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Reducing emissions intensity and improving natural resources management through livestock in natural grasslands in Uruguay

SECTORS INVOLVED



Background

Uruguay's livestock sector is very vulnerable to climate change, as it depends on the productivity of the rainfed natural grasslands. Extreme weather events, including droughts, are expected to become more frequent and intense in the future, resulting in increased losses and damages.

The agriculture sector accounts for 73 percent of national greenhouse gas (GHG) emissions in Uruguay. In particular, the livestock sector is responsible for 86 percent of total methane emissions and 93 percent of emissions in the agriculture sector. Unsustainable management of cattle production over large rangelands areas, in particular overgrazing, has led to ongoing land degradation.

Cattle ranching in Uruguay is characterised by low productivity,¹ particularly among small and medium sized family farms. The pastures and rangelands are overgrazed: high stocking rates combined with low grass height and low leaf area index lead to poor forage availability and quality. This triggers low productivity at animal and herd level, especially related to reproductive performance and daily weight gain. For example, poor feed availability causes low pregnancy and birth rates. The national average weaning rate per mated cow is only 63 percent, meaning that there is a large number of economically unproductive cattle on the pastures,

¹ Kg beef produced per ha per year.

² For the period 1999-2010 (DIEA-MGAP, 2014 Yearbook, 2014).

URUGUAY'S NDC COMMITMENT/ GOAL IN THE AGRICULTURE, FORESTRY AND OTHER LAND USE (AFOLU) SECTOR

Mitigation

- ▶ Adoption of good practices of natural grassland management and management of breeding herds in livestock production, including the supply of forage, regenerative management and appropriate nitrogen.
- ▶ Use of zero discharge technologies for rivers and streams and/or application of good practices of effluent treatment and/or recovery of nutrients and minimization of methane emissions in at least 40 percent of dairy farms.
- ▶ Introduction of intermittent irrigation technology with alternate wetting and drying (AWD) of soils in at least 10 percent of the rice crop area (16 000 ha) by 2025.
- ▶ Maintenance of native forest area, and of shade and shelter plantation.
- ▶ Avoid emissions from soil organic carbon in grasslands, peatlands and croplands.

Adaptation

- ▶ Formulation, adoption and implementation of a National Adaptation Plan for Agriculture by 2020.
- ▶ Adoption, by 2025, of good practices of natural land management and management of breeding herds in livestock production.
- ▶ Adoption of water management models and instruments that promote the rational use of water through reservoirs and dams.

so called ‘breeding overhead’. Furthermore, the poor grazing and feeding conditions negatively affect animal growth rates. Despite the overall gains in productivity in the past decade and success with export markets, there is still ample room for improving productivity, especially among small and medium sized farms.

The government has committed to address the challenges of the livestock sector through a holistic approach, which tackles sustainable land management, food security, economic competitiveness, as well as climate change adaptation and mitigation. A set of practices is promoted for improved livestock management in natural grasslands (in Spanish: *campo natural*), focused on sustainably increasing productivity and efficiency in a more inclusive way.

The natural grasslands in Uruguay are an ecosystem dominated by natural pastures, small shrubs and occasionally trees. It is characterized by variable soil structure and soil fertility, with subtropical climate, humid and hot in summer and mild in winter, and its vegetation is largely composed by native herbaceous grass species and legumes. Beef production in Uruguay is predominantly based on natural grasslands which is the dominant landscape in Uruguay. The natural grassland provides multiple ecosystem services, including food and water, hydric regulation, soil erosion control, and non-material benefits such as recreational and spiritual benefits in natural areas. These services are irreplaceable if lost, so the approach should focus on conservation and restoration in cases where the provision of ecosystem services has decreased.

Uruguay’s national agricultural policies have defined adaptation and mitigation as key priorities and this is reflected in the country’s first Nationally Determined Contribution (NDC), where detailed targets in terms of mitigation and adaptation have been identified. Improved livestock and grassland management in natural grasslands plays an important role in promoting more resilient, less carbon intense and more productive agroecosystems, with benefits for farmers and the society as a whole.

Linking with the overall nationally determined contribution (NDC) implementation

Improved livestock management in natural grasslands promotes a multiple-win scenario for farmers, resulting in improved productivity and income, reduced vulnerability, reduction of GHG emissions intensity and enhancement of sinks in soils and trees for shade and

shelter. This contributes to national food security and to the achievement of the Sustainable Development Goals (SDGs) and of the NDC targets related to livestock production and natural grassland management in the country.

Process

Since 2010 several policies and projects by the Ministry of Livestock, Agriculture and Fisheries of Uruguay (MGAP) have promoted sustainable intensification and climate-smart production systems. As a result, the Sustainability and Climate Change Unit was strengthened, and the natural grasslands unit was created in 2012 within the Natural Resources Directorate (*Dirección General de Recursos Naturales*, DGRN). The goal of the unit is to develop national policies for the conservation of the ecosystem, sustainable utilization, and outreach and promotion of knowledge. The Board for Livestock in natural grasslands (*Mesa de Ganadería en Campo Natural*, MGCN) was also formed including policy offices, academia and farmers’ organizations, with the natural grasslands unit acting as technical secretariat.

Key stakeholders

- ▶ Ministry of Livestock, Agriculture and Fisheries of Uruguay (MGAP):
 - Sustainability and Climate Change Unit;
 - Natural Resources Directorate (DGRN);
 - Unit for natural grasslands.
- ▶ Board for Livestock in grasslands (MGCN);
- ▶ INIA (National Institute of Agricultural Research);
- ▶ Faculty of Agronomy;
- ▶ Farmers’ organizations.

Outcome

The approach of improved management of livestock in natural grasslands tackles the main barriers that hinder many small and medium sized farmers from adopting climate-smart practices and technologies. Such barriers include lack of awareness of climate change threats, lack of knowledge on the benefits of adopting climate-smart alternatives, and lack of adequate incentives and technical assistance to guide the transition to more productive and climate-smart production systems.

In many cases, low productivity is associated with an excess in stocking rates that results in overgrazing and low forage productivity. Therefore, a decrease in the number of animals may be required, resulting in less gross emissions. The increase in fertility reduces the breeding overhead and avoids unnecessary emissions.



The system change is based on the following principles:

- ▶ Maintenance of minimal pasture height (autumn 8 cm, winter 5 cm, spring/summer 8 to 12 cm) through control of grazing intensity over time to match livestock demand with vegetation supply, for example through paddocks or strategic supplementation.
- ▶ Improved uptake of nutrients: allocation of forage as function of corporal condition to improve uptake of nutrients.
- ▶ Improved fertility of cows through control of mating period and early weaning to improve fertility of cows.
- ▶ Improved herd management: maintenance of a greater productive/unproductive animal ratio through, for example, improving reproductive management, decreasing age at first calving, controlling mating and calving season, and strategic supplementation.
- ▶ Establishment of shade/protective forests.
- ▶ Improvement of water sources.

These actions lead to mitigation and restoration benefits in terms of:

- ▶ Reduction of emissions intensity (both Methane and Nitrous oxide): more efficient fodder uptake and improved digestibility, more efficient feed conversion including less thermic stress, a reduction of non-productive animals, and a reduction of energy needed by animals to get to water sources.
- ▶ Carbon sequestration: reduction in herd size with less pressure on land, uptake in woody biomass, more inputs to the soil to build organic matter, development of deeper root system, enhanced recovery periods.
- ▶ Land degradation: less disturbance and selective grazing increases plant species richness and productivity, it leads to prevention and decrease of soil erosion, and to enhanced soil compaction around waterways.

Adaptation benefits

This approach will also result in an increase in the adaptive capacity of small farmers and improve ecosystem resilience over the concerned grasslands, thereby contributing to adaptation to climate change. This is due to the combined effects on soil health, water storage capacity, more shade and shelter, increase in biodiversity and animal corporal condition, and better animal health, as well as on better decisions and risk management.

Biodiversity conservation benefits

Uruguay's natural grasslands are rich in biodiversity, which is key for adaptation and resilience. Most soils are high activity clays soils, which is important to build carbon. Nevertheless, the Uruguayan grasslands have undergone systematic decline in biodiversity, mostly due to unsustainable grazing practices such as overgrazing. However, monitoring and experiments show that well managed grazed plots can maintain or restore biodiversity.

Implementation and long-term sustainability strategy

The long-term strategy stands on five pillars:

- a) Setting a platform to validate new technologies and practices and assess the impacts of innovations for farmers: currently 60 pilot farms have been selected to quantify and monitor the environmental, social and economic benefits and impacts of the adoption of the improved livestock and landscape management approach. The purpose is to calibrate and validate models (e.g. the Global Livestock Environmental Assessment Model, GLEAM) and indicators that can then be applied to estimate the benefits during the upscaling of the proposals, as well as for the monitoring, reporting and verification (MRV) and monitoring and evaluation (M&E) of the NDC targets.
- b) Linking the pilot farms with the area of influence to raise awareness of the benefits of innovations and promote the adoption of good practices in at least 400 000 additional hectares.
- c) Strengthening the National Technology Transfer System for livestock farmers in order to build innovation capacities.
- d) Offering incentives to the adoption of technologies and practices that may require investments, such as fences, trees for shade and shelter and drinking water infrastructure for animals.
- e) Implementing impact assessment to improve policy design.



Next steps

Upscaling is considered crucial for the success of the process, and it will require the removal of existing barriers. The proposed technologies are low cost but knowledge intensive, leaving the National Technology Transfer System for ranchers with a key role to play in supporting farmers learn new abilities to use them. The implementation of practices such as those related to estimating forage availability and carrying capacity of paddocks to determine the optimal stocking rate will also require capacity building for farmers.

To complement the policies and strategies in place to cope with the climate challenges in the agriculture sector, the Ministry of Livestock, Agriculture and Fisheries developed an agricultural National Adaptation Plan (PNA-Agro), with support of FAO. The PNA-Agro was launched in 2019 and it proposes a strategy for 2050 and an action plan for 2025 with adaptation measures in different dimensions, including livestock. The next step is now to implement this plan.

Success factors and lessons learned

Why is this activity “good practice”?

- ▶ Promoting livestock in natural grasslands is not only beneficial to a more sustainable livestock practice, but it also ensures that the benefits of this important natural resource are preserved. Some additional benefits related to natural grasslands include the regulation of atmospheric gases, soil generation, provision of clean water, nutrient recycling, provision of genetic material, climate regulation, pollination, recreation, cultural, aesthetic and educational heritage.

Success factors

- ▶ Participatory design of plans and policies with relevant local and national stakeholders is essential from the beginning. In particular, farmers’ organizations at national and local levels are key partners.
- ▶ The activities suggested to implement in natural grasslands are simple and replicable, allowing their easy adoption and continuation over time, and are applicable throughout the country.

Lessons learned

- ▶ Policy design has to be supported by science, and should be based on farmers’ needs.
- ▶ Successful climate-smart strategies need to identify co-benefits (economical, social and environmental). The increase of farmers’ income and stability due to adaptation to climate variability and climate change are key factors to be taken into account.
- ▶ A transparent and accurate reporting of the progress and achievements is essential to reach the NDC targets. Uruguay is currently dedicated to developing and improving its MRV and M&E systems to track progress in relation to adaptation and mitigation. In the case of mitigation, this entails improving activity data and using dynamic Tier 2 emission factors and parameters that are able to capture progress.

KEY RESOURCES

- ▶ Uruguay’s first NDC :
https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Uruguay%20First/Uruguay_First%20Nationally%20Determined%20Contribution.pdf
- ▶ Reference material for livestock production on natural grassland:
http://www.mgap.gub.uy/sites/default/files/multimedia/libro_campo_natural_final_en_baja_0.pdf
- ▶ Principles to be promoted by the *Mesa de Campo Natural*:
http://www.mgap.gub.uy/sites/default/files/multimedia/aspectos_a_promover_mgcna.pdf
- ▶ Principles of livestock production on natural grassland:
http://www.mgap.gub.uy/sites/default/files/multimedia/lineamientos_para_el_plan_estrategico_de_ganaderia_sobre_campo_natural-mgcna_2019.pdf

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