To what extent the shepherds of the Puna produce goods in a sustainable way? Are they providing more multifunctional services that we really think?

There are a complex web of interactions and knowledge we aim to know and we need to put in value to address with the frequently drought events, and in face to the climate change.

We aim to put in value and to put in evidence the main contributions of the Puna pastoralists to the global well being (production services, ecosystem services, development and socio-cultural services).

Livestock-based solutions

The pastoralists in Puna (Northwestern Argentine) raise camelids, sheep and goats settled mainly on natural pastures of private, community or public lands. These grasslands are located in arid and semiarid environments that receive not only rare but also very variable rainfall (100 to 300 mm per year). The Puna is a 3,500 m o.s.l. plateau with dry and windy climate and high temperature amplitude, sparse vegetation and limited possibilities for agriculture.

Which is the role of natural grasslands and pastoralists in the Puna of Argentina? Do they provide many other services in addition to meat, wool or milk? Which are the main goodness and services provided? Here we show you how we considered these questions through a multidisciplinary team to cope with a multidimensional problem.

Results and evidence

Through our Conceptual Model we decided the scale of work: shepherd family defined as Domestic/Productive Unit (DU). Then we considered at least 2 main indicators within 4 dimensions:

- **Production dimension**: The main products are meat of Llama (Lama glama) and sheep. The main destination of meat is the local market that live and work in the DU.
- **Ecosystem dimension**: Main services provided are biodiversity, soil protection, water cycle regulation, carbon fixation.
- **Local Development dimension**: About wealth and opportunities, we selected: DU Annual income (meat sold) and Number of market channels.
- **Social dimension**: We selected the level of DU participation in the local organizations involved in local meat market, and the number of family members that live and work in the DU.

Multiplier effects

- The generation of multistakeholders dialogues to understand and contribute to the sustainable development of pastoralists in dry lands of Latin America.
- The construction of a multidisciplinary team to study and to make appropriate proposals together with the local producer to these highly complex web of pastoralists, stakeholders and particular landscapes.
- The progressive inclusion of this type of complex object in the university education systems.
- The construction of a baseline to understand, but also to periodically test changes (negative, positive or indifferent) to these various type of Functional Services in the 4 dimensions.

The most important challenges

We seek to

- Improve/increase data collection and interviews
- Promote dialogues with pastoralists to discuss our results and, specially, the impacts it could generate in their negotiation skills.
- Prepare multistakeholders dialogues to consider this methodology and results.
- Increase our multidisciplinary team.
- Use this framework to teach students and young professionals.

Partners and their contributions:

- Aboriginal Communities Pozuelos Ravine, Jujuy, Argentina; they are the main actors providing information and their expectations, perceptions and conceptualizations.
- Researchers of the National Institute of Agricultural Research (INTA); the National University of Salta; personal of National Parks: ideas and proposals.
- IPAF NOA – CIPAF - INTA; National University of Salta; National Parks: funds and equipment.
- CIRAD – FAO: multistakeholder workshops to construct a conceptual framework, founds and ideas.
- Pastoremarcianas y AgriTerris: a good framework to share ideas.

Contacts: Mariana Quiroga Mendiola: quiroga.mendiola@inta.gob.ar

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