Restoring Value to Grassland Initiative: To Maintain the Environmental and Economic Value of Grasslands and to Promote Their Social and Cultural Functions

Liz Wedderburn
AgResearch, New Zealand

Alexandre Ickowicz
CIRAD, France

Rogerio M. Mauricio
Universidade Federal de São João, Brazil

M. Quiroga Mendiola
INTA, Argentina

M. Blanchard
CIRAD, France

See next page for additional authors

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Liz Wedderburn, Alexandre Ickowicz, Rogerio M. Mauricio, M. Quiroga Mendiola, M. Blanchard, Le Thi Thanh Huyen, B. Hubert, J. Lasseur, V. Blanfort, and J.-P. Müller

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Wedderburn, L[1]; Ickowicz, A[2]; Mauricio, R.M[3]; Quiroga Mendiola, M[4]; Blanchard, M[2]; Le Thi Thanh Huyen[5]; Hubert, B[2]; Lasseur, J[2]; Blanfort, V[2]; Müller, J-P[2]
[1]AgResearch, New Zealand; [2]CIRAD - INRAE - SupAgro, Montpellier, - France; [3]Universidade Federal de Sao Joao, Brazil; [4]INTA IPAF NOA, Argentina, [5]NIAS, Vietnam

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Abstract
The Global Agenda for Sustainable Livestock (GASL), a multi-stakeholder partnership started in 2013 includes nine action networks (ANs). The networks are the working engine of GASL and are tasked with implementing activities, reports, providing evidence, guidelines and information on good practices demonstrated by the livestock sector. This paper outlines the activities of the network AN2 "Restoring Value to Grassland", the purpose of which is to "maintain, restore and enhance environmental and economic value of grasslands, while promoting their social and cultural functions globally". Since 2014, AN2 workshops have been held annually with scientists and stakeholders from rangeland/grassland biomes in Latin America (Brazil, Uruguay, Argentina, Chile), the Mediterranean (France, North Africa), Sub-Saharan Africa, Highland and Continental Plateaux (Tibetan Plateau/Mongolia/Atlas in Morocco), the mountainous regions of France, New Zealand and Vietnam, and the prairie area of Canada. A data base of 40 global grassland cases and a range of preferred practices have been compiled for these areas. A methodological framework is now available for assessing the contribution of grassland systems to multiple functions, along with the development of associated indicators that are aligned with the sustainable development goals (SDGs) - social, local development, production, economic and environmental. The framework has been built and tested using the global grassland cases. We present the results from three cases from Brazil, Vietnam and Argentina.

Introduction
Grassland/rangeland systems are a major feed source for livestock. Globally, livestock grazing systems (LGS) deliver a multitude of services to society. Wilson (1986), Landais *et al*. (1987), Veiga & Tourrand (2003) demonstrated the importance of livestock in small farming agriculture through diverse and complementary roles. Alary *et al*. (2011) also documented a synthesis about the diversity of roles and functions of livestock including the important environmental contributions of LGS on several natural and anthropic ecosystems and these roles/functions are further highlighted by Gerber *et al*. (2013) and Dong *et al*. (2016). Raising an awareness of the contributions and functions delivered by the livestock sector is the focus of the Global Agenda for Sustainable Livestock (GASL)[1]. Formed in 2010, GASL is a partnership of sector stakeholders committed to the sustainable development of global livestock activities. GASL addresses global food security and health; equity and growth; resources and climate, while recognising the important contribution of the livestock sector to the SDGs of the UN Agenda 2030. Actions related to system analysis, development of good practice; implementation and documenting/communicating specific experiences and recommendations are undertaken by nine Action Networks (ANs). Outputs from Multi-Stakeholder Partnership (MSP) and AN meetings are used to foster regional and global dialogues, collect evidence, and inform policy and practice to document and develop livestock's contribution to achieve the SDGs. The objective of this paper is to describe the work undertaken by Action Network 2 (AN2): "Restoring the Value to Grasslands".

Methods and Study Site
The Goal of AN2 is to maintain, restore and enhance the environmental and economic values of grasslands, while promoting their social and cultural functions at the regional and global levels. The participants of the AN2 network enable access to contrasting rangeland/grassland biomes and their local communities, including Latin America (Brazil, Uruguay, Argentina, Chile), the Mediterranean (France, North Africa), Sub-Saharan Africa, Highlands and Continental Plateaux (Tibetan Plateau/Mongolia/Atlas - Morocco), the mountainous regions of France, New Zealand and Vietnam, and the prairies of Canada. Participants employ and share a range of methodologies when working with stakeholders using a participatory approach that leads to collective design of shared outputs.

[1] http://www.livestockdialogue.org/

Results

A framework for assessing the contribution of livestock grazing systems (LGS) to multiple functions aligned with the SDGs is under development. A variety of participatory methods to explore LGS through differing stakeholder perspectives are used, including, ontology workshops with researchers, semi structured interviews with farmers, videos and theatre forum . The framework consists of four dimensions with their associated indicators: productive, social, local development and environmental. The three following cases are outlined to illustrate the framework and explore its use

Brazil: *Natural regeneration of native trees for the implementation of a silvopastoral system for beef cattle production.* This case demonstrates the potential to reconcile cattle production, environmental protection and social improvements in the tropics by using the silvopastoral system - trees, shrubs and forages (SPS). The following explains the findings of the contribution of the silvopastoral system on the dimensions of the framework. *Social dimension*: the higher biomass produced in the SPS secures cattle nutrition and offers financial stability to the farmer. These positive outcomes have corresponding flow on benefits to the farm worker families and local community, contributing to improved social security. *Economic dimension* – SPS enables the ability to carry more stock throughout the year with greater beef production per hectare, also providing opportunities for economic diversification (e.g., wood, carbon and tourism) compared to monoculture forage systems. *Local development dimension:* the farm is used as a demonstration site that several local technicians, extensionists and famers visit and learn collectively about the benefits of SPS and are inspired to adopt the principles. This extensions activity, demonstrating the multiple functions derived from SPS, is a key supporting element in increasing sustainable livestock production and consequently local development. *Environmental dimension* – the environmental benefits generated by SPS include higher biodiversity that provides the servicing function of biological control of insects and enrichment of fauna and flora; increased carbon sequestration by trees, and provision of natural sources of organic matter, phosphorus and potassium that reduce the need to use chemical fertilizer for associated grasses. The system is also animal welfare friendly through the provision of shade from trees.

Vietnam: In the mountains of Northwest Vietnam, the smallholder livestock farms depend largely on natural pastures for animal feed. Livestock grazing systems are considered insufficiently intensive to meet production challenges and provide enough income, and therefore they remain weakly supported by local government. This study has quantified the multiple contributions of these grazing systems to the sustainable development of farms and territories. *Social dimension*: Although consumers show a preference for meat from these grazing systems, the products from these systems have not been differentiated nor marketed. Pasture systems support 66% of farm workers. *Economic dimension*: In the Quai Nua commune region studied, livestock grazing systems produce about 49% of the meat production and about 48% of the meat integrated into the beef value chain (fresh meat, dried meat, meal). *Local development dimension*: 11% of the profits of actors in the beef value chain (collector, slaughter man, chef, and processor) are directly linked to the grazing systems. *Environmental dimension*: Livestock grazing systems support organic fertility and production of crop lands, with about 18% of the manure produced at communal level. Grasslands, essential for animal feed, contribute significantly to meat production, job creation, income and profits along the beef value chain. It seems necessary to ensure a visible, logical and sustainable approach to the management of grasslands to support animal production and the sustainable development of territories where livestock grazing systems are part.

***Puna North in Western Argentina*:** These grasslands are in arid and semiarid environments that receive low and variable rainfall (100 to 300 mm/year). The Puna (3,500 m asl) is a plateau with a dry and windy climate and high temperature amplitudes, sparse vegetation and limited possibilities for agriculture. Three scales of analysis exist: the domestic unit, the community and the region. This case reports on the domestic unit as field data was available at this scale. The dimensions of the framework applied include the *Economic dimension*: The main products are llama meat and sheep or goat meat: 330 t and 200 t (carcass weight equivalent) respectively per year in the highlands of Jujuy province (Argentina).The meat is sold mainly in the local (formal and informal) markets. Indicators used include production (kg meat per year/farmer), value (kg meat sold per year(farmer) and the number of species/herd (diversity of livestock/farmer) the latter as an indicator of resilience capability. *Social dimension*: indicators used are related to the fragility of the domestic unit and the strength of local organizations. We selected a few local organizations involved in the local meat market where the domestic unit (which is the productive unit) is involved. The number of family members that live, work and exit the domestic unit are measures of its robustness or fragility. *Local Development Dimension*: At the family manager unit level, we identified several main problems with infrastructure (land tenure, roads, slaughter facilities, water availability and communication); scarce market and price information; and a scarce set of appropriate rules and laws for this type of production. The indicators selected were annual income (meat

sold) and the number and diversity of marketing channels for the local meat produced. *Environmental dimension:* One of the most important issues in this dimension was the availability of parameters to measure transformations in the state of the natural resource. We plan to collect data that includes plant cover, diversity and richness and soil quality (organic matter, water storage capacity). This approach has allowed the research team to organise its dialogue and understand the importance of working across many disciplines and to change how we look at the world to see complexity, discuss ideas and methods, and to undertake participatory reflections.

Discussion

The sustainable development of LGS is a priority due to the economic, social and environmental relevance of livestock in the world. The promotion of sustainable alternatives requires a better understanding of livestock grazing socio-ecological systems, mainly their values and roles at a local level to global scale. However, LGS are complex systems and in order to identify effective interventions, a holistic understanding of system components and behaviours is required. Due to the huge diversity of rangeland contexts (from arid to wet biomes and from highlands to lowlands) and the numerous functions of livestock in these diverse contexts, it is not easy to have a generic representation. That is why it is so important to hear the voice of all of those participating in and influencing livestock grazed derived food systems. The framework provides a means of organising thinking and taking a holistic approach, but it is the social process that the framework enables that participants in AN2 have found most useful. Much time has been spent listening to each other's world view and those of stakeholders to find a common language. These processes take time and are context specific. The ability to test the approach in real world situations has been helpful to create a shared set of indicators and to test the utility of the approach in diverse circumstances, to date it appears robust. The use of a framework that includes all four dimensions and associated indicators was helpful in demonstrating the contribution of livestock grazing systems to multiple functions simultaneously. The framework enables: making transparent the multiple values and challenges delivered from grassland livestock systems; identifying the trade-offs when seeking to optimize one value over another and use as a learning tool with multiple stakeholders and to provide a narrative for society to gain greater awareness of grassland systems and their multiple functionalities.

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References

Alary V., Duteurtre G., Faye B., (2011). Élevages et sociétés : les rôles multiples de l'élevage dans les pays tropicaux. *In : Elevage en régions chaudes. Coulon J.B., Lecomte P., Boval M., Perez J.M. (Eds)*. INRA Prod. Anim. 24. 145-156.

Dong, S., Kassam, K.A.S., Tourrand, J.F., Boone, R.B. 2016. *Building Resilience of Coupled Human-Natural Pastoral Systems in the Developing World: Exploration of interdisciplinary strategies for sustainable pastoralism*, *Springer*, New York, USA, 308p.

Gerber P.J., Steinfeld H., Henderson B., Mottet A., Opio C., Dijkman J., Falcucci A., Tempio G. (2013). *Tackling climate change through livestock – A global assessment of emissions and mitigation opportunities*. FAO, Rome.

Landais E., Lhoste P., Milleville P. 1987. *Points de vue sur la zootechnie et les systèmes d'élevage tropicaux*. Montpellier : INRA-LECSA, 26 p.

Veiga, J.B. & Tourrand, J.F. 2003. Caracterização da viabilidade dos sistemas agropecuários da agricultura familiar na Amazônia Oriental brasileira. Coll. Embrapa Amazônia Oriental, Embrapa, Belém, Brésil, 468p.

Wilson, R.T. 1986. Livestock Production in central Mali: Long-term study on cattle and small ruminant in the agropastoral system. ILCA Research Report, n°14, Addis Abeba, Ethiopia, 113p.