

Developing a Nationally Appropriate Mitigation Measure from the Greenhouse Gas Abatement Potential from Livestock Production in the Brazilian Cerrado

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Brazil is one of the first major developing countries to commit to a national greenhouse gas (GHG) emissions target that requires a reduction of between 36.1% and 38.9% relative to baseline emissions by 2020. The country intends to submit to agricultural emissions reductions as part of this target with livestock production identified as offering significant abatement potential. Focusing on the Cerrado core (central Brazilian savanna), this paper investigates the cost-effectiveness of this potential, which involves some consideration of both the private and social costs and benefits (*e.g.* including avoided deforestation) arising from specific mitigation measures that may form part of Brazil's definition of Nationally Appropriate Mitigation Measures (NAMAs).

The analysis was made using the EAGGLE optimization model (Economic Analysis of Greenhouse Gases for Livestock Emissions), which helps define abatement costs. A baseline projection suggests that the region will emit 2.6 Gt from 2010 to 2030, the equivalent of 9% of the country's total net emissions.

According to our results, around 66% of livestock emissions in Cerrado are due to enteric fermentation. Deforestation due to cattle grazing responded for 26% of these emissions. By implementing negative-cost measures identified in a marginal abatement cost curve (MACC), by 2030, regional emissions could be reduced by 27.8 MtCO₂e.yr⁻¹, while the abatement potential of all measures shown by the MACC is 28.2 MtCO₂e.yr⁻¹. The key finding from the use of the EAGGLE economic optimization model is the representation of the cost-effectiveness of key mitigation measures. Specifically, that pasture restoration is the most promising mitigation measure in terms of abatement potential volume and that it offers a cost saving for the livestock sector.

As the Brazilian Cerrado is seen as model for transforming other global savannas, the results offer a significant contribution by identifying alternatives for increasing productivity whilst minimizing national and global external costs.