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Describing the evolutions, in a territory, of the interactions between livestock farming systems and downstream operators. Proposal for a methodological framework, based on the comparison of 4 territories and 2 types of production: milk and meat.

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Abstract: In the era of globalization, agrifood systems do not always evolve towards more sustainable patterns and are caught up in tensions between delocalization and relocalization. When analysing the evolutions of agrifood systems (linked to a type of production and sited in a given area), account needs to be taken of the way in which the changes are involved at different levels: livestock farming systems, systems for processing and distributing agrifood products, and the development of the territories in which these activities take place. This goal supposes that there is a methodology capable of analysing these evolutions. Our work proposes such a methodological framework, more particularly to report the joint evolutions of livestock farming systems and downstream operators in rural territories. It was based on the comparison of four case studies: 3 in France (Vercors and Livradois-Foréz for milk production and Cévennes for meat production) and one in Uruguay. This methodological framework, which uses a process approach, is organized to describe and qualify the ongoing dynamics in the joint evolutions of different aspects of agrifood involved in these changes over time. It includes, for an area and a type of production the evolution of: i) the livestock farming systems, characterized by a diversity of breeding systems and collective actions set up by farmers to assert and market their production, ii) the downstream operators, involved in the territory, described by the types of operators and the relationships between them, and iii) the “livestock farming system – downstream operator” interactions. We consider two forms of these interactions: product marketing methods, i.e. the choices of product-purchaser pairs, and vertical coordination modes between livestock farmers and downstream operators, illustrated by the elaboration and implementation of a specification. We illustrate the use of this methodological framework and discuss how, by integrating various levels of actions, it can contribute to understanding the joint evolutions of livestock farming systems and downstream operators in rural territories, and to envisaging evolutions of agrifood systems towards more sustainable patterns.

Keywords: livestock farming systems, downstream sector, co-evolution, livestock territories, international comparative analysis

Introduction

Farming System Research is based on the rationale that it is important to take the interactions between the farmer and his environmental and social context into consideration in order to study farming practices. This approach considers that evolutions in farming systems cannot be analysed independently of changes to the work collective or to the social, economic, political and biophysical environment of which they form part (Darnhofer *et al.*, 2010). A widening of the analysis frameworks of agriculture is all the more necessary because its dependence on the context is increased (dependence on upstream and downstream sectors, importance of policies and regulations ...). Moreover, this context is itself highly evolutionary. It thus questions how agriculture adapts to its changes. For example, the processes by which the dynamics of globalisation enable production areas to become specialised (Rieutort, 1995), associated with a concentration of operators in the agri-food sector, can lead to areas of production and consumption becoming dissociated and/or to the link between production and use of natural resources being broken. Such evolutions question the autonomy of farmers in an era of « empires » of agricultural markets and multinational agro-food industries (Van der Ploeg, 2008). Work on transitions in agriculture, in the case of an evolution towards more environmentally-friendly production methods for example, reaffirms the importance of adopting a systemic approach in order to understand the evolutions of farming production systems (Lamine *et al.*, 2012; Bonny, 2010).

Research on livestock farming systems has followed this trend. They assume that the transformations of livestock farming systems should be studied as part of wider socio-technical systems (Gibon and Hermansen, 2006; Cochet and Devienne, 2006). Nevertheless, most of this work tends to prefer a one dimensional approach, adopting a viewpoint that is essentially zootechnical (Ryshawy *et al.* 2012), micro-economic, geographical (Mottet, 2005) or from sociology (Levrrouw *et al.*, 2007; Terrier, 2013). Rare is the research which develops a really systemic approach, i.e. which seeks to characterize the evolutions of livestock farming systems jointly, with cross-reference to two, three or four of these viewpoints. Some studies underline the tension which can exist between the challenges of organizing production (in particular in terms of managing reproduction and feed) and demand from the food supply chain (Hubert *et al.*, 1993, Dedieu *et al.*, 1997). Others question the adaptation of farming systems to the production of a specific food product with a certification sign (Napoleone, 1993; Roche *et al.*, 2000; Ingrand *et al.*, 2008). Nevertheless, to our knowledge, no study adopts a wider viewpoint and analyses the territorial evolutions of livestock farming systems jointly with those of downstream operators of the food chain. Work on the marketing of livestock products gives preference to socio-economic approaches (Muchnick and de Sainte Marie, 2010) (Boutonnet, 1998), and even fairly comprehensive approaches such as the analysis of people's life cycles. However little has been carried out on co-evolution of livestock farming systems and downstream sector over the long term. What is more, studies that consider the interactions between food supply chains and territories, in particular regarding supply chains under official quality signs (Paus and Reviron, 2010) generally barely mention interactions with livestock farming systems beyond their adaptations to specifications.

These studies clearly show the influence of sector changes on the evolutions of livestock farming systems. However, they do not facilitate the comprehension of the evolution of the interactions between farming systems and the downstream sector. It seems to us that, when thinking about transitions in agriculture, better analysis of the co-evolution of farming systems AND downstream operators allows to identify more clearly the rooms for manoeuvre and the constraints farmers have due to the supply chains. The challenge of our reflection concerns the transformations of livestock farming systems in territories and their continued existence, linked to market trends and sectors.

Our objective is to develop an approach to analyse the evolutions of livestock systems in a territory, taking into account their interactions with downstream sectors which are themselves undergo-

ing change. We use Pettigrew's conceptualization of change (Pettigrew 1990). He proposes to explore together the context and the content of change, and their interconnections through time. The first key component is the importance of embeddedness, studying change in the context of interconnected levels of analysis. The second is the importance of temporal interconnectedness, locating change in the past, present, and future. Thirdly, context and action need to be explored: how is action a product of context, and vice versa. And lastly, Pettigrew articulates a central assumption about causation: causation is neither linear nor singular - explanations of change are bound to be holistic and multifaceted. For us, it means add to a causal approach (why), a sequential one (how). It's rather different from trajectories analyses which make comparisons between states at different dates. It's rather different too, from analyses by drivers for action which make enumerations of drivers without showing how, when and why they are activated throughout the change.

The first part of our paper (part 2) presents the material and method we used to devise our analysis framework, using four case studies of livestock territories. Part 3 presents the results of the comparative analysis under these case studies highlighting interactions between farming systems and downstream sectors and transformations of livestock farming systems. The last part discusses the results and concludes.

Materials and method

Iterative approach based on 4 territories and 2 types of production

To devise our framework for analysing the evolutions, we implemented an iterative approach combining bibliographical study, observations in situ, and mobilization of expert knowledge. This approach, related to an analysis of the knowledge engineering type (Girard, 1995), is intended to update the appropriate dimensions to be observed to take account of these interactions and the way in which they combine over time.

The study is conducted at territorial scale. It corresponds to a scale of analysis midway between individual trajectories and global trajectories. It enables the interactions and coordination of the stakeholders to be observed (Alphandéry and Bergue 2004 quoted by Lamine 2012). In addition, this territorial scale makes it possible for the local context to be taken into account in the evolutions of the livestock farming systems. We chose four case studies (boxed text 1), i) to have two different types of products (milk and meat), ii) for the same type of product, to be able to compare two different territories: Vercors and Livradois-Forez for milk, Uruguay and Cevennes for meat, and iii) to have a study site with a politico-economic context different from that of France (here Uruguay). In the four areas, the studies were carried out by crossing bibliographical data with data from surveys conducted in the form of semi-directive interviews with actors of the supply chain (from production to distribution, inter-professional unions,...) and in the territories (agricultural support and guidance associations, territorial authorities,...).

Boxed text 1: combined presentation of livestock farming in the study areas:

The Plain of Ansina and the Mountains of Tacuarembó (Uruguay)

The livestock products are intended primarily for export. Agriculture and the downstream sector are therefore directly affected by the evolution of international trade. The livestock farming systems, characterised by the majority use of natural grasslands, consist of properties of between 400 and 5000 ha. Depending on the land's capacity for forage production, there are cattle breeding farms associated with sheep farming, breeder-fattener farms or cattle fatteners. Other production activities using extensive land areas have appeared over the past twenty years (wood and cellulose production with plantations of pine and eucalyptus, production of soybean and wheat), or have rapidly expanded (rice cultivation).

Cévennes (France)

Livestock farming in the Cévennes is characterised by 4 types of systems: sheep; sheep and onions; dairy goats; goats for cheese-making. It exists alongside other productions: onions only, apples, market gardening. Livestock farming is based on the use of local pastoral resources and grasslands in the valley floors. For suckler sheep systems, shepherding is generalized, as well as the practice of summer transhumance. The production of thin light lambs is the majority production, now collected by large structures external to the territory. Some diversification in types of products and outlets has been observed recently (heavy lambs for Aid-el-kébir or direct sales in small boxes).

Livradois-Forez (France)

In this area, cattle breeding prevails (dairy cattle, beef cattle, dual purpose cattle). It is based on the use of permanent grassland, but forage systems vary according to i) the possibility of cultivating the land, ii) commitment to certified supply chains (entirely hay production specifications, PDO²⁴⁵ Fourme d'Ambert or Bleu d'Auvergne,...), and iii) the presence of mountain pastures. The dairy character of the territory in the 1980s has eroded following multiple closures and conversions or diversifications into meat. Today, 1/3 of the farms (1700) are in dairy cattle and 90% of the volumes of milk produced over the area are collected by two operators: the Société fromagère du Livradois (SFL) (40%), an independent dairy located in the territory which produces Fourme d'Ambert and Bleu d'Auvergne as well as generic products (raclette), and Sodiaal (50%), the co-operative group which carries out processing in its production facilities on the borders of the territory.

Plateau of the Vercors (France)

Dairy cattle farming is dominant in this territory. Also to be found there are suckler cattle herds, suckler sheep, goats for making cheese, and equine or mixed farms. Dairy farming is based on grass (permanent and temporary grasslands), and cereal cultivation is being developed once again in particular in systems that are turning towards Organic Farming. The production is under a quality signs: AOP Bleu du Vercors-Sassenage, and AB (organic) label for some of it. The milk is marketed either by direct sales, or via cooperatives: one local and one of national scale (Sodiaal).

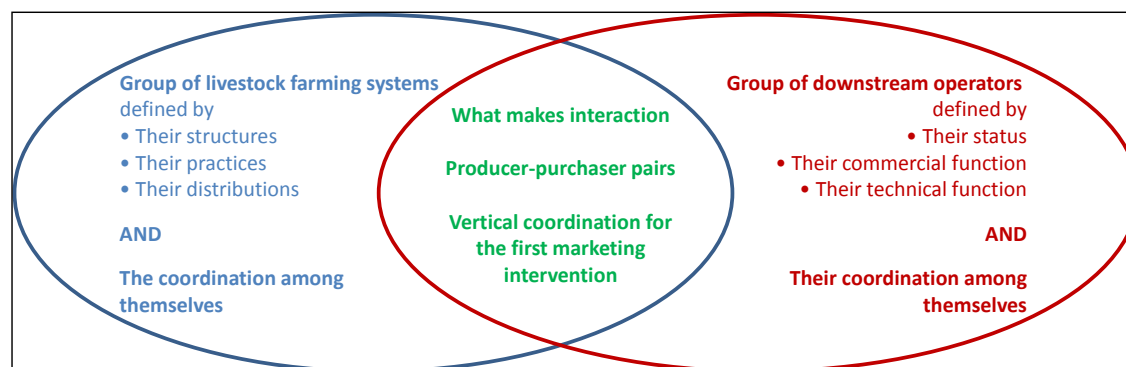
Elaborated framework and cross-case analysis

We identified a set of elements which characterise i) the livestock farming systems (LFS), ii) the downstream agents and iii) the nature of the interactions between these two 'sub-systems' (Figure 1). First, we assume that the organisations of 'horizontal' relationships among livestock farming systems and among downstream agents, impact their interactions. It is thus necessary to consider these organisational forms when characterising farming systems and the downstream of the supply chain. Second, we assume that the link between the livestock farmers and the downstream sector is made via the first product marketing transaction. As a consequence, we postulate that two dimensions have to be considered to characterise the interactions between LFS and the food supply chain: i) the products sold by the farms (type, degree of processing, degree of differentiation...), which can be associated with a particular type of buyer, and ii) the way the farmers/first buyers relations are coordinated. Indeed if the farmers intend to satisfy a specific demand, the type of product marketed and the identity of the buyer for whom this product is intended may

²⁴⁵ Protected Designation of Origin

impact the farming practices. On the contrary, in certain cases, it can be assumed that the characteristics of the products supplied can impact the downstream of the food chain. This interplay finds its expression in the establishment of various modes of vertical coordination between livestock farmers and their customers. For example, certification schemes based on specifications can provide a framework for trade between producers and purchasers. They influence farming practices and possibly affect the downstream practices too (definition of the processing method, marketing, slaughter ...). These certification schemes often result in the design of specific forms of governance of transactions (contracts), in order to guaranty the respect for their commitments by both parties (Sauvée and Valceschini, 2004).

Figure 1: All of the variables which constitute the « object of study »



In a first stage, for each study area, we analysed the transformations since the 1960s²⁴⁶. We identified sequences of time in order to describe the evolutions of i) livestock farms and horizontal coordination mechanisms between producers (collective actions,...), ii) downstream operators and the way they coordinate together (collection agreements, production-distribution partnerships,...), and iii) the product-purchaser pairs and the vertical coordination mechanisms of the first product marketing. In a second stage, a cross-case analysis of the areas was carried out to highlight the different dynamics of the object of study in the four case studies, according to the place of the various actors (producers and downstream operators), and in particular according to the evolutions of the global context and the different territorial conditions. We analysed more specifically in each case what the transformations of the livestock farming systems were. Only the results of this second stage will be presented in this article. They highlight the importance of the products and the coordination mechanisms as elements of interaction between livestock systems and downstream sectors.

Results

The cross-case analysis of the four study areas led us to identify two possible major dynamics for the links between livestock systems and sectors. They are distinguished by the trigger factor: led by the downstream sector or by the agricultural production. These two dynamics are going on differently according to the national context and to the territorial conditions in which they are set up. In each type of dynamics, we illustrate the evolutions of the variables of the systems and especially, we observe the transformations of associated livestock farming systems.

²⁴⁶ This historical depth is justified by the coherence of the evolutions observed in particular on the French study areas, since this is when the laws are negotiated on livestock farming, and when the systems change, notably under the effect of the establishment of the CAP.

Evolutions of livestock farming systems in relation to the supply chains

a) Incentive by downstream operators...

Certain evolutions of the livestock farming systems can be understood as a response of producers to consumer demand for specific products and/or production methods. The strategies of differentiation of the downstream operators have often led them to set up certification schemes based on specifications which have a strong impact on livestock systems. These schemes are often supported by contracts and incentives such as price premiums. In the case of milk, during the 2000s, the cooperative group Sodiaal wanted to develop its “organic dairy products” sector, so it encouraged its milk suppliers in the region of the Quatre Montagnes (Vercors) and in the Livradois-Forez, to convert their herds to organic farming. In the specific example of the Quatre Montagnes, in addition to technical support, they set up a financial incentive system (bonus per litre of milk as of the period of conversion), as well as a 5-years commitment on a guaranteed minimum price of milk once the conversion was completed. This arrangement encouraged livestock farmers to commit to important modifications in their technical management: return to cereal cultivation - sometimes under cover crops - and improvement in fodder quality, to limit the purchase of very expensive organic feed; more thorough observation and monitoring of the animals and modifications to their health practices. Important changes were sometimes made in their means of production, such as investment in new buildings, or changing the breed to consolidate the hardiness of the herd. We also observed the appearance of new “product-purchaser” pairs in these two territories, with milk producers who continued to deliver part of their production, and at the same time set up a business processing their milk and selling it in short supply chains.

This kind of dynamic can also be observed in the “meat” study areas. In the Cevennes, at the beginning of the 1960s, local traders made themselves the relay for a demand for thin light lambs that emanated from large groups outside the region. It is within this framework, that the Cevennes breeders, looking for lambs with better conformation, faster growth rates and more adapted to standard fattening, started to practice industrial crossing by introducing rams such as Ile-de-France or Berrichon which have pronounced butchering traits. This led gradually to the degeneration of the local breed (Raïole) and to its virtual disappearance in the 1980s. The traditional productions (very heavy lambs, fattening with sweet chestnut and ‘asegats’ (castrated males)) disappeared too. In Uruguay, from 2006-2007, the incentive to produce younger (less than 3 years) and lighter animals for export, but also to deliver more homogeneous batches of animals, was via an incentive grid with a bonus /deduction system. To produce these younger animals, producers are led to intensify their production, buying in fodder or even complete rations, growing forage crops, and using mechanization (tractor). Consequently, the production costs increase, and the risk-taking too. To manage this risk, this kind of production has often been set up with the assurance of contracts with a pre-negotiated selling price, seasonal credits, technical monitoring etc. One in five transactions is now carried out like this as far as the Tacuarembó slaughter-house is concerned, whereas this kind of livestock farmer-slaughter-house relationship was anecdotal 10 years ago.

...which can also be an obligation by downstream operators

Sometimes, these links between the processing-distribution sector and the producers, initiated by the downstream, are obligatory. Considering the Vercors case, collection agreements between Sodiaal and Vercors Lait, initially targeted on organic milk, were extended to all milk, because of the small number of Sodiaal non-organic farms that were left on the area. Consequently, farmers of Sodiaal, who until that time were not subject to PDO Bleu du Vercors-Sassenage specifications, were then obliged to conform to them. For some livestock farmers, this led to the complete modification of their fodder system based on grass silage, because it was prohibited by the specifications. This kind of evolution is also observed in the case of the cooperative of Autrans which,

until its disappearance in 1997, prohibited livestock farms where it collected milk from using the spiral wrapping technique which was widespread in neighbouring communes, because it was not really compatible with the manufacture of pressed cooked cheese, the main product of this cooperative.

To conclude, these examples show that the strategies of the downstream agents, which take shape with the evolution of product-buyer pairs and associated vertical coordination mechanisms, may induce changes in the LFS, at an individual scale (obligation to produce under such and such specifications) as well as at a territorial scale (some move from milk to meat, for example), and in the way horizontal relationships among livestock farmers (for example, association for the transport of animals) and among downstream agents (collection agreements) are organized.

b) Farmers' initiatives

In some cases, the farmers initiate the evolutions and lead the entire process of change. For some producers, it becomes a priority to develop a marketing strategy which allows them to control the added value of their products. For them, it is also the opportunity to respond to new, increasingly insistent society expectations (mad cow crisis, seeking a proximity relationship, ethical consumption...). For example, in 2006, three organic milk producers in the Livradois-Forez area joined together to create a small artisanal dairy, "la Tourette dairy". This structure creation was designed in coherence with their choice of using organic farming technical management. New products such as fresh yoghourts and dairy products are being marketed directly to retailers or consumers under the "La Tourette" brand name. This change induced an evolution in the relationships between the farmers and the downstream of the supply chain: they developed direct relationships with consumers and retailers, on the one hand, and they re-organized their milk exchanges with the processors, on the other hand.

This same type of dynamic, at the instigation of producers, is to be seen in the three French study areas. Some livestock farms are internalising the technical functions of processing (cheese-making or animal slaughter and cutting meat), the logistical functions (storage, sorting and transport) and the marketing functions (in particular, distribution). For example, in the Cevennes, since the early 2000s, producers have been launching out into the direct marketing of their lambs (in small boxes or as individual items). Direct sales correspond to new forms of vertical coordination for the first transaction on livestock products. They create direct links between producers and consumers, based on confidence and on a product that represents the values of local development (protection of the environment, maintenance of the rural fabric, traditional product...). At territory level, a new "product-buyer" pair, the "meat lamb – individual customer" appears. This phenomenon was also observed in Vercors. In this region, after having led the establishment of the PDO Bleu du Vercors-Sassenage, milk producers re-appropriated the local production tool for themselves, and recreated the Vercors milk cooperative to ensure the production of the PDO. This initiative responded to the neglect of the PDO by the previous and only processor in favour of more industrial and standardized production. There is a similar trend in Livradois-Forez, where farm production of PDO Fourme d'Ambert has very recently reappeared. In these new dynamics, new forms of horizontal coordination for marketing are also being set up. It is for example the creation of a farmers' association to pool the customer database and transport tools, the farmers' participation in peasant farm shops, or, in certain cases, approaches by producer organisations to combine direct sales and long circuit sales. Finally and especially, these changes lead to the introduction of "new" practices, such as, in Cévennes, an additional lambing period in the spring to complement the traditional autumn lambing, and fattening of the lambs.

In our four study areas, we are seeing that the evolution of first product marketing can lead to the appearance of new livestock farming practices, which have an impact on the whole operation of the farm. There are also situations where marketing is a real technical and economic lever for the

production system. This is the case of farms which associate processing and direct sale of milk and cheese with the delivery of milk to a dairy (private or co-operative), in the Quatre Montagnes territory for example. The delivery is then a source of regulation to sell surpluses or reduce work at certain periods. This is also observed in meat sector (Nozières and Moulin, 2011).

The influence of the context.

In the previous part, we focused on changes in livestock farming systems and their links to the evolution of the interactions between them and the supply chains. These changes can result from evolution of the context: the structure of downstream sectors and the national and international institutional environment.

The downstream sector context

Certain dynamics, instigated by the sector or the producers are actually induced by a profound change in the organisation of the downstream sectors. In the three studied French areas, the take-over of processing and marketing operations by the livestock farmers, observed since 2000, can be interpreted as a response to the concentration of downstream operators and the distancing of their decision-making centres with respect to the producers. This modification to the downstream structure leads farmers in these territories as a whole, to react by internalising their activities, in order to better control the decision-making, even in the direction to be taken by production in their territory. These evolutions of the supply chain lead some modification to the interactions between livestock farms and downstream sector, as well as by profound changes in livestock farming systems and in the way livestock farmers coordinate together. In the two dairy production territories of our study, in the 1960s-1970s were marked by the disappearance of cheese-making on the farms (Bleu du Vercors-Sassenage and Fourme d'Ambert and de Montbrison). It is linked to the development of village cooperatives on the model of the cheese dairies of the 1920s and 1930s in the Vercors, and the development of artisanal dairies in the Livradois-Forez. This evolution is in part induced by the development of road infrastructures and the improved access to mountain areas in particular which allowed the organisation of the milk collection even in winter. The tedious work of cheese-making is dropped as soon as there is a possibility of delivering milk and making an income from it. The producer-purchaser pairs at territory level illustrate this change, since what is marketed by the producers becomes exclusively liquid milk, sold in dairies, and no longer cheese sold to private individuals or to merchants passing from farm to farm (e.g.: the 'coquetiers' in the Vercors). In the Vercors, the production systems have been profoundly modified to spread milk production throughout the year to supply the dairies. Cereals have been abandoned to produce grassland, selection has been turned towards milk from the Villard cows (previously for work, meat and milk, and producers joining together with the creation of a cattle station to improve the performances of the Villard breed) and work has been reorganised, with the women no longer processing the milk. Similar processes are to be seen in the Cevennes in the meat sector. In the 1990s, the financial problems of a small structure in a nearby territory (Bovidoc) led this structure, first to withdrawing from its commitment to lamb producers in the area, then to be taken over by another, larger cooperative, really far away from the territory. This led to the producers withdrawing from these two structures, and initially to the simplification of the production systems. Then since the beginning of the 2000s, the farmers have been searching for new products and new outlets, in particular meat lambs sold in short supply chains. More recently, Vercors and Livradois-Forez are territories where an evolution is being observed in relations between the milk collectors. Some form of cooperation is becoming established. Collection agreements are being set up for organic certified milk, between Sodiaal and the Vercors Lait co-operative for the Quatre Montagnes, and between Sodiaal and Biolait (AB collection co-operative) for Livradois-Forez, as Sodiaal does not carry out its own collection for these products. This modification of organisation of downstream operators could lead some change in livestock farming systems.

Political and market contexts

Evolutions in the interactions between livestock farmers and sector operators as well as transformations of the associated livestock systems are also dependent on the political and economic contexts of which they form part. Seizing opportunities related to the opening of new markets can lead producers or downstream operators to modify their practices and their relations with their customers or suppliers. For example, in Uruguay, in the early 2000s, a truly national project contributed to giving this country the “free from foot-and-mouth disease” status. The setting up of vaccination and health monitoring in Uruguayan livestock farms, promoted by producers, industry and the state, aimed at eradicating foot-and-mouth disease in this country. It was therefore a question of regaining large export markets lost in 2000 with the epidemic, which had caused serious losses for the whole sector. It was after this status was restored and the state had set up favourable investment conditions in processing infrastructures that the main exporting slaughterhouses were bought up by international companies. To gain market shares, demands for more specific animal products (age, weight, type of finishing) were gradually accentuated by industry with the producers (cf. preceding paragraphs). This resulted in doubling the value of exports between 2000 and 2008, and from a competitive point of view in distinguishing the country from its neighbours of the MERCOSUR. This dynamic was set up in 2006-2007, in a context where Uruguay again entered the markets free from foot-and-mouth disease (2002). The aim was to increase shares within these more remunerative markets. To satisfy the requirements of these markets, industries invested in relatively expensive traceability systems, health checks on meats, etc., which forced them to ensure a large volume of raw material. These investments were undertaken in 2005-2006, after large international companies bought out the largest exporting slaughterhouses in a legislative and financial incentive framework by the Uruguayan government. The evolution of regulations also leads producers and/or downstream operators to modify their practices and to think of other ways of interacting with their customers or suppliers. Thus, within the current framework of the CAP reform, and in particular, the suppression of dairy quotas and the generalized obligation of contracting, planned for 2015, one can see a tendency to increase the integration of producers in certified supply chains.

Discussion - Conclusion

Interests of the approach

Through the analysis of four cases of livestock territories, we characterize the evolutions of what creates interactions between downstream operators and producers, i.e. the vertical modes of coordination used for the first marketing transaction, and the nature of the product/customer pairs. We also describe evolutions of downstream organization and of producers among themselves. We show that these are dimensions which enable the transformations of livestock systems to be better understood, in terms of structure and practices, in response to political and economic evolutions in the context or to seize opportunities created by this context (developing a new market, securing an outlet, enhancing the value of a type of product...). Understanding how interactions between production systems and the downstream supply chain evolve, enables changes in herbivore livestock farms to be better identified, changes made or levers mobilized by livestock farmers to ensure the continued existence of their farms. In certain situations, the livestock farms change, at the instigation of downstream operators; this can go so far as becoming obligatory. In others, it is the farmers who impel a dynamic, modify their links with their customers and change the organization of their livestock systems, by working on their products and on the vertical coordination with the rest of the supply chain. In all the cases, it is the continued survival of the livestock farms which is concerned, encouraging farmers to play at various levels: as individuals (transformation into farm cheese deliveries, used to increase added-value or to face a lock-in with delivery of milk quotas) and as collectives (association among producers to develop direct sales).

These transformations of the systems take place in a variety of national and territorial contexts, and the livestock farmers' levers for action are often both individual and collective (development of quality signs or a production tool...).

Diverse phases of evolution

Analysing these objects enables to describe a succession of phases in territorial evolution. In particular, we observe a swing between i) phases where simplified marketing methods for each farm have been observed, in certain cases, accompanied by standardized marketing methods at territory level, with product/consumer pairs in which the central product is a standard product and the main purchaser on the territory is a major extra-regional group, and ii) phases when the large extra-regional groups withdraw from these areas. These withdrawal phases are accompanied by a diversification of marketing methods at territory level, with work on the product/consumer pairs where the added value of the product is primarily constructed at producer level. In the examples we have mobilized, in the first type of phases, it is the sector which directs the productions, the functioning of the livestock farms, which instigates the adoption of some practices. On the other hand, the driving forces for the appearance of phases of the second type are varied: i) the appearance of new outlets and market opportunities, ii) the inability of farms to produce according to the specifications of organized sectors (particularly in terms of frequency), iii) the logistical constraints for the collection of products from certain farms (distance, inaccessibility....); iv) the remoteness of the decision-making centres, and an impression of dispossession and reaction. In these different phases, we saw that several sociotechnical systems (Rip et Kemp, 1998) co-exist and sometimes influence themselves and sometimes not, like the sociotechnical system around the Bleu du Vercors-Sassenage, product by manufacturers and the one around the other cheese, product by isolated farmers.

Between globalization and territorialisation

The analysis of these dimensions also makes it possible to understand how tensions between globalization and territorialisation are solved when livestock farms and sectors co-evolve in a territory. The objects of study that we observe are neither completely territorialised, nor completely globalized. The backlash of the globalization movement causes a search for identity areas (Guermond and Mathieu (1986), quoted by Delfosse (2007)). The accentuation of national uniformity and the fear of European standardization cause reactions whose aim is to add value to the diversity of French cheese-making productions and the origin of this diversity. They emphasise concepts of local, traditional, 'terroir',... enhancing the value of cheeses under quality and origin labels, with a renewed interest for raw milk cheeses. These local cheeses, like the PDO Bleu du Vercors-Sassenage, established in the 1990s, appear as an opportunity for the mountain regions. This approach is accompanied by the farmers' takeover of the production tool, and a "symbolic return" of the Villard breed, associated with the sale of half of the Vercors milk to Sodiaal, without which it could not survive. This has mutual benefits, since it guarantees that Sodiaal has a substantial volume of milk without having to manage the logistics of farm-to-farm collection. In many cases, this local production, under SIQO, is now firmly associated with distribution in supermarket chains. This is the case of the Cheese-making Company of the Livradois, which gradually abandoned its organic product range, and in 2005, in partnership with Carrefour, set up a "Quality Commitment" on Fourme d'Ambert and Bleu d'Auvergne, products based on raw milk from animals fed only on hay and grass.

In further research, we will continue this comparative analysis, by using this framework to analyse livestock dynamics in territories and especially what it is similar and different between meat and milk territories.

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(<https://metafort.cemagref.fr/projet-scientifique/Equipe%20select/mouve-les-interactions-elevage-et-territoire-dans-la-mise-en-mouvement-de-l2019intensification-ecologique>).

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