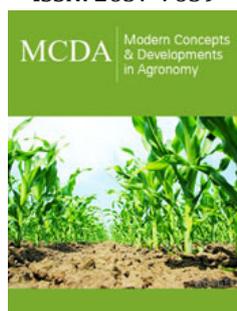


Exploring Agroecological Transition Pathways: The Case of Family Livestock Farmers in Northern Uruguay

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Abstract

Agroecology represents one of the main alternatives in Uruguay and other countries to production models generated by the green revolution. In Uruguay, agroecology has become more popular but is still marginal, despite the existence of a national plan (Law 19717) that promotes it. The implementation of agroecology needs a knowledge generation system to support it; however, research on agroecological transition processes is still incipient. The objective of this work is to improve the knowledge of the family livestock farmers' decision-making processes through the study of socio-productive practices, and consequently contribute to actions and public policies closer to farmers. The practices highlighted in this work allowed a typology elaboration that represents the possible pathways through which family livestock farmers move towards agroecology. The agroecological transition is conjugated in plural.

Keywords: Socio-productive practices and strategies; Agroecological transition; Family livestock farmers

Introduction

The diverse international experiences in agroecology show that livestock farmers transit towards agroecology through different pathways [1-3]. The way livestock farmers transit towards agroecology is the product of the interrelation of at least three factors: conditions external to the farms at the national level (public policies, research systems, etc.). The way livestock farmer's transit towards agroecology is the product of the interrelation of at least three factors: conditions external to farms at the national level (public policies, research systems, etc.); organizational and local/regional trajectories; and internal farm conditions [4]. These depend on farmers' situations and their projects, which determine the innovation capacities of the livestock farmer families themselves. This model approaches the one proposed by Geels [5] who explains that transitions depend on the interrelation between three dimensions: the socio-technical landscape (public policies, regulations, etc), the socio-technical regime (relations between industry, agriculture, science, market, etc) and innovation niches. In Uruguay, agroecology starts to become important in agricultural production, at the beginning of 2015, when different NGOs propose a Law project that is finally approved on December 11, 2018. This Law n° 19717 promotes a National Plan for the Promotion of Production with Agroecological Bases and declares of general interest the promotion and development of production systems, distribution and consumption of agroecological products, with the

objective of fortifying food sovereignty and security, contributing to environmental care, generating benefits that improve inhabitants' life quality (Law n°19717). Regarding livestock, natural pastures occupy more than 70% of the total exploited area in Uruguay; bovine livestock is the productive specialization of 50% of the country's agricultural holdings. If we consider ovine livestock, this increases to almost 60% of farms [6]. Family farming, according to official sources, is a significant social group in Uruguay: 36,965 family farmers in 21,657 holdings are mostly engaged in cattle and sheep production as the main economic activity [7]. Faced with the importance that agroecology is taking particularly in family farms, we wanted to explore how livestock farmers decide whether or not to implement more agroecological production systems, it means exploring innovation niches, according to the proposition of Geels [5]. For this purpose, in the northern region of Uruguay, where livestock activity from natural pastures predominates, we selected a sample of nine livestock farming families where we conducted studies cases (three interviews of more than 2 hours) according to the global farm approach methodology [8], in order to understand the situations, finalities (or objectives), management practices and strategies of the livestock farmers (Figure 1).



Figure 1: Livestock farming landscape.

Agroecological transition pathways

The functional analysis of the livestock farmers' practices and strategies allowed us to identify and characterize the farms' trajectories, the decisional rules and the actions of family's livestock farming.

The farmers' objectives act as a framework in which decisions are made. The main finalities found are those related to:

- A. The family
 - i. prioritizing children's education,
 - ii. maintaining a family lifestyle;
 - B. The farming system and the livestock farmer's profession:
 - i. having autonomy as livestock farmers,
 - ii. being a family farmer,
 - iii. building a legacy,
 - iv. developing their own sustainable way of production.
- The rules, which make it possible to select the most relevant actions according to finalities, can be classified into three types related to:
- A. The family
 - i. provide children formal education;
 - ii. ensure the family's welfare;
 - B. Production
 - i. diversifying production,
 - ii. optimizing available resources (Labor, Natural resources, knowledge),
 - iii. skill training;
 - C. Economy/organization
 - i. maintain different income sources,
 - ii. producing, managing and commercializing collectively.
- The strategic common rules associated with socio-productive practices identified in the first analysis were grouped by criteria similarity [9], 3 strategic macro-rules were obtained (i) Social and productive integration; (ii) Focus on productive changes (iii) Improving quality and maintaining a lifestyle.
- The actions reflect the way livestock farmers produce, commercialize and operate the system. We can also classify them into three types related to:
- A. The family
 - i. accompanying and stimulating the children's education,
 - ii. prioritizing family decisions,
 - iii. self-consumption of the farm's own products;
 - B. Production
 - i. use animal health alternatives: homeopathy, biocontrol, biogarrapaticide,
 - ii. carry out controlled grazing (stocking rate according to grass availability),
 - iii. rotate pastures to let them rest and seed;
 - C. Economics/organization
 - i. sell organic products (meat and wool),
 - ii. sell secondary products (milk, cheese, vegetables, sweets),
 - iii. participate in collective projects for family production financed by public policies.
- One of our hypotheses regarding the agroecological transition is that there are several pathways and that depends on the

situation and the project of family’s livestock farming. To validate this hypothesis, we constructed a typology based on the models of strategic functioning of the family-farm system obtained from the interviews with the families of the sample of livestock farmers.

The typology makes it possible to group (homogenize) the farms according to function similarity and thus identify the pathways by which it is possible to move towards an agroecological model (Table 1).

Table 1: Agroecological transition paths: typology.

Technical-Productive Management Practices				
PRODUCTION OBJECTIVES	Reproduction and animal health	Concentrated calving and lambing period. Calves are sold at weaning. Organic garrapaticide was used.	Concentrated calving and lambing period, temporary weaning, fecal worm egg counting analysis (mostly). Animal management by category. Animal selection (fine merino, texel tattoos).	Long service period, calving and lambing period from August. Shearing in November, sometimes prepartum shearing. Calendar health (drenches every 2 months).
	Production and forage supply utilization	Natural grass quality improvement, some winter greening and lotus pasture. High stocking rate, feeding with pasture rotation by category. Rearing outside the family farm.	Continuous grazing with pasture height measurement (stocking rate relative to the grass availability). Rational Vosin grazing (high stocking rate). Animal category management.	Natural grassland conservation (few animals in large areas), some improvement. Low livestock density, low stocking density, low animal rotation.
		Macro-Rules Sheared		
		Social and productive integration	Focus on productive changes	Improving quality and maintaining a lifestyle
Transition Typology				
Agroecological transition pathways/ denominations		Exchange and diversification <i>“Putting your eggs in several baskets”.</i>	Biodiversity management <i>“Innovating to intensify the agroecosystem”.</i>	Traditional practices <i>“If it works, don’t change”</i>

The typology allows us to understand the pathway in which livestock farmers move towards agroecology.

The pathway of diversification

Management practices and strategies are based on natural resources with models (systems, techniques, practices) arising from collective action, as in this case the use of a biogarrapaticide in an associative field. The practices of environmental care have several objectives: to increase the product quality to be commercialized, to take advantage of the potential of the fields without having to invest in external inputs (soil use efficiency), and to start to follow paths (innovations) that make their products better for people’s quality of life (use of biological pesticides, stop using glyphosate, carry out rotational grazing with differentiated plots) [10].

The pathway of biodiversity management

Management practices and strategies are manifested in the complexity of farming systems and propose biodiversity management emphasizing the intensification of agroecosystem technological management with very little use of external inputs. Innovations in production management pursue goals that are related to strong family trajectories, for example: serious health problems in the family that force to change production management for family care. These are changes that follow a defined path, for example, rational Vosin grazing, continuous grazing with stocking rate management according to grass availability, animal category management, incorporation of decision-making tools such as fecal

worm egg counting analysis, tattooing of sheep, including the use of biogarrapaticide.

The pathway of traditional practices

The practices of these livestock farmers are based on the preservation of traditional or peasant practices. They are families deeply attached to their farms for generations, defined by their parents’ legacy and by passion for living in farmland. Although the practices are argued by “it has always been done this way” and “do not change what works”, they can be modified, which gives these farms a certain resilience or flexibility (Figure 2).



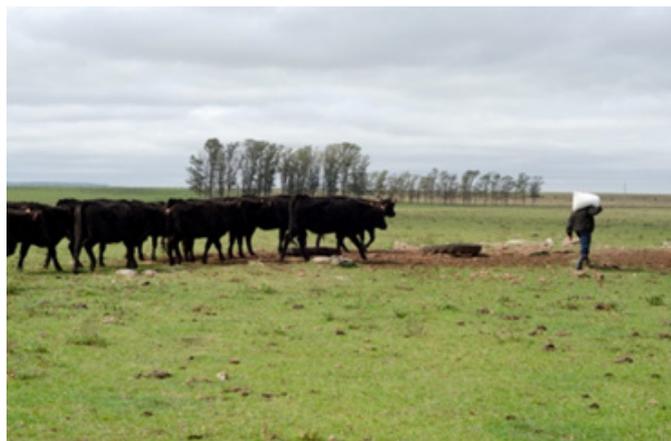


Figure 2: Farmers performing livestock production tasks.9247174128

Conclusion

The study cases are the first methodological step necessary to understand the livestock farmer families' decisions, the sense of their practices, and why they do what they do. The rules and finalities of each family made it possible to define a "set" of actions practices and strategies that are related to agroecology and that allow us to find different "pathways" of agroecological transition. The typology allows us to visualize: support actions, differentiated and territorialized public policies according to defined transitions types and to incorporate them into the "virtuous circle" of the agroecology. For example, for livestock farmer families that follow the pathway of diversification, we could think of public policies that encourage promotion and commercialization in local markets or local sales of by-products, highlighting their natural characteristics. For those who follow the pathway of biodiversity, in addition to training in biodiversity, public policies could be considered to

improve the marketing of organic products (seals, for example) and workshops could be organized to exchange experiences between the territory and farms. And finally, for those families that follow the pathway of traditional practices, it is possible to think about actions to show the sense of being part of the territory, valuing tradition, and based on public policies imagines a proposal for cultural tourism where the territory tradition is highlighted.

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