

# Livestock and Local Development: Going to a New Humananimal Relationship

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## Presenter Information

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# Livestock and local development: Going to a new human-animal relationship

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**ABSTRACT**

Along the past ten years, the French National Agency for Research (ANR) has financed projects regarding livestock. Results of five projects were gathered to understand the long-term livestock trends. At the end of the 19th century, animal breeding was oriented towards the production of goods to meet the local, regional, national and global demand, according to the zone. The market gradually became the key-factor to norm both production and consumption. It is now integrating environmental norms and is starting to invest in the social domain. However, this economical vision of animal production does not take into account the other functions of livestock, from "farm fork" to "table fork". So, in parallel to the multi-functionality of livestock at the farm level, which is mentioned by several authors, livestock has a significant role at the local scale. Furthermore, in the past four decades, animal production sector has known several serious scandals with severe consequences in human health. At the same time, the FAO scoop in 2006 about the significant environmental impact of animal breeding has chocked a large part of the human society. Hence, in parallel to the discredit of animal production towards the consumers, these successive crises have led a part of the local and global society to question the human-animal relationship. In this way, a large part of the urban population with no contact with the rural world, would easily believe in animal welfare, and break the supply chain leading to the slaughterhouse. And to confirm this trend, research institutes are already seeking alternatives to meat and animal proteins. Consequently, maybe it is time now to think imagine other farming systems based on other human-animal relationships and other environment-society interactions; and perhaps to establish an adequate set of policies to strengthen this perspective.

**Key-words**: Animal breeding, Environmental impact, Human-Nature partnership, Livestock, Marketing animal products,

## Introduction

Along the past ten years, the French National Agency for Research (ANR) has financed several projects regarding livestock at the local and global scale. The results of five of these projects were gathered in order to better understand the long-term livestock dynamics and draft scenarios. Research actions have been developed in fifteen sites in diverse biomes located in seven countries of Europe, Africa, America and Asia. Literature review and preliminary data collection in the sites showed the high complexity of the livestock dynamics such asthe intensification of the livestock farming systems in regard to land and the intensification of labor in some cases, and the adoption of more extensive practices by breeders, in other cases. A similar change was noticed for the farm size which increases or decreases according to the site and the type of the farm. Diverse strategies have been mentioned regarding marketing, collective actions and environment impacts. To face this complexity, the analysis was done for each site

and project separately before adopting a comparative approach.

The first session gives a brief review of the literature regarding livestock dynamics in the past, current and future time. The second session describes the objectives, methods and main results of each of the five projects. The results are presented in the third session, organized in the three following sub-sessions: (i) the territory as the local place where stakeholders interact with resources, supply chains and policies; (ii) the main livestock farming systems and their trends at the local scale; (iii) the hopes and fears of local people regarding livestock sector. These results are discussed in the fourth session.

## Context of Livestock Farming System Research

Launched by the Michigan State University - MSU (Gilbert *et al.*, 1980; Norman, 2002), in partnership with diverse universities and research centers, the farming system approach considered the research method (FSSP, 1983; Hildebrandt and Russel, 1996) which aimed at better understanding the farming processes, especially how to integrate, in a scientific approach, the different factors that drive the farming activity in order to ease the exchange of objectives, strategies and farming practices between researchers, farmers and technicians. The obtained outcome was a new approach that consisted of the top-down model "Research - Extension - Development". The Research-Development concept was created later in order to integrate the farmers and the local development agencies in the farming system research process (Jouve and Mercoiret, 1987; Chambers, 1989; Chambers *et al.*, 1989).

The research on the livestock farming systems started in the same period due to the benefits of the methods to analyze the practices and assess the performances (Landais, 1983). However, researchers faced the complexity of livestock activity, especially the multi-functions of the animals, the mobility of the herds and the long-term cycle of the ruminants. In 1985, Lhoste (1986) suggested an interesting method to analyze the livestock farming systems. This author considered the system as a tripod based on human, animal and resource. These three entities interact, and the interactions are as important as the entities in order to understand the system. Figure 1 represents the three entities and interactions.

This representation of the livestock farming system has been a significant innovation for the livestock research sector due to the two following reasons: First, it allowed to compare, through the same model, completely different livestock systems in terms of objectives, strategies, practices and performances, as for example the comparison between a cattle ranch, a small holder's dairy-beef herd and a pastoral breeder. Secondly, it gave a clear location of the three different research domains at the farm level (animal, resource and family) and their interactions. It also allowed a better identification of the

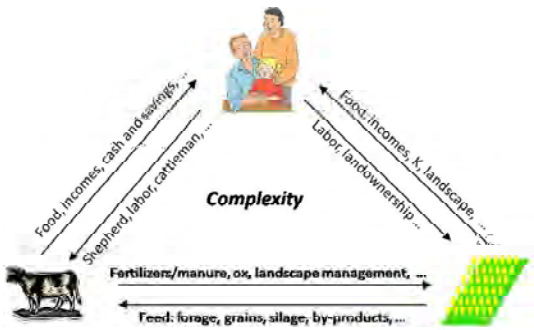


Fig. 1. The Three Entities and their Interactions

Source: Adapted from Lhoste, P (1986) by Tourrand & Faye (2012)

interactions between the research sectors, and hence meeting the farmers' demand. For example, higher nitrogen fixation improves productivity of pasture and increases nutritive value of the forage.

In the nineties, facing the diversity of the bioclimatic and socioeconomic contexts regarding animal breeding, the FAO launched the classification of the livestock farming systems based on the biome or bioclimatic zone, the feeding resources and the level of intensification (Seré*et al.*, 1996; Steinfeld and Mäti-Hokkonen, 1996). The advantage of this classification was recognized by FAO and applied by this institution at the national and global scale. However, the use of this classification shows two limits: First, it is not easy to analyze the complexity of the farming systems due to the previous defined classes. For example, in the small farm, the herd grazes on the rangeland, the dairy cattle receives a special ration based on irrigated crops, and the fattening bulls receive another ration based on grains purchased on the market. Three feeding systems coexist in the same livestock system. But they result from the same objective. Another limit is the scale of analysis focused on the livestock system when the drivers of change usually act at the farm scale (Steinfeld *et al.*, 2006).

Local scale is an essential level for the five projects financed by ANR since 2005. Compared to the livestock farming system model Lhoste (1986) and the classification (Seré *et al.*,1996), the local level included value chains, relevant factors for economic approaches (Delgado *et al.*, 1999), but also extension services, development and financial agencies, capacity building and learning systems, social services, urban-rural relationship, infrastructure, climate change, etc. as mentioned in Fig. 2.

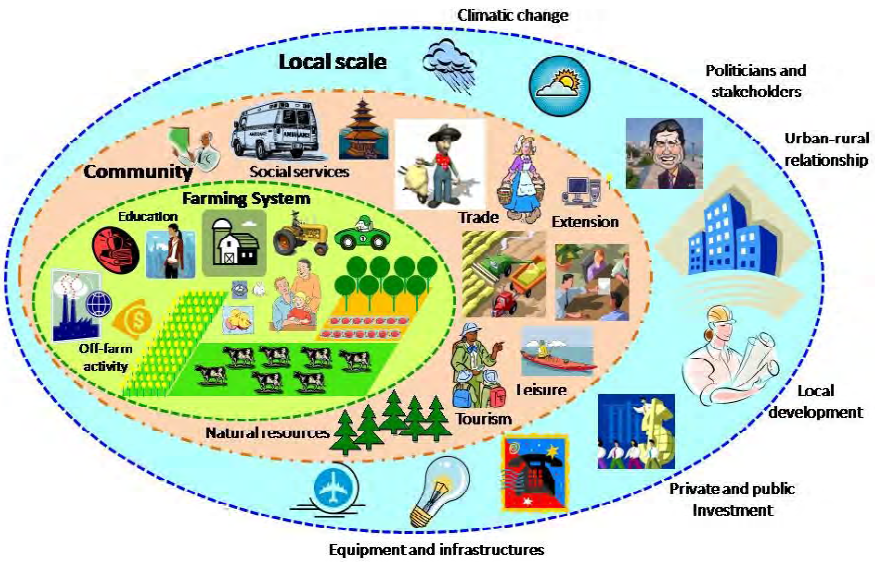


Fig. 2. From Farming System to Local Scale
Source: Tourrand & Faye (2012)

At the farm level, the approach took into consideration the farm as a whole and complex system with several entities and interactions among the components of the system, including diverse animal productions (cattle, small ruminants, poultry etc.), forage production, byproducts used as feed, cropping systems (rain-fed, irrigated, cash-crops, plantations of trees and fruits, etc), natural resources (water, soil, forest), equipment, labor, family members working or just living in the farm, their representations, their hopes and fears, their projects for the future.

## Materials & Methods

The five projects simultaneously considered economic, social, environmental and policy implications of transformations happening at farm and local scale, in order to address the multiple dimensions of sustainable development of livestock sector in different research sites and at the global scale.

Figure 3 locates the research sites of the projects. Contrasted research livestock areas were analyzed by one or more projects in order to take account of the diversity of livestock sectors at the global scale.

Interdisciplinary approaches, participative methods and integrated partnerships have been applied in the five projects in the objective to focus on the different factors of change and the effects of these changes at the farm and local scale. According to the project, data collection was done through on-farm surveys and monitoring, interviews with key-informants and stakeholders, and analysis of public and private databases such as the case of remote-sensing data on animal disease control.

The five projects are presented hereafter:

***ECOTERA: Eco-efficiencies and territorial development in the Brazilian Amazon (2014-17):*** Carried out in the Brazilian Amazon, the objective of this project is to produce a multidisciplinary knowledge and develop tools that will enable the local actors of a territory facing global changes. The project aims to explore under what conditions eco-efficiencies of agricultural production systems

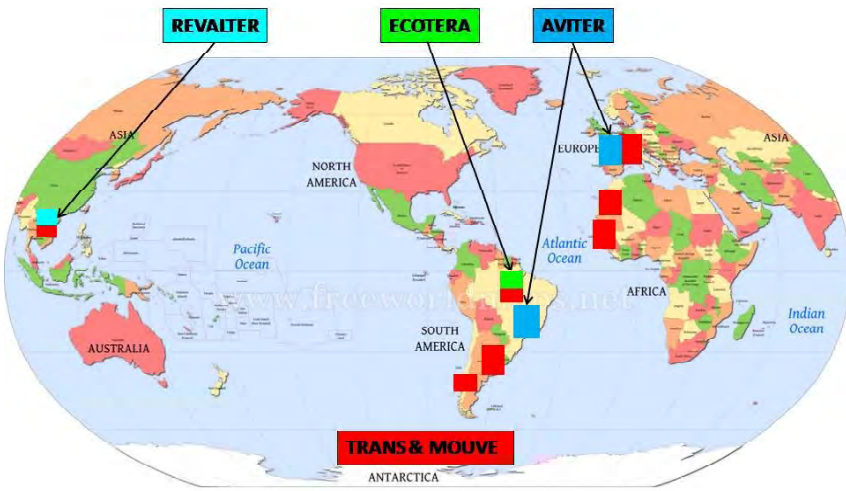


Fig. 3. The Five Projects and their Research Sites

and land use can lead to sustainable development trajectories of their territory. The project aims to evaluate the eco-efficiencies of production systems and landscapes with spatial indicators and mapping tools, to assess the effects of geographical and organized proximities on innovation and adaptation processes, and to build development scenarios at the farm and the local scale.

***MOUVE: Interactions Livestock – Local Development and Dynamics of Ecological intensification* (2011-14, *http://www1.clermont.inra.fr/mouve*):** The MOUVE Project produced knowledge on the forms and conditions of ecological intensification in ruminants breeding in harsh areas. The livestock farming system interacts with its territory through natural and human resources, produced goods and services, effects and impacts of livestock, but also through market regulation and policymaking. The expectations of the local people focused on the type of livestock systems to be adopted in the future, the sustainability of the farms, the policies and collective actions, the regional planning and its impacts on the ecosystems, and of course the evolution of the market. Significant changes are expected, especially in the management of the farms with a lower contribution of the family members, the increasing size of the farms, the more constrained environmental norms and the development of a private-public policymaking and collective actions.

***REVALTER -Multi-scale assessment of livestock development pathways in Vietnam* (2013-16, *http://www.futurelivestock.net*):** As in several Eastern Asian countries, the livestock sector in Vietnam is affected by a rapid industrialization due to sharply rising national demand for pork and dairy products. Leading in partnership with the Vietnamese Ministry of Agriculture and Rural Development, the REVALTER Project aimed to guide the national livestock development policies by building future scenarios for the sector. This approach relies on analyzing the previous changes that affected the relationship between livestock and ecosystems. The research is conducted at three levels: farm, local scale (territory) and value chain. The project teams also seek to understand the governance mechanisms associated with trajectories of changes.

***TRANS: Livestock Transformations and Local Dynamics* (2006-09, *www1.clermont.inra.fr/add-trans/*):** In 2005, the TRANS group announced that "the dynamics of change in livestock farming are essential to the challenge of sustainable development in grassland and rangeland areas. The vitality of these zones is highly dependent on evolutions in livestock farming, which contribute to the evolution of the natural landscape that are basic to environmental issues. The purpose of this project is to have a new approach to changes in livestock farming and to connect these changes to the dynamics of natural areas". TRANS produced a different vision, analyzing interactions between transformations in farms and economic and political changes. Special attention was given to the collective actions and their effects on land use change. Another result was the diversity of technical and economic aspects, at the farm and local scale. TRANS changed the idea of work and labor, in regard to composition of working groups of farmers, combinations of activity, and farmers working in a situation of uncertainty.

## Results

***Territory as a socio-ecosystem where policy meets production chain, initiative and innovation*:** According to Brunet *et al.* (1992) and Sack (1986, 1997), the territory is a socio-ecosystem where several entities interact, especially the society, the environment and

economics. Due to this three-dimensional structure, the territory is a significant level, at the "local" scale, to build, debate, analyze and asses the regional planning (Moine, 1997). Based on this concept, we have tried to model in a simple scheme with diverse transformations regarding the livestock farming systems, the supply chains and the policies (Fig. 4). The first slide (S1) represents the Lhoste's tripod (1986) with (i) a horizontal axis for the animal, from the animal wellbeing to the production of commodity, (ii) a vertical axis regarding the feed resources, from the feed autonomy to the feed inputs, and (iii) a third perpendicular axis showing the gradient of livestock practices from the diversity to the norm. Based on the different case studies on the research sites, the second slide (S2) represents the two opposite trends of livestock systems, both at the farm et local scale, one going towards globalization and the other going towards localization. Also based on the different and contrasted research sites, the third slide (S3) shows the environmental policies relatively independent from the two trends. For example, norms to reduce the greenhouse gas emissions or to preserve the biodiversity in the pastures usually impact any kind of livestock farming systems.

In contrast, other policies affected

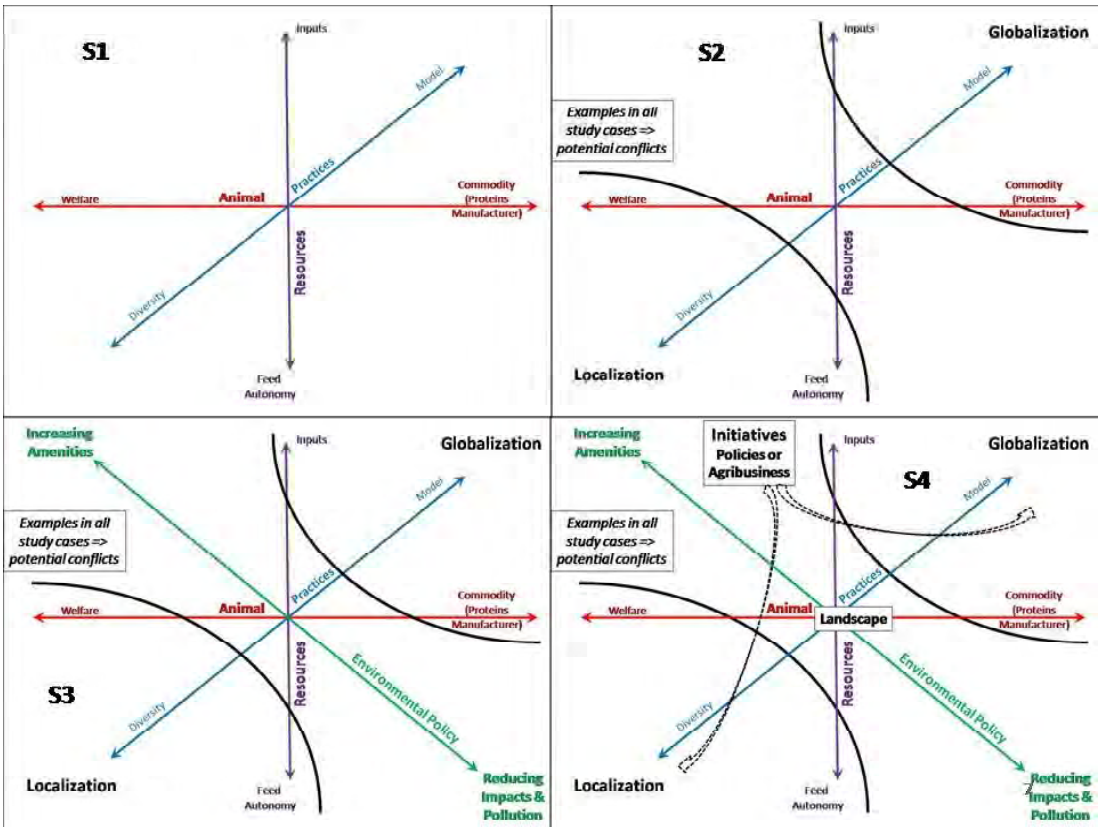


**Fig. 4.** The territory, as a complex socio-ecosystem where policy meets supply and market chains

differently the livestock farming systems, especially those relevant to the market, labor, quality, etc., as mentioned in the fourth slide (S4). For example, a policy which aims to support local production in order to improve livelihoods of family breeders tends to promote localization process. On the contrary, a policy which aims to increase agribusiness and the exportation of commodities tends to promote globalization process. But the two contrasted policies can be applied at the same time. In this case the policy at the national level tends to promote either localization or globalization processes, as for example in Vietnam with the double support to big dairy farms and local dairy production initiatives. It is also the case inthe European Union and Morocco with the two pillars of respectively the CAP and "*MarocVert*" Plan. It still is the case in Brazil with two ministries, the Ministry of Agriculture mainly focusing on agribusiness and the Ministry of Social Development supporting small holder production.

The analysis of the farming system, policy, supply and market chain using the same concept of territory and the same representation/model, allows better understand the trends and the strategies of the different stakeholders. For example, in Western France, a part of the poultry production is typically in the globalization process with very efficient production models focused on exportation and based on import of inputs. Ten years ago, this trendled the agribusiness to change the production in Brazil where the main part of the feed was produced, especially soy bean. The impact on Western France economics was terrible, especially on local employment and subcontracting. During the same period, in the South-West of France, the poultry production aimed for national consumption was increasing and was able to compete with the Brazilian production which attended the French market through specific products. Moreover, for several reasons, the transfer of poultry production from Western France to Brazil did not succeed, as expected. Furthermore, a special policy in Brazil tended to limit the concurrence between the South of the country where the production was decreasing, for the same reason as in Western France, and Central Brazil where the production was economically more efficient. This limitation can be explained by the fact that the environmental impacts were not taken into consideration.

Another example is given in North Vietnam where policies supported investment in both big dairy farms of several thousand cattle, and initiative for local dairy products based on small holders farms. The national strategy regarding the big farms aims to reduce the dairy products importation due to the low national production and the increasing demand. The policy regarding local initiatives aims to benefit from the increasing demand for dairy products in order to strengthen the local dairy production. The result is the adoption of more efficient practices allowing more productive dairy systems, in both small and big farms. Moreover, as mentioned in other areas, due to the adoption of advanced technologies in the big farms, it is expected to disseminate these technologies in the small farms through local learning, especially the consulting agencies and the big farms workers.

***Territory as a complex set of expectations and representations regarding livestock:*** In each research site, different and contrasted expectations about livestock have been registered. One of the major results is that livestock does not only play a role in the production of goods, but it also has diverse functions in the use of resources, local development, land use and landscape, environment, social and cultural issues, etc. A

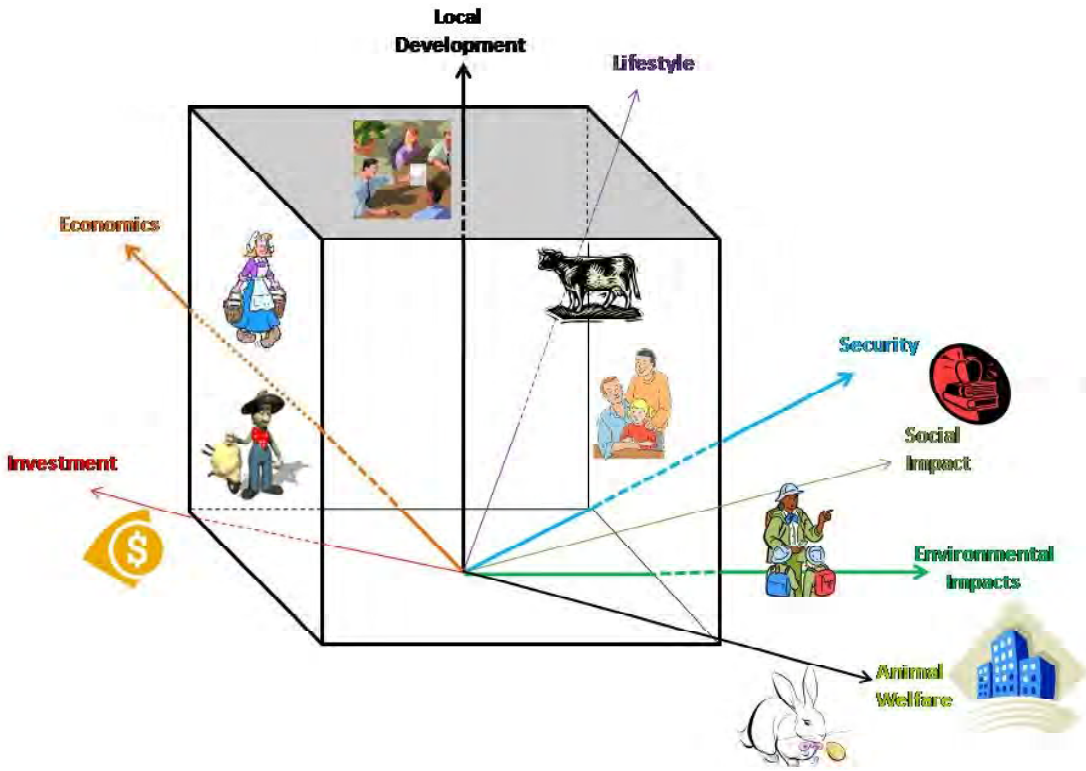


Fig. 5. Different Representations of Livestock and Main Locations of Stakeholders

second major result is that there are no shared representations of livestock among the local stakeholders, including breeders, traders, inputs providers, development and financial agencies, rural planners and policymakers, consulters, experts and researchers, etc. This lack of a common representation led to debates, sometimes to conflicts. The territory is the scale where the opposing views meet and debates and conflicts take place. Nevertheless, there is usually a consensus, at least a regulation to avoid the clashes, and the territory is the relevant scale for these consensus and regulations.

However, four great expectations have been identified: 1) strengthen the security (food, economics, etc. ...) of household farmers and their families; 2) contribute to the economy of food chains; 3) reduce the environmental impacts, including pollution, and contribute to biodiversity conservation; 4) be a significant component of local development, including economic, social, cultural points of view. Stakeholders are usually linked to more than one expectation. For example, producers are mainly represented in the first expectation which focuses on security. Traders, inputs providers and stakeholders of supply and market chains are logically more present in the second expectation which is their subsector. In the same way, stakeholders acting in rural planning and local development are more present in the fourth expectation. The third expectation gathers stakeholders of different origins.

Other expectations exist besides the main four. This is particularly the case of livestock seen as an investment sector, as well as any other commodity by investors. This expectation is at the origin of the recent factory farms for beef and dairy products, as some decades ago in poultry and pork sector. Another expectation (or distrust) regards animal welfare. This is more urban and more external to the livestock sector, and it is leading to vegetarianism and veganism, which accounts for around one billion humans. This group suggests a new human-animal based relationship. The weak significance of this expectation in our result is partially due to the low number of urban people and consumers in our sample.

Furthermore, another expectation was noticed in the more traditional parts of pastoral societies for whom livestock is a lifestyle, an identity. For these groups, livestock is everything, including food security, income, saving, the main or the only activity of the household and community, pillar of land use, relationship with neighbors, etc. Finally, another expectation concerns the social impact of livestock. This refers to the negative social image of livestock in some rural contexts, such as the fights between landless or small holders and big ranchers or between the natives and the cattlemen and pioneers. This expectation is strongly represented in scientific communities, mainly in human sciences. It is an old expectation but it is still present today and is at the origin of critical expectations regarding livestock, environment and welfare.

The Figure 5 shows the different representations and the main locations of stakeholders.

***What about the future of livestock? What Livestock Farming Systems?:*** The five projects have a specific task about the scenarios for the future. During the interviews, the workshops and the informal talks, the stakeholders explained about their own visions of the future for livestock. Many of them have doubts, interrogations and questions about: livestock farming systems in the future, dominant models and alternatives; future of livestock sector, especially facing the new environmental norms and other norms regarding other topics, for example animal welfare; evolution of demand of animal products and impact on prices; governance of livestock from local to global scale.

Today, defining the livestock farming systems of the future is a challenge. If some systems should strongly change, others should change slightly. For example, the systems of traditional pastoral breeders, such as the Peulhsin North Senegal and the Gauchos in North Uruguay, have to strongly compete for the land exposed to the expansion of peanut and soya production in both countries respectively. However, if the environmental regulation moves forward in the same dynamic, the significant contribution of the natural rangeland should be recognized, especially in water cycles and biodiversity conservation. Hence, norms and policy measures protecting rangelands should be implemented. Moreover, these pastoral societies, their practices and local knowledge are a human heritage that should be protected, as Amerindian communities were protected along the past decades.

The factory farms of several thousand dairy cattle, including huge feed-lots and the intensive poultry and pork production will remain due to the demand on their products and the efficiency of these production systems in terms of profitability and environmental impact. Even so, they have to further reduce their environmental impacts and improve their integration in the landscape and territory.

The future of the family farms is more difficult to imagine due to the big diversity of this group. Perhaps, those that will sustain will be the farms with an income allowing a lifestyle similar to that of an urban area, in order to attract young people. These farms would eventually have subsidies for environmental and social functions. Sustaining family farming systems would need permanent efforts in terms of capacity building and monitoring to follow-up the technology updates. The other farms will have difficulty to maintain their livestock activity, except those valorizing their production in niche markets, individually or through collective action, at a local or global scale.

The scenarios are different for the small and landless farmers. Due to the poverty in many rural areas, livestock will continue to have an essential function in food security and livelihoods improvement. Moreover, livestock appears as a significant node in the subsistence agriculture, as mentioned by Duteurtre and Faye (2009) and Coulon *et al.*(2011).

Finally, the big ranches, with extensive production and environmental impacts caused by gas emissions, should intensify their practices by diversifying or integrating crop, animal and trees, for example. Furthermore, they would have to face higher costs of labor justifying the intensification.

Another important result regarding the future of animal breeding is the low attractiveness of livestock activity to youth. Mentioned by all stakeholders, the disadvantages of the work with animals are known, these are mainly those related to farming activities (high investment for low return, many work for low income, need to live in rural areas) and moreover the need of permanent presence. Moreover, the decreased interest of young people in farming is supported by the recent and successive scandals in livestock sector and the latest bad environmental image of the livestock activity.

## Discussion

The first point of discussion is the relevancy of policies in the future of livestock. It is clear that, more than any other time, animal production and the livestock sector will depend a lot on policy measures and norms that are defined at the local, national and global scale. Until the eighties, the norms in animal production and livestock sector were usually defined at the national level, based on traditional, local and national products. The surplus use to be exported to the international market, especially to the developing countries which, at that time, accepted almost any kind of products to achieve their food security and reduce their importations. In the nineties, due to the different scandals involving animal production (ESB, hormones, dioxin…), the market has gradually controlled the livestock sector through the implementation of norms controlling the quality of products (Sere*et al.*, 1996; Delgado *et al.*, 1999). Then, the environmental norms have progressively defined the policy measures applied in the developed countries first, then in emerging and developing countries, especially after 2006 (Steinfeld *et al.*, 2006).

At the same time, policymaking changed, as demonstrated by the MOUVE Project. The number and the diversity of the stakeholders involved directly or indirectly in policymaking have increased. Nowadays, any policymaker working on livestock issues has to refer to the different stakeholders supported by contrasted private or public institutions, associations, etc. Moreover, policymaking is suggested many times by the stakeholders, based on the demand of local population. Progressively, policymaking was going from strict top-down

process to mixed top-down and bottom-up system, as noticed by the REVALTER and ECOTERA Projects.

The second point of discussion is linked to the territory as the right place for this new policy making. Due to the advancement of democracy and a stronger participation of the local population in policymaking process, intermediate scales are necessary to debate, explain, and assess the public actions and emergence of new ideas. As analyzed in the MOUVE Project, it is for example the case of implementing environmental norms which cannot be the same in different contexts. So, new rules have to be discussed and adapted to the local context, as suggested by the AVITER and ECOTERA Projects. Furthermore, some stakeholders have suggested managing the supply and market chains in order to produce and consume in the territory, and consequently reduce the environmental impact of transport. This is an interesting proposal but it requires a lot of changes in farming practices, since globalization has also negative impacts on the production and marketing.

The third point of discussion is the next step to be taken in term of the norms. Before the mid-nineties, few people thought that the livestock sector could be shocked, in less than ten years, by environmental measures. As explained, the change was certainly due to the strong environmental impact of the livestock activity (Steinfeld *et al.*, 2006) linked to the first effects of climate change. This is also due to the new rules of governance involving more levels of policymaking, as noticed in all the five projects. Maybe the new human-animal relationship will define the future of livestock farming systems and livestock sector. Research institutes are working on this scenario, especially to find other proteins source to substitute meat consumption. Furthermore, a significant part of the human population, estimated at around one billion people (12-15%), does not consume meat already. Some of them do not eat any animal products. This trend could be supported by religious reasons; lobbies are very active as well, focusing on the education of kids and policymakers. The growth of this trend at the local and global scale could lead to serious limitations to the current livestock sector that is focused on the production of goods for human food. Maybe, alternative values and functions could be found for the animals, especially in transport linked to their mobility, energy production, maintenance of landscape and fragile ecosystems, urban services, etc.

In conclusion, the local scale or territory has recently emerged as a relevant level in analyzing and understanding the changes in livestock farming systems and their range of activity. These changes refer to different factors from food safety to climate change effects. New concepts and mechanisms appeared at the local scale, especially the collective action, the local policymaking, and the participative assessment etc. Methods are not clearly defined and warrant further investigation. In addition, maybe the change caused by the environmental issue is little as compared to the future change linked to the new human-animal relationship.

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