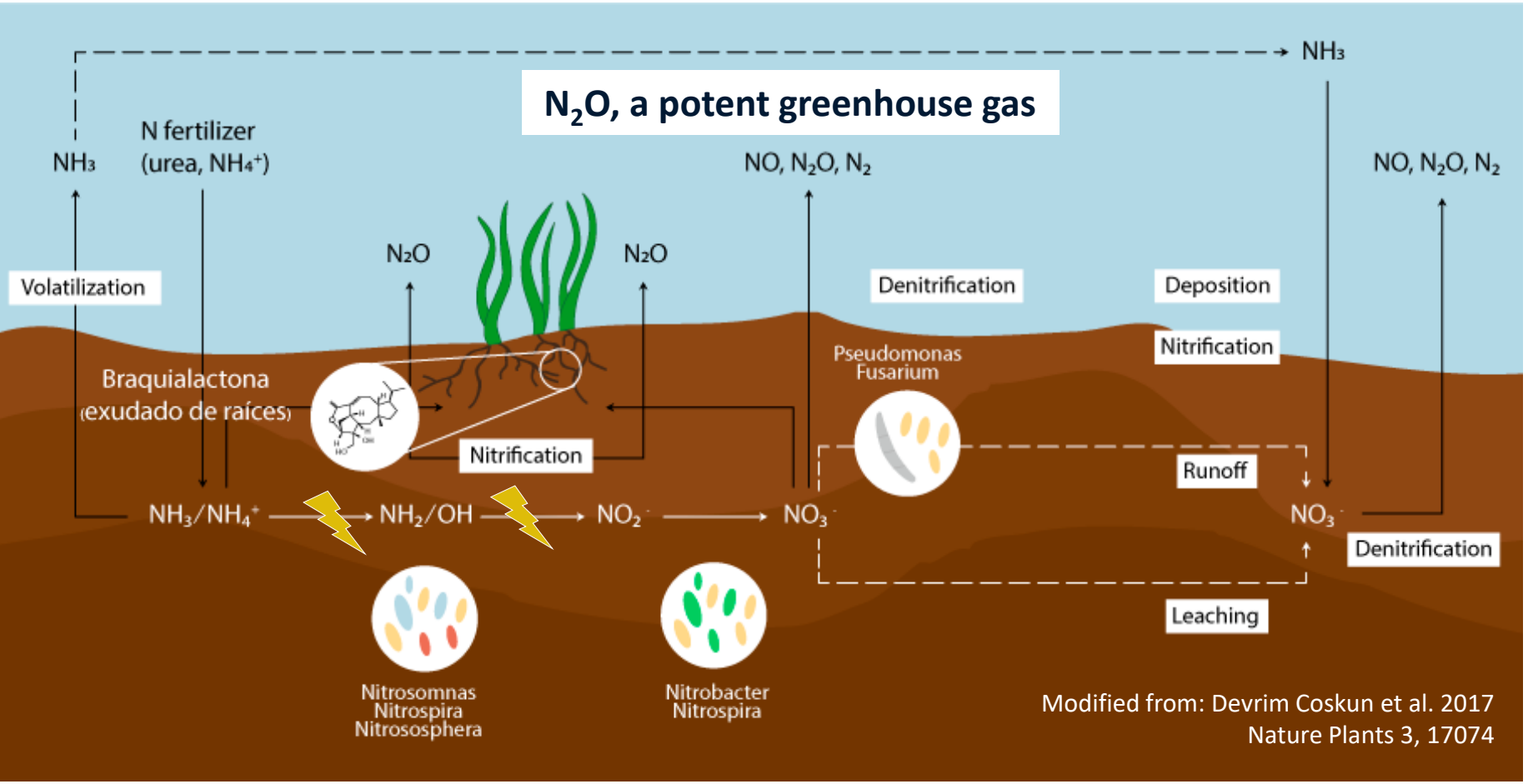
PNAS

G. V. Subbarao[a,1], K. Nakahara[a,2], M. P. Hurtado[b,2], H. Ono[c], D. E. Moreta[b], A. F. Salcedo[b], A. T. Yoshihashi[a], T. Ishikawa[a], M. Ishitani[b], M. Ohnishi-Kameyama[c], M. Yoshida[c], M. Rondon[b,d], I. M. Rao[b], C. E. Lascano[b,e], W. L. Berry[f], and O. Ito[a]

[a]Japan International Research Center for Agricultural Sciences, Ibaraki 305-8686, Japan; [b]Centro Internacional de Agricultura Tropical, A.A. 6713, Cali, Colombia; [c]National Food Research Institute, National Agriculture and Food Research Organization, Ibaraki 305-8642, Japan; [d]International Development Research Centre, 150 Kent Street, Ottawa, ON, Canada K1G 3H9; [e]Corpoica, Kilometro 14 via Mosquera, Bogota, Colombia; and [f]Department of Ecology and Evolutionary Biology, University of California, Los Angeles, CA 90024

Edited by William H. Schlesinger, Cary Institute of Ecosystem Studies, Millbrook, NY, and approved August 26, 2009 (received for review April 6, 2009)

DOI: 10.1073/pnas.0903694106



Modified from: Devrim Coskun et al. 2017
Nature Plants 3, 17074

Plant roots produce nitrification inhibitors to suppress nitrifier activity in soils to reduce $NO3^-$ formation, facilitate $NH4^+$ immobilization, improve N uptake and reduce N_2O emissions.

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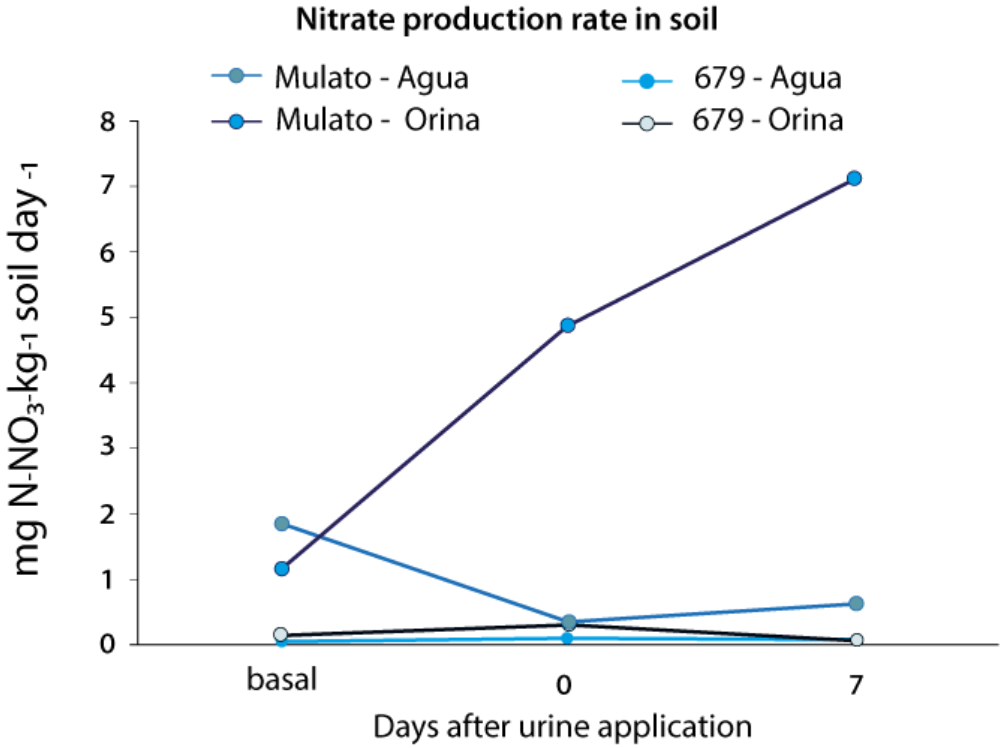
BNI function can effectively control nitrification and N_2O emissions in cattle-urine patches

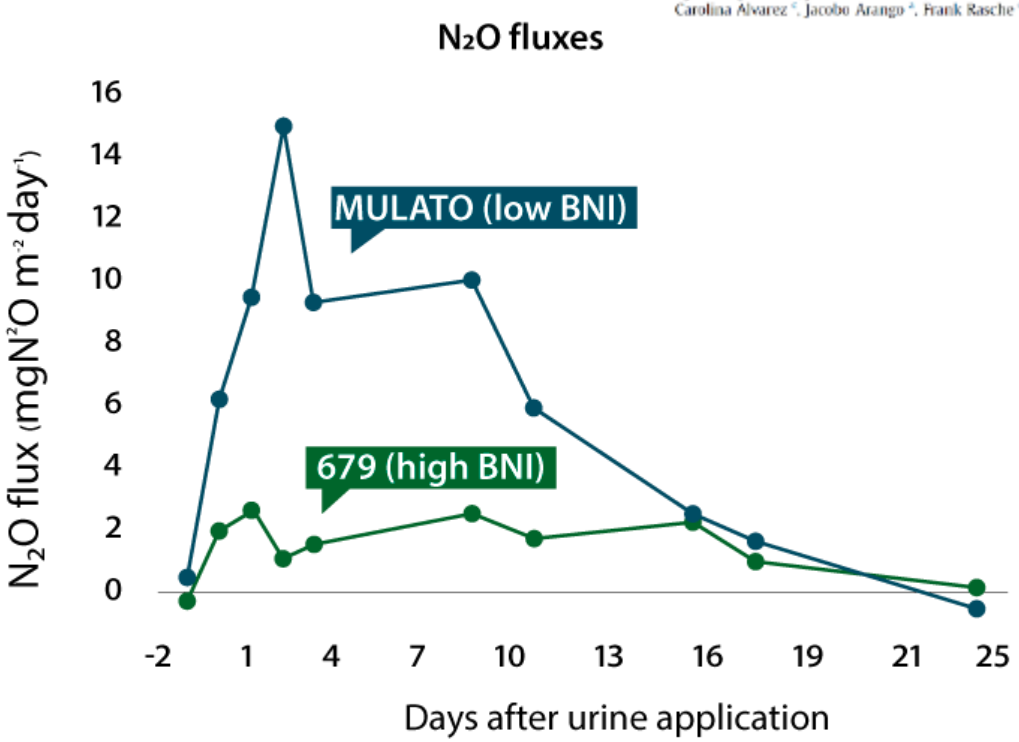
DOI: 10.1016/j.soilbio.2016.12.029

Biological nitrification inhibition by *Brachiaria* grasses mitigates soil nitrous oxide emissions from bovine urine patches

Ryan C. Byrnes, Jonathan Núñez, Laura Arenas, Idupulapati Rao, Catalina Trujillo, Carolina Alvarez, Jacobo Arango, Frank Rasche, Ngonidzashe Chirinda

Mulato low: BNI – Bh CIAT 679: High BNI



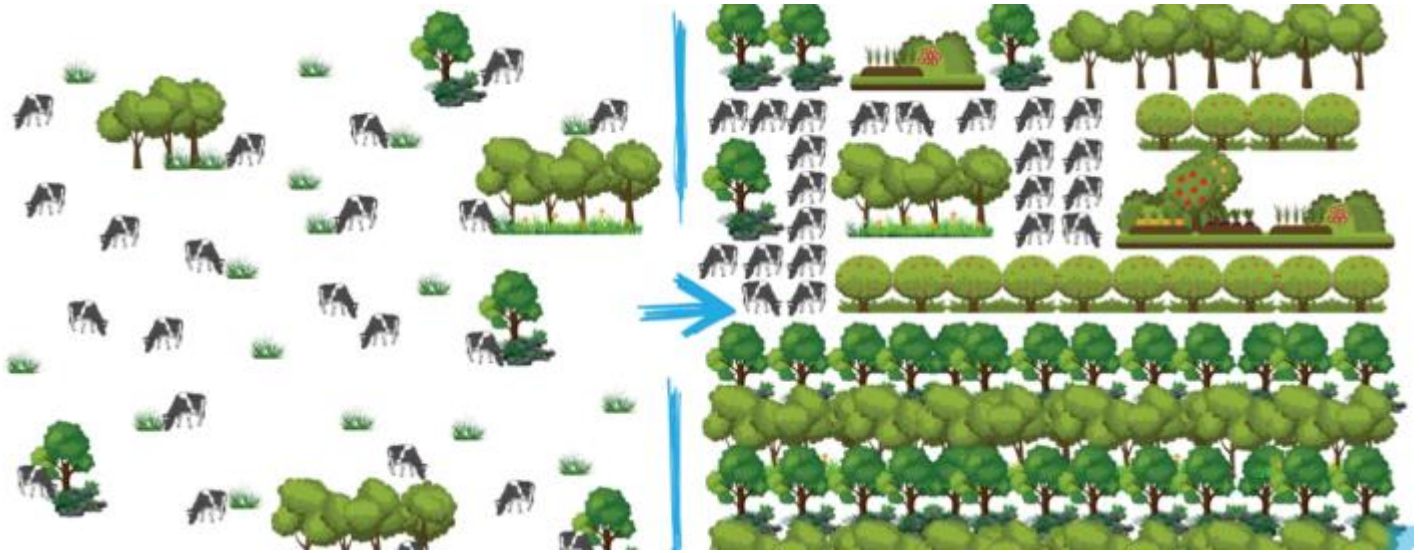


technical assistance and financing facility in Colombia

A joint venture of CIAT and Climate Focus

ganso.com.co

- ✓ Objective: To **support farms** with extensive livestock operations **to transition to an intensified system** with **improved pastures and management** that increases productivity in **less area.**
- ✓ The **areas freed by intensification** processes are available **for other more sustainable practices** (timber, cocoa and other agroforestry) that provide additional and diversified income, as well as the conservation and restoration of natural ecosystems.



- ✓ **Intensification** of cattle operations
- ✓ **Diversification** of production
- ✓ **Restoration** and conservation

GANSO Business Model

Technical Assistance and Consulting

Deforestation monitoring

GANSO Guarantee

Farm assessment → Management plan → Finance plan → Implementation → Monitoring

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What is GANSO's guarantee?

- ✓ Voluntary evaluation tool for farms interested in evaluating their management.
- ✓ Guarantee mechanism for the market.
- ✓ It allows for the continuous improvement of livestock farms.
- ✓ Has been developed in response to a growing demand in the Colombian market for sustainable beef products and zero deforestation.
- ✓ It is framed within the objectives and principles of the Global Roundtable for Sustainable Beef (GRSB).

hdl.handle.net/10568/110456

How does it work?

The GANSO Guarantee has four pillars which group a set of fifty practices of sustainable cattle production that are verified by an independent evaluating entity.

- ✓ Environment (40%)
- ✓ People (20%)
- ✓ Management (20%)
- ✓ Cattle (20%)

Alliance

Carulla

grupo éxito

Concluding remarks

- ✓ Although livestock (cattle) is an important source of income for farmers, it is also a significant source of GHG emissions.
- ✓ Well managed tropical forages can help intensify production in less area (sustainable intensification).
- ✓ The inclusion of forage legumes that are rich in tannins and saponins (secondary metabolites) can improve productivity and at the same time reduce methane emissions.
- ✓ Some improved grasses (*Brachiaria* and *Panicum*) exhibit BNI abilities that increase NUE and reduce nitrous oxide emissions.
- ✓ Mitigation technologies exist and farmers need guidance in technical and financial aspects to implement them.
- ✓ Markets and consumers can play an important role in supporting sustainable livestock practices at farm level.
- ✓ Deforestation and cattle traceability system is needed to avoid cattle associated with deforestation to enter to the deforestation-free value chain.

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Since 1967 Science to cultivate change

Thank you!

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