Assess and recognize multifunctionality of Grazing Systems for practice change and public action towards contribution of livestock sector to sustainable food systems

A.Ickowicz, L.Wedderburn, AN2 Co-Chair et al.... (GASL AN2 members)  
CIRAD France, Agresearch New-Zeland, etc...

Introduction / Background

Livestock grazing systems (LGS) play a significant role in livestock production accounting for 39% of global domestic ruminant numbers, and 30% of animal derived proteins. One and a half billion hectares of land Multifunctionality unstable for cropping due to poor rainfall, soil fertility and topography are utilized by LGS as is 54% of the total terrestrial landscape. Much of this (28M km²) is in desert or marginal xeric shrublands areas. Many of these systems are dependent on both the mobility of livestock and people (socio-ecological systems) as they take advantage of the spatial and temporal variability in forage production throughout the year. The large land footprint of LGS and its associated management of livestock result in impacts on the ecosystem dynamics that result in a diversity of functions for both the environment and human well-being at different scales and dimensions (production, economics, cultural, environmental, local development etc.). These functions are not always considered when assessing the impact of LGS. The prolific debates that occurred during the 2021 UN Food Systems Summit have led to several so-called “Coalitions” that have to be implemented by states and civil society, many of them dealing with livestock issues. They have confirmed that Food Systems are now a global issue and that industrialized countries cannot represent a model for the rest of the world and that we have to learn from the local South and its diversity of farming systems, particularly about herbivore breeding. The GASL Action network “Restoring value to grassland” consider LGS within the context of a Multifunctionality (MF) framework that makes transparent the many functions derived from LGS. We document the results of its application through global case studies. The hypothesis is that the multiple functions of LGS, demonstrated in a diversity of global contexts, will inform the description and identify pathways for sustainable food system development.

Methods / Approach

Current methods of assessing the different functions of LGS oversimplify and underestimate the impact and are limited in their abilities to consider simultaneously interwoven dimensions and the ways they interact. We hypothesise that the use of the concept of “Multifunctionality of agriculture” which was developed during the 1990s (UNCED 1992) is a better way for developing a more exhaustive assessment of the different functions of LGS and allowing to express trade-off between functions reinforcing abilities for stakeholders involved to envision desirable futures for the activity. A multi-stakeholder participative modelling approach was developed to ensure a broad diversity of contexts and world views informed a common framework applicable to the diversity of LGS global contexts. Participants included researchers from a range of disciplines from seven different countries (Argentina, Brazil, France, Mongolia, Senegal, New-Zealand, Vietnam), and agribusiness, farmers and policy makers. The resulting Multifunctionality of LGS conceptual model (CM) consists of four dimensions (productive, social, local development and environmental) within which entities (farmers, livestock husbandry, pasture, products, atmosphere, water, infrastructures, organisations, etc.) and processes (trading, feeding, producing, consuming, building, earning, etc.) operate within, and are described using UML language with their associated indicators (Figure 1 and the indicators described in table 1). The construction of the CM allows for the exploration of not only the behaviour within in each of the individual dimensions but also the interactions between the dimensions and functions. This then enables the user of the CM to identify the differing outputs and to then make transparent the resulting trade-offs that may need to be explored.

References / Links


Results

The opportunity to apply the Multifunctionality common framework to a global range of contexts has demonstrated the power of the approach. Figure 1 illustrate the 4 dimensions grouping the different functions of LGS in 4 main domain in interaction. Table 1 summarises the cases, the specific set of indicators they used and the results of multifunctionality based local debates and analysis. The transversal analysis of results lead to the present conclusions on the impact of the MF approach:

- Creating a space and process for multi-stakeholders to hear, respond and decide
- Multifunctionality LGS conceptual model applicable to a variety of contexts
- Supporting sustainability through different scales
- MF framework help to articulate activities in territories
- Help managing diverse points of views and trade-offs
- The multiple functions of LGS are still present at global level but fragile and endangered

Figure 1: A Multifunctionality conceptual model for livestock grazing systems organised with 4 dimensions including entities, processes and indicators

Table 1: A summary of the indicators used in the case studies and the results of the application of the Multifunctional (MF) approach

Conclusions / Significance

Lessons that emerge from the use of the multifunctionality framework may be (i) The four dimensions resonate with all livestock farmers and provide an inclusive approach for full participation. (ii) The framework enables the exploration of the whole system and demonstrates the importance of promoting diversity (livestock species, livestock systems, flora and fauna,...). (iii) Viewing LGS as part of nature and not separate, enables the integration of LGS into nature and biodiversity conservation schemes. (iv) Innovative value chains including traditional livestock systems is an option for Sustainable Food Systems (v) Sustainable Food Systems may need to build on the complementarity of different livestock systems whilst building on the synergies with other land use activities. Thus can we reverse the global standardization and take advantage of the lessons from elsewhere to reinvent and redesign multifunctional and sustainable LGS, well integrated and adapted to the diversity of territories?

Acknowledgements

1. French Ministry of Agriculture for support to the Action Network
2. Partners institutions of case studies for support to ground studies and Action Network
3. GASL Secretariat for support to the Action Network