

# Effects on territories of ending milk quotas

## Exploratory findings from two contrasting French case studies: the Niort Plain and the Chartreuse Massif

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### Abstract

In France, the ending of milk quotas marks a breach in the mode of milk supply management and dairy farmers' conditions. Regulation administered by public authorities gave way to private regulation by dairy companies. In this context, farmers and actors of territorial development are concerned about the future of dairy farming at local scale.

This paper explores the effects of ending milk quotas at the local level by comparing two contrasting case studies: upland and lowland areas. It is based on the same conceptual framework of socioeconomic metabolism, which addresses the biophysical exchange relationships between societies and their natural environments. We sought a better understanding of the effects of ending milk quotas, through looking at milk flows and uses of local resources, and the system of actors activating and regulating these flows, and their strategies. Our research is based on interviews and presentations of our characterization of milk production designed to prompt discussions between farmers and local actors. We show that the ending of milk quotas, and the ensuing high price volatility, means increased disparities between farmers. It generates (i) in the upland area, rivalry and tensions at the local level, and (ii) in the lowland area, difficulties in sustaining cow milk production in an area that is turning towards crop production. Lastly we discuss, among other topics, the multidimensional and growing requirements and systems boundaries that farmers are facing.

**Keywords:** end of milk quotas, production structures, downstream operators, relationships between dairy production and territory

### 1. Introduction: the ending of quotas challenges territories

Milk quotas were set up in 1984 and stopped in April 2015, ending 30 years of regulation of milk supply by the public authorities in favour of private regulation through formalised contracts between producers and industrial operators. The quota system helped sustain production over the whole country (Perrot et al., 2015). Although the number of dairy farms has declined in every region, volumes delivered have held quite steady (Chatellier, 2015<sup>1</sup>). The exit from quotas was not abrupt but begun in 2008 with the deregulation of the CAP and more liberalised markets, leading to the milk price crisis of 2009, and the passage from quotas to contract from 2012. There are several outcomes (Perrot et al., 2015):

- greater importance of processors, who have also experienced deep restructuring (concentration, internationalisation, system re-engineering; Ricard, 2013),
- more volatile prices of both milk and inputs, and pressure on producers' management decisions,
- major changes in the relationship between dairy production and territory, with deep restructuring (Roguet et al., 2015) and widening disparities between production areas.

Local areas are at the heart of these changes in production systems. However, outside the areas where there has been a collective organisation, e.g. around a recognised high value-added PDO (Protected Designation of Origin) product, the patterns of change in territories are steered by downstream players, which are not necessarily concerned about their impacts or the wealth created locally. Territorial players, who are faced with economic and environmental development issues, are concerned about the effects of ending milk quotas on production, and are seeking to recover some control over the system. In lowland areas, one issue is the competition with cash crops, which have benefited from better economic conditions in recent years and without the constraints of animal husbandry (Fillonneau, 2012), while upland areas are penalised by their

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<sup>1</sup> The number of farms delivering milk dropped from 384 950 with an average delivery of 65,8 tons of milk/farm (25,3 million tons in total) in 1983, to 67 380 in 2013 with an average delivery of 345,4 tons (23,3 million tons in total).

topography and climate and lack competitiveness in the world market unless they can produce a product with high added value (Dervillé et al., 2012).

Here we explore the effects on territories of ending milk quotas. We therefore characterised and examined the reconfigurations undergone by the dairy industry (focusing on the production and processing steps) and how they interact with territories. In the conceptual framework of socioeconomic metabolism, we compare two contrasting cases: one located in lowland and the other in an upland area. The aim was to better capture the reconfigurations at stake with the ending of milk quotas in order to prompt reflection with territorial players, and to re-think the links between dairy industries and territories.

## 2. Materials and Methods

### 2.1 The conceptual framework of socioeconomic metabolism

In a systemic and sustainable thinking, addressing the interactions between industries (with vertical flows) and territories (with horizontal flows) raises the question of the socio-ecological system at play (Fischer-Kowalski and Haberl, 2007; McGinnis and Orstrom, 2014), which depends on flows of materials and energy for its reproduction and maintenance. The socioeconomic metabolism concept<sup>2</sup> has gained interest in this research fields (Erb, 2012). It aims to studying the biophysical basis of human society, and is developed in flow analysis and accounting (Pauliuk & Hertwich, 2015). The material and energy flows result from political, economic, social and technical choices, and couldn't be analysed without taking them into account. Buclet (2015) proposes then to study the biophysical exchanges between societies and their natural environment by linking material and energy flows to socioeconomic organisations (actors systems and created wealth -in a large meaning-) in which they are embedded. Understanding the forms of territorialisation of the dairy industry in this conceptual framework questions:

- the forms of dependence of the territories, for their dairy production, on exogenous resources and operators, or on other territories,
- the forms in which the dairy production is anchored to the territory,
- the environmental and socioeconomic footprints of the production on the territories (impact, services provided or wealth created).

Here we focus on characterising the forms of dependence of territories on external resources and operators for their milk production.

### 2.2 The case studies and their comparison

Two contrasting cases were used for this study: an upland area, the Chartreuse Massif (CM), and a lowland region, the Niort Plain (NP). Besides compiling statistics on each area, we also (i) carried out semi-directive interviews with dairy farmers, downstream and upstream operators, and other actors in the territory<sup>3</sup>; and (ii) delivered presentations, locally, of our characterisations of dairy production and forms of interaction between industry and territory, to prompt reflection and exchanges among producers and with local actors. The material was collected between November 2014 and July 2015, and interviewees were asked about past, current and presumed changes linked to the end of quotas and its expressions since 2008.

The first step was to use the common conceptual framework for each territory to analyse and characterise the territorial contexts, the structuring of the dairy industry and the forms of its interaction with the territory before the formal end of quotas in April 2015. We analysed milk flows, from their source (use of local resources and flows of feeds purchased for dairy production) to their processing stage (milk flows between farms based in the area studied, and the associated

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<sup>2</sup> For a review see the special issue of the *Journal of Industrial Ecology*, 2015: Frontiers in Socioeconomic Metabolism Research.

<sup>3</sup> In the CM, besides the use of published data, a survey was conducted on 20 farms and 9 dairies collecting and/or processing milk, together with other actors in the territory or upstream. The metabolism of 11 of the farms was reconstituted. In the NP, the work was conducted as part of training for graduate agronomists. The aim was to meet dairy goat and cattle farmers, upstream actors (animal feed cooperative), downstream actors (dairy), agricultural advisors and territorial actors.

dairies<sup>4</sup>, some of which could be located outside the area), and the system of actors mobilising and regulating these flows (characterisation of the: operators, management systems -in particular since 2008- and modes of coordination, forms of interaction with the territory and the added value it gains). The second step consisted in a cross-analysis of the past effects from 2008 and discussed future changes on the territories due to the ending of milk quotas, with special focus on changes in the forms of dependence on external resources and operators.

### 3. Results

#### 3.1- Structuring of the dairy industry in the two study areas before 2015

##### *Territorial context: a dairy industry in decline in the Chartreuse Massif, and rivalled by field crops in the Niort Plain.*

The CM is an upland area located in the Northern Alps, astride the Departments of Isère and Savoie. It comprises a Natural Regional Park over 60 communes and covers 91300 ha. Farming is one of its main activities, with forestry. The NP, located in the South of the Department of Deux-Sèvres in the Poitou-Charentes Region, comprises 38 communes and covers 42000 ha. It corresponds to an area of transition between broad crop plains and bocage hosting diversity of production systems (field crops and mixed crop–livestock). Livestock is mostly dairy herds (cows and goats). The main characteristics of the farms with dairy cows (DCs) are given in Table 1.

Table1. Characterisation of farms with dairy cows in the two study areas

	CM		NP	
	2000	2010	2000	2010
<b>Number of farms</b>	165	103	139	88
<b>% (of all farms in the area)</b>	16%	15%	16%	14%
<b>UAA<sup>5</sup>/farm (ha)</b>	47	69	126	153
<b>Number of DCs per farm</b>	25	34	43	59
<b>MFA/UAA</b>	93%	96%	30%	34%
<b>PG/UAA</b>	84%	87%	8%	6%
<b>Average volume delivered/farm</b>	For CM in 2014: 219 000 L		For NP (CLS) in 2014: 572 500 L	

Sources: Agreste farm census 2000 and 2010, statistical analysis from SSP / Irstea UR DTM, and survey data.

In 2010, the CM dairy farms were smaller (34 DC/farm) than the French average (45 DC/farm), but NP farms were larger (59 DC/farm). This was reflected in the volumes delivered and the average UAA per farm, which were more than twice as high in NP than in CM. Only 34% of the areas in NP were used for animal forage supply, due to the presence of cash crops in the dominant mixed crop–livestock systems. We note an expansion of farms between 2000 and 2010, at the expense of the grasslands which were reduced to the non-arable areas. The upshot is that the DCs hardly left their stables, except for some cases near their buildings. Conversely, in CM, the specialised dairy systems are grass-based, although some farms grow crops for on-farm feed. Farms with DCs make up only 14–15% of all farms in each area, and their numbers are in constant decline. In CM we observe a switch to suckling systems, and in NP a trend towards specialisation in cash crops.

##### *Dependence of dairy production on external operators*

##### *Chartreuse Massif: a fragmented dairy industry.*

Using the data obtained from the interviews, we count 61 farms in CM, delivering 13 million litres (ML) of milk. Eight dairies receive this milk. Only one dairy is located in the CM study area: the Entremonts cooperative (Figure 1). Two-thirds of the volume produced leaves the area. Except

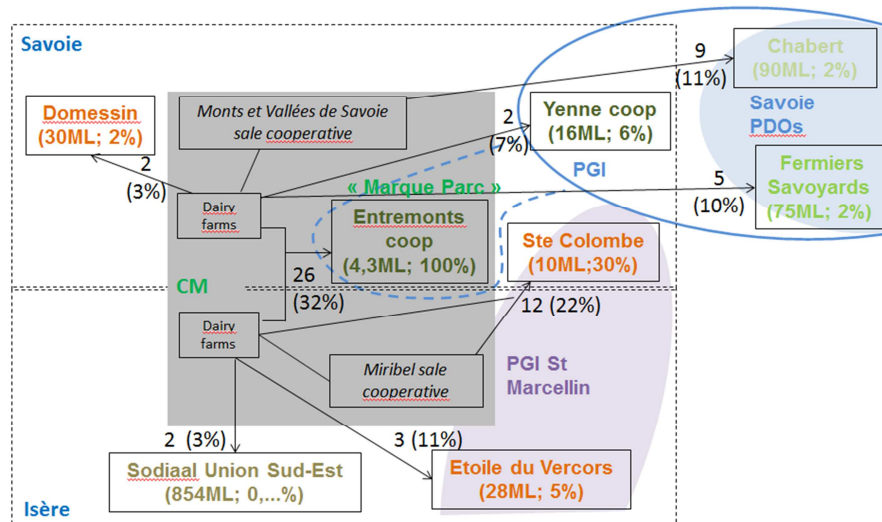
<sup>4</sup> We ignored the few farms that processed 100% of their milk on-farm as the end of quotas was less of an issue for them.

<sup>5</sup> The descriptive variables of the utilised agricultural area (UAA) are: proportion of the main forage area (MFA), itself broken down into permanent grassland (PG), maize forage and silage, and temporary grassland or meadow; proportion of cereal crops; proportion of industrial crops; proportion of fresh vegetables and proportion of permanent crops.

for the dairy Sainte-Colombe that receives 30% of its milk from CM, this milk makes up no more than 5–6% of the total volume for the other dairies. These dairies differ in various ways, in:

- their status: from small-sized directly-managed cooperative to large cooperative group with international reach or private enterprise belonging to large groups.
- the added value: one third of the milk production is processed locally via the Entremonts coop. , which uses the “Marque Parc” (a brand linked to Natural Regional Parks) for its cheeses, requiring the farms to meet Savoie PGI<sup>6</sup> specifications. The remaining two thirds are not identified as coming from CM, and either (i) enters the standard long processing chain (Sodiaal and Domessin) or (ii) are used for PGI Saint-Marcellin or PGI and PDO Savoie cheese. The wealth created then benefits in part to the CM producers, but does not benefit the area in any other way.
- their potential for development according to (i) the proportion of the volume processed: less or greater than that collected, which forces some dairies to find other outlets for their surplus (only the Yenne coop. and Domessin process more than they collect), and (ii) the level of use of processing plants, in particular when some are at saturation point, as for the Entremonts coop.
- their systems for managing volumes and prices<sup>7</sup>. Professional management has been set up to replace the hitherto administrative management of the milk volumes produced for PDO and PGI Savoie (price A and B system with coefficients of regulation, both annually and monthly) from 2012. The other dairies have set up their own systems, after some negotiation with farmers<sup>8</sup>. To illustrate, in 2014, average yearly milk prices were in the range €375–515/1000 L. Thus, not only did the mode of governance of dairy production slip from the hands of the territorial actors in CM (except for the Miribel cooperative), but these varied systems also generate marked differentials between ‘neighbouring’ farms in prices paid and volumes allotted.

Figure 1. Distribution of dairy production in the Chartreuse Massif in early 2015



Key: milk sale coop; directly-managed coop; Indirectly-managed coop; SICA; cooperative group; private enterprise (belonging to a group)

On arrows: number of CM farms delivering to that dairy (% of total vol. of milk from CM)  
In 'dairy' boxes: total volume collected by the dairy; proportion of milk from CM

<sup>6</sup> Protected geographical indication

<sup>7</sup> In place of the quotas, there is a regulatory obligation for processors and producers to sign 5-year contracts. These must state, among other things, the rules for: allocating reference volumes, adjusting reference volumes and allotting volumes released by cessation of business; milk price fixing (base price, quality price, specific premiums); dealing with non-compliance with contractual individual volumes; and terminating contracts. The introduction of annual references can be indicative (i.e. volume A and the rest B, but excess paid at the same price), or discriminating (i.e. excess paid at release price), or else constraining (i.e. single price A for a set volume, excess penalised or refused). The quality-certified sectors are authorised to regulate and supervise product supply, and thereby volumes of milk. It is possible to negotiate the clauses of the contract collectively via producers' organisation. The cooperatives are recognised as such.

<sup>8</sup> For example, the Domessin dairy has set a single price for a reference volume, and surplus production is penalised. Producers that had federated have more weight in the negotiations—one example is the Miribel sales cooperative which manages to negotiate a premium from Sainte-Colombe for PGI Saint-Marcellin.

#### *Niort Plain: a concentrated dairy industry*

In the NP, we find around 60 farms delivering 37 ML of milk<sup>9</sup> to two operators, in a cooperative system with regional scope. These two operators are specialised in producing PDO Charentes-Poitou butter, and diversified goat cheeses.

-Since 2004 the Sèvre dairy cooperative (CLS) has grouped the Sèvre et Belle cooperative and the Echiré cooperative renowned for its production of a high-end 'Echiré' butter. This product enjoys additional status within the PDO, through its own specifications, and a 'GM-free' guarantee (entailing an additional cost estimated at €7-15/1000 L according to the dairy farmers). It is sold to prestige customers. This cooperative is faced with a decline in the number of producers, putting the structure's future at stake. The milk is collected from 72 dairy farms at more than 602 ML/farm, which in 2015 equated to 43,4 ML of milk. The expansion of structures (there were 96 farms at 490 ML/farm in 2011) was not sufficient to prevent a fall in collection volume of nearly 4 ML since 2011, i.e. 7% of the production. Over this period, base price paid to producers peaked in 2014 at €320/1000 L but was €302/1000 L in 2012 then fell to €283/1000 L in 2015<sup>10</sup>. The current price situation is unfavourable in view of the constraints of quality specifications, in particular for milk intended for Echiré butter.

-Terra Lacta, formerly Glac, was renamed in 2013 after its four basic cooperatives merged. The group collected 870 ML of cow's milk, and made numerous dairy products (PDO butter, UHT milk and cream, powdered milk ingredients).

Only the Sèvre et Belle dairy is actually located in the PN study area, but the others are adjoining. Historically, this feature offered the area the advantage of having decision making centres nearby, and thus not needing to rely on 'outside' operators.

#### *Dependence on external resources: a dairy industry reliant on external animal feed supplies in both study areas*

In neither study area are the farms self-sufficient for animal feed. In CM, this dependence is linked to the difficulty of growing maize and cereals in upland conditions and/or to land shortage. In NP, the farms could theoretically be self-sufficient on animal feed in terms of available land and possible crops, but the farmers prefer to grow high-yield cash crops rather than animal feed for their own herds. In practice, the specifications for PDO butter is based on a feed ration with at least 50% maize, which requires protein supplementation. And soymeal came from South America or even India, while alfalfa is either produced on-farm or imported from the Champagne-Ardennes Region or Spain. In some cases, this is the heaviest cost of production for the dairy activity, depending on the production levels targeted. Figure 2 gives an illustration mapping the flows of one of the farms surveyed. In this case, milk production is 610000 L/year, at 7800 L/DC. The area under maize forage (30 ha) makes up 80% of forage supply, the rest coming from meadows (30 ha). The purchase of concentrates is the main production cost, at 305 kg/1000 L<sup>11</sup>. Feed self-sufficiency is not a priority for farmers as it does not generate any extra economic profits. Most crops are intended for sale (140 ha including maize and wheat, but also rapeseed and peas).

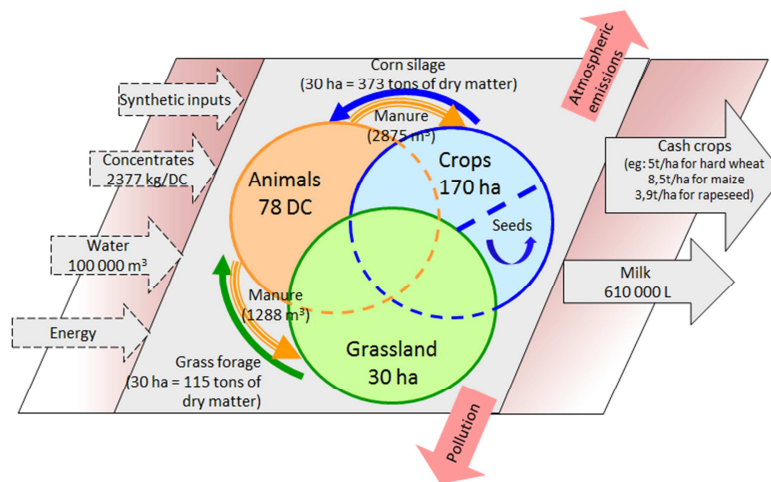
In CM, we reconstituted the metabolism of 11 farms. Five deliver their milk to the Entremonts cooperative, with an average delivery of 165800 L/farm, i.e. 5100 L/DC at 300 kg of purchased feed/1000 L. These systems are all based on upland grass, depending on energy and protein supplementation. For the farms delivering their milk to outside operators, the average is 311150 L/farm, 6500 L/DC and 245 kg of purchased feed /1000 L. These systems are located on lower ground where crops can be grown and a greater animal feed self-sufficiency achieved.

<sup>9</sup> These figures were obtained by extrapolation from the number of farms counted in 2010 and the evolution trend (let 62 in 2015), and from the average delivery for the CLS in 2015 (let 600 ML/farm for 62 farms, i.e. 37 ML).

<sup>10</sup> Compare these figures against average base prices over the Poitou-Charentes area: €361 in 2014 and €298 in 2015. Like in many cooperatives, the pricing policy in the CLS is a subject of local controversy, particularly as profits had reached €50/1000 L in the past, and there was formerly a premium of €18/1000 L for Echiré butter. The cooperative chose to invest in a new plant. Also, butter-making leaves a by-product, skimmed milk, which value is difficult to increase, thus reducing earnings. The CLS joined forces with another cooperative to try and make better use of this by-product.

<sup>11</sup> The average over 113 farms in the Department was in 2013: 250 kg/1000 L for an average production of 7900 L/DC (data from the Chamber of Agriculture of Deux-Sèvres, cow's milk records).

Figure 2. Flows for dairy production in a farm surveyed in the Niort Plain



### 3.3 Effects on territories of ending milk quotas

#### *Stronger forms of dependence on external operators?*

With the liberalisation of markets from 2008, restructuring has accelerated among the downstream operators to form groups that carry more weight on the markets, and to cut costs by economies of scale and scope. In NP, Terra-Lacta and the group Bongrain (renamed Savencia in 2015) joined forces in 2013, and the territory's 'independence' from external operators is becoming very relative. In CM all private dairies were bought by bigger group (Etoile du Vercors by Lactalis, Domessin by Intermarché, Ste Colombe by the Italian group Granarolo).

In addition, agreements between dairies on the collection and sale of milk for logistics and cost reasons are multiplying, especially in CM<sup>12</sup> where the collection areas overlap. Farmers no longer know what happens to their milk, which is collected by one dairy, delivered to another and paid by a third one to which they are affiliated. This is a symptom of a widening disconnection between downstream operators and territorial actors. This trend may lead to a stronger dependence of territories on fewer, larger operators, whose decision centres are ever further away, for whom the territories are no more than logistic variables in a flow optimisation designed to reduce costs. This effect could spiral through a less dense array of farms increasing collection costs, and jeopardising collection by private operators. In CM, the Danone group had vanished from among the processors in 2015, since it has no more than two farms in CM. The attachment of dairies to producers and a production area seems dependant of their status (cooperative -with obligation of collection- or private), the presence of specific products with certified origin, and the volume that the area supplied<sup>13</sup>.

Moreover less dairy farms and further dairies can also lead to a loss of a 'dairy atmosphere', which in turn demotivates the remaining producers. In NP, some farmers have the feeling of lost identity and not belonging anymore to the territory, as they find themselves stranded alone in their locality surrounded by cereal crops. This effect becomes particularly acute in both study areas as it is no longer only small structures that are quitting dairy production but even large farms, some with heavy capital investments such as milking robot.

<sup>12</sup> For example in 2014, the costs of collecting milk in CM ranged from 15 to 60 €/1000 L according to the operators, considering that some dairies: move to collection every 72 hours, while some cannot because the quality specifications require collection every 24 hours; collect densely farmed localities where the fall in the number of farms concentrates volumes over a limited number of neighbouring points, while some still collect farms scattered over hilly uplands.

<sup>13</sup> The producers in CM supplied the Saint-Colombe cheese-making plant with practically all their milk for PGI Saint-Marcellin, for which it was difficult to find other producers in the certification area. This was less true for other dairies, for which CM was just one among many other areas.

Another local effect of ending milk quotas are greater differences in the price paid to milk producers, and its stability, prompting producers to change dairies. Several such cases were found in the CM survey. This has generated local tensions, especially when dairy farmers who moved were in a producers' organisation (e.g. milk sale coop) which was thereby weakened in its negotiations with processors.

#### **Stronger forms of dependence on external resources?**

The producers who have managed to maintain their activity after the 2009 crisis employed different individual strategies. Some have opted for expansion, but it is grounded on greater dependence on inputs from outside, in particular animal feed. Others have sought greater self-sufficiency, which in CM have taken the form of adding value by developing processing and direct sales, diversifying sources of income (e.g. by developing a meat activity), or making more gainful use of locally available resources so as to reduce dependence on external resources and operators. Others have sought to improve the profitability of their dairy activity. At individual level, this involved re-thinking inputs and how to reduce them, or re-thinking milk quality to make better use of resources. Collective dynamics are also observed. In both study areas, there is local reflection on setting up soymeal production activities, in tandem with feed supply cooperatives, with collective investment commitments. In NP, the GM-free constraint for CLS has made feed supply increasingly difficult. Today, less than 10% of available soymeal is GM-free, causing strong pressure on prices. For alfalfa, mechanisation and labour costs are high. There is new reflection on setting up collective drying plants, revolving around biogas units for animal waste, or setting up 'short' alfalfa chains between cereal and dairy farmers, with outsourcing of fieldwork. But these dynamics are constrained by territorial contexts. Scope for expansion is narrow in CM. In NP, water supply issues and the allied environmental pressure directly affect the self-sufficiency of some dairy farms where the yields required to meet the dairy herd's needs are not reached (e.g. limited access to domestic water catchment areas, or extra costs for irrigation). For alfalfa, development is slowed down by issues concerning investment in biogas plants and convincing cereal farmers of the usefulness of this approach.

#### **4. Discussion: strengths and weaknesses of the approach...**

There is abundant work on the reconfiguration of the dairy industry (Ricard, 2013) or on territories viewed as dairy production areas (Napoleone et al., 2015), but scarce few studies on the socio-ecological interactions between dairy industry and territory, in terms of both material flows and systems of actors. A large proportion of the work done on interactions between agrifood industry and territory addresses either localised agrifood systems (Muchnik et al., 2008) or production under origin-certified labels (Paus and Reviron, 2010). For standard food-chain activities, only a few studies have investigated the organisational structure of the industry as a critical factor in achieving a (re)-territorialisation of agricultural production. The approach presented in part here aims to offer a way to analyse these interactions between industry and territory, without being restricted to quality-certified production or short circuits. Approaches using socioeconomic metabolism mostly analyse the biophysical basis of agricultural systems and their energy and material throughput (Grešlová et al., 2015). By examining both flows and systems of actors, our approach details also the forms of socioeconomic interactions by considering the interplay of the actors that steer and regulate the flows.

#### **... for addressing the multidimensional and growing requirements and systems boundaries faced by farmers**

Our approach shows the multidimensional and growing requirements and systems boundaries that farmers are facing. A milk producer is integrated in the scopes, for example, of: its locality with its agronomic, environmental, climatic constraints and opportunities, and its administrative, regulatory and management rules; a milk sale cooperative; a processing collector; a certification of origin, etc. These different scopes involve different issues and actors, and are not governed by the same rules and systems for action and decision-making. This has to be fully understood before any changes can be attempted, e.g. changes in socioeconomic metabolism for more sustainable development (Buclet, 2015).

### ... for examining interactions between dairy industry and territory

This approach enables us to find the role and place of territorial resources and actors in the dynamics of dairy value chains, particularly in their governance. We have focused on the forms of dependence and self-sufficiency of territories for their production (Van der Ploeg, 2008). However, this was a first exploratory approach, which now requires further detailed work on (i) the ways in which production is anchored in the territory and its contribution to territorial development; this anchoring is both socioeconomic and ecological (Baritoux et al., 2016), and (ii) the socioeconomic and environmental footprints of these operating modes (Buclet, 2015), for instance by transforming material flows in C, P or N imprint (Billen et al., 2012) as environment markers. The strength of such an approach is that material flows account for environment or socio-economic issues as they are analysed in regards to distant and local resources. A further aim is to understand the current situation in regards to its historical background so as to envision possible future perspectives (Napoleone et al., 2015).

This would allow looking further in the drawing up and assessment of different scenarios. Our approach also raises a number of questions and paradoxes for sustainable development. In CM, most of the milk collected in the area is sent for processing elsewhere, yet a cheese-making unit in CM is making non-area-specific products using inputs from outside the area, even though its name, 'Le Chartrousin', would suggest territorial roots. This approach aims to generate exchanges and reflexivity among territorial actors concerning the future of local dairy production.

### ... for prompting exchanges and reflexivity of territorial actors

This was tried out in both study areas. It revealed the low level of reflection by farmers on their production costs, and their dependence to external resources and operators. In NP, the actors, including the farmers, estimated that only 10–15% of farmers knew their production costs precisely. The question also arose of how to stem the tide of withdrawal from dairy activities, and maintain production, with problems of: transmission of farm ownership (given the capital needed to take on ever-larger farms); organisation and workloads.

In CM we presented the work to dairy farmers and other CM actors, including elected government representatives. The followed exchanges revealed the awareness of territory's actors of the fragmentation of the dairy industry, and provided several outcomes concerning (i) individual and collective strategies to be implemented to strengthen the self-sufficiency of farms, favour pooling (equipment and labour) and thus reduce production costs and lighten workloads, and (ii) a joint project for dairy farmers in CM around a "milk from Chartreuse" to develop and communicate, to enhance the activity's image and even raise or guarantee milk prices.

In NP, discussions on the farms themselves revolved around problems of water quality and quantitative management, procurement of plant proteins, and differences in milk quality in geographically neighbouring farms. The sharing of experience was found useful to gain a better understanding of farmers' disparities and solutions and help find the right trade-off between quantity and quality. As regards the CLS, discussions revolved around how to improve the communication and marketing of the CLS's territorial specificities such as the quality specifications and the 'GM-free' status<sup>14</sup>, the traditional manufacturing processes, and the large number of jobs created by the company<sup>15</sup>, in order to increase earnings, better remunerate farmers, and more generally ensure a stable future for the dairy industry in NP through greater market control. However, all the exchanges in NP stressed the importance of dairy farmers in the territory, and ensuring their future and their continued contribution to various local services.

## Conclusion

The ending of milk quotas, and the ensuing high price volatility mean very different or variable milk prices for the dairy farmers in any given area. These increased disparities between farmers plus the price volatility generate: (i) in the upland area, rivalry and tensions at local level; we noted changes of dairy companies for dairy producers, and (ii) in the lowland area, difficulties

<sup>13</sup> Many dairy farmers wish their efforts (obligation to spread straw in stalls and use GM-free soymeal) were better appreciated by consumers and that the milk was correspondingly higher priced (especially as the coop endures competition from pasteurised products based on milk produced with GM concentrates).

<sup>15</sup> The dairy today has more salaried staff than farmers. Its marketing fails to leverage the 'hand-made' processes, even though they represent a heavy wage cost. This annoys some dairy farmers, who do not understand how the dairy works.



sustaining cow milk production where crop production had become more remunerative in recent years and required less work in a traditionally mixed cropping-livestock farming area, and so could cause farmers to stop dairy production. Effects are also seen within dairies over strategic decisions to be made, which impact producers' earnings from milk production. Faced to the dynamics of the dairy industry, in a freer market, and a sharper competition, some territories 'endure' while others seek to build up self-sufficiency or leverage comparative advantages. Territories can aim for economies of scale (specialisation and development for high volumes), economies of scope (complementarity among different activities) or differentiation. The CM, which had tended to 'endure' the changes in the dairy industry, has moved to get more closely involved in the future of dairy production. Being unable to make economies of scale, it looked more towards a strategy of scope and territorial differentiation that remains to be defined jointly with producers and processors. The NP looked at both economies of scale, as it presents the highest average volumes per farm, and differentiation, with high-end butter. Nevertheless, earnings from milk did not follow suit, milk quality has not always been up to par, and dairy farming is still under competition from field crops. So what is the right strategy to adopt: quality, quantity, or stronger complementarity with crop systems?

With the ending of quotas, according to the characteristics of individual farms, dairy area, and operators involved, the local producers and processors do not share the same opportunities for development and the actors in the territories do not have the same possibilities for re-territorialising the dairy industry. How can these conflicting interests be reconciled? The future of our two study areas, like that of many others, remains to be written, and will depend on how the territories embrace the question of the future of dairy production, and whether they let the industry take its market-led course or seek to make it a strong driver of territorial development -both socioeconomically and environmentally.

## References

- Baritoux, V., Houdart M., Boutonnet, J.P., Chazoule, C., Corniaux, C., Fleury, P., Lacombe, N., Napoléone M. & Tourrand J.F. (2016). *Ecological embeddedness in animal food systems (re-)localisation: A comparative analysis of initiatives in France, Morocco and Senegal*. *Journal of Rural Studies* 43 :13-26.
- Billen, G., Garnier, J., Thieu, V., Silvestre, M., Barles, S. & Chatzimpiros, P. (2012). *Localising the nitrogen imprint of the Paris food supply: the potential of organic farming and changes in human diet*. *Biogeosciences* 9: 607-616.
- Buclet, N. (2015). *Essai d'écologie territoriale. L'exemple d'Aussois en Savoie*. Paris, CNRS Editions.
- Chatellier, V. (2015). *La fin des quotas laitiers : un enjeu territorial*. *La revue foncière* 4: 20-24.
- Dervillé, M., Vandenbroucke, P. & Bazin, G. (2012). *Suppression des quotas et nouvelles formes de régulation de l'économie laitière : les conditions patrimoniales du maintien de la production laitière en montagne*. *Revue de la régulation* 12: 2-21.
- Erb, K.H. (2012). *How a socio-ecological metabolism approach can help to advance our understanding of changes in land-use intensity*. *Ecological Economics* 76: 8-14.
- Fillonneau, G. (2012). *Du déclassement professionnel à la désaffectation pour le métier. Le cas des producteurs laitiers du Marais Poitevin*. *Revue d'Etudes en Agriculture et Environnement* 93 (3): 323-350.
- Fischer-Kowalski, M. & Haberl, H. (2007). *Socioecological transitions and global change: trajectories of social metabolism and land use*. Cheltenham, Edward Elgar Publishing.

Grešlová, P., Gingrich, S., Krausmann, F., Chromý, P. & Jančák, V. (2015). *Social metabolism of Czech agriculture in the period 1830–2010*. *AUC Geographica* 50 (1): 23-35.

McGinnis, M. D. & Ostrom, E. (2014). *Social-ecological system framework: initial changes and continuing challenges*. *Ecology and Society* 19(2).

Muchnik, J., Sanz Cañada, J. & Torres Salcido, G. (2008). *Systèmes agro-alimentaires localisés : état des recherches et perspectives*. *Cahiers Agricultures* 17: 513–519

Napoléone, M., Corniaux, C. & Leclerc, B. (Eds), 2015. *Voies-lactées. Dynamique des bassins laitiers entre globalisation et territorialisation*. Editions Cardere.

Paus, M. & Réviron, S. (2010). *Mesure de l'impact territorial d'initiatives agroalimentaires. Enseignement de deux cas suisses*. *Économie Rurale* 315 : 28-45.

Perrot, C., Caillaud, D., Chatellier, V., Ennifar, M., You, G. (2015). *La diversité des exploitations et des territoires laitiers face à la fin des quotas*. *Fourrages* 221 : 57-68.

Ricard, D. (Dir.), 2013. *Les reconfigurations récentes des filières laitières en France et en Europe*. Clermont-Ferrand, Presses Universitaires Blaise Pascal.

Roguet, C., Gagné, C., Chatellier, V., Cariou, S., Carlier, S., Chenut, R., Daniel, K. & Perrot, C. (2015). *Spécialisation territoriale et concentration des productions animales européennes : état des lieux et facteurs explicatifs*. *INRA Prod. Anim.* 28 (1) : 5-22.

Van der Ploeg, J.D. (2008). *The New Peasantries. Struggles for Autonomy and Sustainability in an Era of Empire and Globalization*. London, Earthscan.