Biodiversity conservation as a new rationale for localized and sustainable agro-food systems. The case of two French PDO mountain cheeses

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Abstract: *Our paper is based on the first results of a twofold interdisciplinary research project financed by the French Ministry of the Environment (DIVA2 programme) which purpose was to analyse the emergence of biodiversity conservation as a new goal set to geographical indications and to study its effects on the strategies of the various stakeholders, and their impacts on the farming practices and the agro-food systems. Case studies have been carried out on the value chains of two mountain cheeses which names are protected Designations of Origin: "Saint-Nectaire" and "Salers". The purpose of the socio-economic and institutional study was to analyse the co-construction of new norms of action favouring a sustainable use of meadows biodiversity in the two PDO cheese supply chains. Starting from a literature survey and interviews with the stakeholders, we have tried to trace the historical process of PDO implementation and to identify the internal and external driving forces behind this dynamic. The first results show a weak direct influence of meadows biodiversity conservation concern on the current collective process of norm construction. Nevertheless, the biodiversity awareness of breeders involved in these two PDO, notably Salers, seems to offer room for favourable evolution. However the weakness of collective action and the diversity of the PDO areas (in terms of livestock management and forage systems) that characterise the local context could make such a proactive change difficult without external support.*

Keywords: *Biodiversity conservation, sustainable agro-food systems, PDO, PDO mountain cheese, Geographical Indication*

Introduction

Since the Convention on biological diversity, it has become commonplace to suggest the development of markets for genetic resources or products involving traditional ecological knowledge as conservation measures. Following the TRIPS Agreement, sustainable use and search for market opportunities have been presented as the cornerstones of many policies directed towards biodiversity protection. Accordingly, several institutional arrangements originally dedicated to promote alternative agro-food systems have been brought forward as means to promote biodiversity conservation while securing incomes and rights over land and resources for local people and farmers. Such protection schemes imply the creation of norms and of governance arrangements that may be transformed by the introduction of biodiversity conservation commitments as a new legitimacy register. Our communication will focus on the French (European) Geographical Indications system.

Our paper is based on the first results of an interdisciplinary research project (BigDIVA), financed by the French Ministry of the Environment (DIVA2 programme) which purpose was to analyse the emergence of biodiversity conservation as a new goal set to geographical indications and to study its effects on the strategies of the various stakeholders, and their impacts on the farming practices and the agro-food systems. Case studies have been carried out on the value chains of two mountain cheeses which names are Protected Designations of Origin: "Saint-Nectaire" and "Salers".

It was a twofold project. The first aspect of the project dealt with the impacts of the present dairy production chains on the diversity of the meadows. This assessment was meant to identify the practices favouring meadow biodiversity and to supply information about the driving forces behind the adoption of these practices. Farmers representations of and commitments to biodiversity seem to play an important role in this respect. The individual strategies are also embedded in collective, historical, institutional, political, social and economic dynamics that have to be analysed as well. It was the second side of our research project and our communication will focus on the results of this second step.

The purpose of the socio-economic and institutional study was to study the co-construction of new norms of action favouring a sustainable use of biodiversity in the two PDO cheese supply chains. Starting from a literature survey and interviews with the stakeholders, we have tried to trace the historical process of PDO implementation until now and to identify the internal factors (specific to the considered chains, i.e. power and added value distribution…) and external driving forces (French and EU policy reforms…) behind this dynamic and its potential contribution to territorial sustainability.

First, we describe briefly the current impacts of the new commitments to sustainability and biodiversity conservation of the French quality and origin policy. Second, we give the first results of the two case studies that have been carried out.

Biodiversity conservation as a new rationale for Geographical Indications: the French context under international influences

There is no single, worldwide accepted definition of geographical indications. It is a generic term that has been adopted in international arenas to encompass and replace more specific designations (WIPO, 2002)[1]. In fact it covers different realities according to the countries, culture and traditions (Rangnekar, 2004; Sylvander and al. 2004; Hayes and al. 2005)[2]. Their only own common denominator lies in the quality linkage that they establish between the product and its geographical origin. The European Protected Designation of Origin (PDO) and its French equivalent "Appellation d'Origine Protégée" (AOP) are types of GI.

Protected Designation of Origin and the French quality and origin policy

PDO is a voluntary contractual instrument designed to single out products that draw their authenticity and specificity from the area in which they originate. PDO protection is based on a description of the products –mostly foodstuffs, wines and spirits- cultivated or harvested, processed and prepared within a given geographical areas (the PDO area). Through PDO, the producers have the quality and specificity of their product recognized and the product name protected from misuse and imitation. The protected area is defined in French as a *terroir*, a notion that encompasses geographical features e.g. soil or climate conditions, but also cultural dimensions: it implies shared traditions of production, a common history, a collective identity and often heirloom varieties and landraces. This notion calls to mind the ideas of entrenchment, heritage. The products protected by PDO are part of the living heritage of the country and are associated with valued know-how and high quality (Bérard and Marchenay, 2004).

Gaining approval for a PDO is a long and costly process, implying organizational skills and networking abilities for the producers. The latter must first organize themselves into unions for the capacitation

[1] Article 22(1) of the TRIPS Agreement defines GI as "…*indication which identify a good as originating in the territory of a Member or a region or locality in that territory, where a given quality, reputation or other characteristic of the good is essentially attributable to its geographical origin*"

[2] Different options may be favoured for implementing obligations under the TRIPs Agreement so there is a huge variety of national laws on GI (from the *suis generis* law in the EU to their protection under trademark law in the United States). In addition to such a diversity of national laws the variety of local institutional arrangements –due to various degrees of State involvement, top-down versus bottom up implementation, stakeholders' interests and strategies…- must be stressed.

to apply for registration of GI is in practice limited to groups or collective entities. These unions are in charge of preparing the application file and once the PDO is accepted they have to uphold the rules of production at the local level. The French *Institut National de la Qualité et de l'Origine* (INAO) under the control of the Ministry of agriculture which is in charge of the protection of GI, plays a decisive role (supporting and controlling) in the all process of PDO collective elaboration until its -by law- registration.

The French quality and origin policy that includes PDO is long standing. It was set up over a century ago (with the formal definition by law of the "*Appellation d'Origine Controlée*" in 1905) and is governed by the French Code of Rural Law. The French system that has been reformed in 2006 is linked with the European system established in1991 and 1992 and reformed in 2006[3]. According to the latter the notion of PDO – more or less equivalent to the previous French AOC- and of Protected Geographical Indication (PGI) have been introduced in the French law[4].

The goals and issues of the French official quality and origin signs system have changed over time (Sylvander et al., 2005). Originally intended to protect the product names from misuse and imitation, quality and origin signs have been used since the 70[s] to promote the diversification of agricultural production (market and agricultural policy issues). Since the 80[s], a new justification of this policy has emerged: the promotion of typical products with special ties to their geographical origin benefits local development. It is actually considered as a means to allow producers and economic agents to enhance more effectively the value of their products. Moreover, it allows consumers to make enlightened choices regarding food quality, environment, taste and production process by ensuring that the promises made are actually kept (product clarity and credibility issues).

The new justification of GIs as possible tools to promote local heritage and environment is closely linked to the Convention on Biological Diversity (implementation of the Article 8j) and The Agreement on Trade-Related aspects of Intellectual Property Rights (TRIPs) negotiations (Boisvert and Caron, 2007). Even if the actual scope of its protection is still undefined and much debated (geographical indications are criticised as trade barriers and distinguished subsidies)[5], there is a growing interest for GIs as a means of protecting and valorising indigenous and local knowledge favouring the in-situ biodiversity conservation specifically in developing countries (Downes and Laird, 1999; Dutfield, 2000). The model of European and French PDO has been particularly put forward in international arenas as a suitable political option in order to favour both biodiversity conservation (via its sustainable use) and implement a kind of farmers' rights (Boisvert, 2006).

The present level of integration of biodiversity concerns in the French quality and origin policy

The environmental justification of GIs originates from the international level that plays a crucial role in the codification and normalization of the agricultural sector. It has exerted a decisive influence in both Europe and France. The reference to biodiversity conservation in the context of the protection of local agricultural products is also linked to the growing societal awareness and consumers' interest in the contribution of agriculture to sustainable development. These changes in the demand side

[3] There are three types of official signs used to single out agricultural products in France: three signs associated with origin and tradition (PDO, Protected Geographical Indication, Traditional Speciality Guaranteed), the Organic farming label, and an official quality sign that guarantees superior or special quality (Red label). Both the government and joint trade organizations including farmers, processors and distributors are involved in the official system of quality and origin signs. These signs come within the exclusive jurisdiction of two public organizations (INAO and the Agence Bio*)* under the control of the French Ministry of Agriculture.

[4] It must be stressed that the French stakeholders involved in the quality and origin policy have taken an active part in the public consultation launched by the Commission of the European Communities on the occasion of the publication of its Green Paper on agricultural products quality (CEC, 2008). This consultative process mainly dedicated to identify ways for improving European quality and origin policy includes suitable options for a better promotion of sustainable agro-food systems.

5 After years of controversies between European Union and the United-States, the protection of GI has been secured under the TRIPS Agreement (articles 22 to 24).

lead to a diversification of the socially constructed quality criteria (concern for the environment, animal welfare, fair and ethical trading, local and rural development...) favouring new market niches that may compete with official food product quality signs (Boisvert and Caron, 2007).

The timeliness of including formal commitments to environmental protection in the PDO system has been discussed both when the new French agricultural law (*Loi d'Orientation Agricole*) was adopted in 2006 -that has reformed the French quality and origin policy- and during the "*Grenelle de l'Environnement*". No consensus has yet been achieved on this issue and a voluntary approach has been favoured. It is therefore not compulsory to include environmental provisions in the specifications of PDO. The only official quality sign that has to do with the protection of the environment is the organic farming label. However, its combination with PDO tends to become more common and is perceived as a means to enhance the sustainability of the PDO agro-food systems and to meet consumers demand. Indeed, according to official polls and consumers surveys carried out by various governmental agencies, the public generally consider PDO agro-systems as tradition-based and environmentally friendly.

The impacts of PDO in terms of biodiversity conservation and promotion of traditional know-how highly depend on the specification files (that may be completed by technical rules) which in turn might be very different depending on the product considered. PDO registration requires the description of the *terroir* and its geographical limits (area associated with the particular name), of the specific cultivation, production and processing techniques, and of resulting products. In most cases, registered techniques, practices and rules are the result of compromises between tradition and modernity, sanitary norms requirements and authenticity, local breeds variability (Bérard and Marchenay, 2004). Diversity of ingredients and techniques and their variability over time are reduced because of the induced normalisation of the PDO registration process. The strategies of the stakeholders and the local balance of power as well as developments in the outside world play a decisive role in this collective process of norms construction at the local level. The great variety of local declinations of PDO, that are always contingent, dependent on and rooted in unique historical, cultural, sociological and economic contexts, and that result from place-specific combinations of strategies, actors interplay and decision-making processes make it impossible to draw general conclusions about the possible link between PDO and biodiversity conservation.

The examination of recent PDO decrees shows that they link more explicitly local how-know and biodiversity together, suggesting a growing legitimacy of the integration of ecological quality in origin policies (De Sainte Marie and Bérard, 2005). This new concern for biodiversity has been confirmed by a study commissioned by the French Ministries of agriculture and the environment and the INAO within the framework of the Agricultural Plan of the National Strategy of Biodiversity (CNASEA, 2008). Nevertheless, a thorough assessment of the current PDO specification files reveals that the practices and various elements of the production system that are likely to have impacts on biodiversity, such as farming practices and techniques, production diversity, spatial organisation and land use, are only partially regulated. The only exception is the limitation of yields which is often formally provided for in PDO specifications. Silage –that implies early cutting and intensive management of the meadows- is banned or limited for only half of the French PDO dairy products. When it occurs, the introduction of (animal and plant) breed specifications is rather based on organoleptic or agronomic grounds than on the concern for biodiversity conservation.

The aim of the interdisciplinary project BigDIVA funded by the Ministry of the Environment was to study meadow biodiversity conservation issues in the context of two French PDO mountain cheeses production systems in the Auvergne Region. The socio-economic and institutional approach addresses the place and the role of biodiversity concerns in the local collective process of norms construction governing these two PDO supply chains.

The case of two French PDO mountain cheeses: Saint-Nectaire and Salers

Meadows appear to be a major asset for sustainable development of the Auvergne region (localised in the center of France – 85,6% of the Auvergne municipalities within the LFA scheme and 63% are

located in mountain area) mainly dedicated to grazing livestock. In these highlands, permanent grassland represents 64% of the total area of farms. Local agro-food chains and processing industries are the third regional employers. Moreover, meadows are both emblematic parts of the highland landscapes - and as such one of the tourist attractions of the region - and fragile ecosystems protected by the Habitats Directive (Natura 2000 network). There are six regional PDO products linked to grazing livestock production, including Saint-Nectaire and Salers PDO cheeses.

A large number and variety of stakeholders are involved in the production and maturing of the Auvergne PDO cheeses. The weakness of the collective dynamics and – before the recent reforms- - the low standards in terms of cultivation practices, production and processing techniques adopted in the specifications of the PDO cheeses produced in Auvergne, are emphasised in the literature (Ricard, 1994). This situation has made it possible for the dairies producing the PDO cheeses to pay only very low premiums to the breeders who supply them with milk.

The first step of our research was to identify and analyse the socio-institutional and organisational characteristics of the two supply chains (based on desk review and individual and collective interviews with stakeholders). The role and importance of biodiversity conservation in the collective norms of action and their evolutions following the recent revision of the considered PDO specifications have been studied. In addition to the interview of creameries, dairies, the managers of Saint Nectaire and Salers PDO joint associations, a sample of breeders have been interviewed[6]. The objective of these interviews was to gather information about their representation of meadows biodiversity and their awareness about conservation issues and their practices, their support to and involvement in the PDO collective project and socio-economic factors, in order to understand their logic of action. This part of our work has been conducted in close association with the biodiversity diagnosis part of the research carried out on the same sample of actors by the agronomists and ecologists of the research team (Orth et al., 2009). In the following paragraphs, we present the first results of this work in progress.

The socio economic institutional and organisational characteristics of Saint-Nectaire and Salers PDO

Saint-Nectaire PDO

Saint-Nectaire has been officially registered as *Appellation d'Origine Contôlée* in 1955. Saint-Nectaire is a pressed uncooked cheese made from cow milk. After ten years of conflicts the Saint-Nectaire PDO has evolved and includes two distinct types of production (see 1964 Decree): (1) a farmhouse cheese ("*Saint-Nectaire fermier*"), which is made on from the unpasteurised whole milk, twice a day, directly after milking. Traditionally made farmhouse Saint Nectaire can be either matured on farm or sold to cottage industries or industrial creameries; (2) a cheese produced in dairies ("*Saint-Nectaire laitier*") manufactured in the PDO area from pasteurised or unpasteurised milk with a standardised fat content originating from the PDO area. Saint-Nectaire is the fifth French PDO cheese (out of 37) and the first farmhouse cheese in volume (almost 45% of the total tonnage of Saint-Nectaire cheese is produced on farm by breeders).

Saint-Nectaire PDO area covers 72 "*communes*" (administrative units) localised both in Puy-de-Dome and Cantal "*départements*" (districts). With 1 900 km^2 Saint-Nectaire PDO area is one of the smallest cheese PDO areas in Europe. There is a domination of volcanic soil, and an altitude ranging between 800 and 1886 m a.s.l. The permanent pastures represent 80 to 100 % of the farms UAA. Nevertheless the PDO area is not homogenous: the Eastern and Western peripheral zones have a lower altitude and more limited rainfalls.

In 2008, 234 on farm cheese makers, 527 milk producers, 26 cheese ripeners and 5 industrial dairies were involved in Saint-Nectaire supply chain. The actors of the PDO Saint-Nectaire supply chain are

[6] 20 breeders involved in the Saint-Nectaire PDO and 20 breeders involved in the Salers PDO have been interviewed. 9 other stakeholders have been interviewed for the institutional part of the Saint-Nectaire PDO study case and 7 for the Salers PDO's one.

organised in the Saint-Nectaire cheese association (its elected administration board is made up of 4 colleges -milk producers, milk collectors and cheese makers, cheese ripeners, and on farm cheese makers). Following the last reform of the French agricultural quality and origin policy (2007 Decree), the Saint-Nectaire association has become a "Management and Defence Body " *("Organisme de Défense et de Gestion*") in October 2007. All the stakeholders had to explicitly and formally decide to join this new organisation that is in charge of the implementation of the new monitoring procedures of compliance with Saint-Nectaire PDO specification. These new monitoring procedures rest on a combination of self-assessment, internal and external inspections (carried out by an appointed and certified independent control organization) has been introduced by the 2007 policy reform in place of the former internal controls that were supervised by INAO[7].

Figure 1. The PDO Saint-Nectaire supply-chain.

The renewal of Saint Nectaire PDO specifications had sparked off years of heated debates, when the 2007 quality and origin policy reform was adopted. A new PDO decree was accordingly adopted in 2007. Following the trend that has been described above, the latter affirms and strengthens the link between the product and its *terroir* through the introduction of new technical provisions regarding the production, especially about dairy cattle feeding (Farrugia et al., 2009)[8].

In order to support breeders efforts to improve milk sanitary quality and favour the implementation of new PDO specification and the new control procedures, a regional agreement ("*Accord cadre prime AOC Auvergne*") that creates a new additional incentive premium has been signed by all the stakeholders in 2009. This agreement set up a new regional framework to negotiate the purchasing price of the milk collected to make PDO cheeses.

Salers PDO

PDO Salers is a seasonal (15th April - 15th November) farmhouse cheese made from unpasteurised milk from a single dairy herd twice a day after each milking. Renneting is carried out in a wooden container called "*gerle*". Grazing cattle is the rule, each breeder being required to declare his or her grazing period.

Salers cheese was firstly registered under the protected denomination of "*Salers de haute montagne*" in 1961 as a seasonal (from 20 May to 30 September) farmhouse production associated with highland cattle grazing and with the Salers local breed. But the 1979 decree overturned the

[7] According to this new legal requirement a "control plan" has been elaborated and registered after its validation by INAO. This new process has been implemented from April 2009.

[8] Under the new specifications, permanent natural grasslands must represent 90% of the farms UAA, cattle grazing a minimum of 140 days of animal pasture is required, 100% of the forage and 70% of the livestock feed provided to the cattle must be born in the PDO area. And from 2020, corn forage and silage will be prohibited. From 2015, all the animals should be bred in the PDO area. Finally, cheese maturing has been extended from 21 to 28 days.

provisions on the minimum altitude of the pastures (850 m) and on the exclusive use of the local cattle breed. The production period was also extended (1 May -31 October) and the PDO area was enlarged to the whole Cantal PDO area. The decree also defined production and control criteria.

The current decree was adopted in 2000 after a six-year negotiation over the specifications. The use of the *gerle* that is crucial to the specificity of the PDO Salers cheese (due to the wood microbial flora) has been a key point in the debates. It has eventually been made compulsory in the 2000 Decree. Though meadows and their biodiversity play a critical role in Salers agro-food system, no explicit provisions have been adopted regarding either their biodiversity status or the grasslands management practices in the 2000 Decree. Another potential threat to agrodiversity has been the renunciation to the exclusive use of Salers cows' milk. Indeed, the Salers dairy breed is endangered. Nevertheless the exclusive Salers breeders (only 10) have been recognized a special status within the Salers PDO by the 2000 Decree and are entitled to use the special and exclusive designation "*Tradition Salers*". The 2000 Decree has restricted the PDO area (that had been previously enlarged by the 1979 Decree) to the volcanic massif and the adjacent *communes*. However, no altitude requirement has been reintroduced, so that there is a wide variety in the farming and cattle management systems within the PDO area.

The enforcement of the health regulations has challenged the legitimacy of the traditional use of *gerle* and sparked off a controversy and a period of crisis (from 2000 to 2006) that have destabilized the whole supply chain and impacted its governance. This controversy has thrown light over the highly diverse and possibly antagonistic strategies of the stakeholders of this small PDO, in spite of their limited numbers (92 cheese makers and 11 cheese ripeners). There was indeed disagreement about the legitimacy and necessity of using *gerle,* which is a part of the local cultural heritage and a marker of Salers *terroir* but which is the same time imposes limitations on the volumes of milk that can be processed.

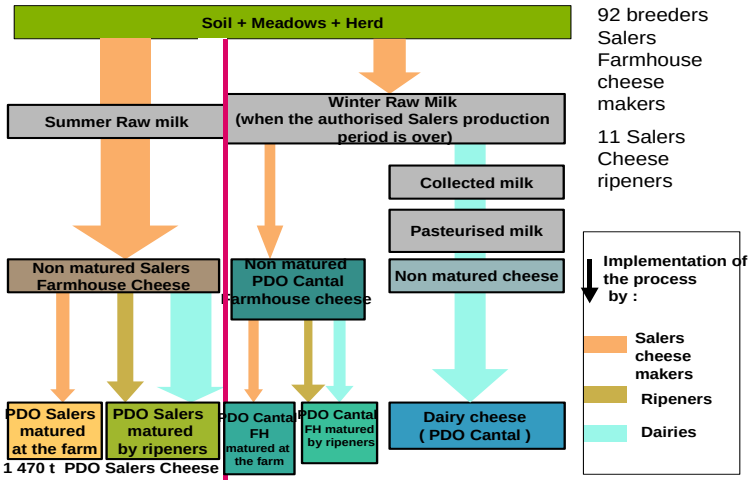

Figure 2. The PDO Salers supply-chain.

Salers PDO is closely linked to the Cantal PDO – Cf. Figure 2. The Salers PDO appears as the result of a strategic differentiation and diversification of the Cantal PDO cheese of which the production is more intensive (Ricard, 1994; Bérard et al., 2008). Thus both PDO share a common joint association (CIF - *Comité Interprofessionel des Fromages*). However a Salers Section has been recently created (with 8 cheese makers and 4 ripeners representatives) following the latest national policy reform (ODG creation).

Current external and local dynamics that do not clearly favour the integration of biodiversity conservation issues at the collective level...

In both case studies, the analysis of the present situation shows a low level of integration of biodiversity conservation concerns in the co-construction of new norms. The recent changes in the two PDO supply chains, beyond the attempt to reinforce or maintain the linkage between the products and their *terroir*, have been driven by other factors.

In the *Saint-Nectaire* case, the historical conflict between on the one hand farmhouse cheese makers and, on the other hand, milk producers and industrial dairies, has played a decisive role. The new specifications of the PDO (2007 Decree) are the result of long and heated negotiations largely initiated and supported by farmers-cheese makers against the industrial dairy sector. They favour hay feeding which may induce important changes in the forage systems and possibly in the current techniques and practices and might have economic impacts even for the farmers – cheese makers who have promoted them (Farrugia and al., 2009). It is difficult to draw clear and unequivocal conclusions about the potential impacts of the new PDO specifications on biodiversity conservation because there is a huge diversity both of the farming systems within the PDO area and of the farms within these systems, and because the new requirements have not been driven by biodiversity concerns[9] (Orth et al., 2009).

In *Salers* case, which is exclusively a farmhouse production, there is no such thing as a direct conflict between the farmers that would be only milk producers and those who would also be cheese makers. Yet *Salers* PDO is embedded in the *Cantal* PDO (75% of which is a dairy-made pasteurised milk product) and *Salers* production represents a market niche for the Cantal producers. Because two PDO areas overlap, most *Salers* cheese makers also produce PDO *Cantal* or sell their milk to *Cantal* cheese makers (when the Salers authorized production period is over). The recent toughening of PDO *Cantal* specifications (2007 Decree) – notably to improve its organoleptic quality and its market positioning - could have an impact over the strategy of differentiation of the PDO *Salers*.

The "*gerle* controversy" initiated by the health regulations enforcement (due to EU Directives implementation) has unsettled the supply chain, reinforcing the antagonisms among the breeders. This crisis has undermined the consensus that had enabled the adoption of the 2000 Decree and has affected the local balance of power. The enforcement of the health regulations has favoured the cheese ripeners and enabled them to gain influence through the technical support they have provided to the farmhouse cheese makers. This evolution might reduce the differentiation between *Salers* and *Cantal* cheeses (Bérard et al., 2008).

The strengthening of health norms has also impacted the PDO *Saint-Nectaire* supply chain, particularly the farmhouse production. In so far as they are both raw milk uncooked pressed cheeses, both *Salers* and farmhouse *Saint-Nectaire* meet with technical difficulties regarding the health regulations. The implementation of the new sanitary requirements is also particularly costly (notably in terms of control). The outside pressures exerted by the regulations promote an industrial conception of the quality (Sylvander, 1995) and has decisive impacts on the local construction of norms for both PDO supply chains. The strengthening of sanitary obligations favours the option of milk pasteurisation (which reduces both health risks and production costs). As it has been experimented with other French PDO cheeses (notably *Camembert* that has drawn the media attention) such regulatory evolutions affect the balance of power between dairy industries – that have offensive strategies on PDO productions- and the raw milk cheese makers within the PDO supply chains. This raw vs. pasteurised milk technical debate echoes the opposition about the strength of the links between the *terroir* and the product quality. The use of raw milk requires high quality pasture and a strict control of the cattle feed as well as adapted local breeds and depends upon the closely related natural and cultural components of the milieu. Thus it potentially favours the awareness of the supply chain stakeholders about biodiversity conservation issues. On the contrary, pasteurisation practices make it possible to free oneself from most of these links and interdependencies (Escafre, 2009). The 2007 Decree has favoured a new balance of power within the

[9] However the influence of the plant diversity of the meadows on the organoleptic quality of *Saint-Nectaire* is explicitly mentioned in the part of the decree dealing with the link between the product and its *terroir*.

PDO *Saint-Nectaire* supply chain that seems to strengthen the product and *terroir* linkage –even if no biodiversity conservation commitments have been made (Farrugia and al. 2009).

.... in spite of awareness about biodiversity at the individual level (Salers PDO case)

Though biodiversity conservation is not included in the formal norms that are collectively constructed at the local level, it does not mean that individually, the stakeholders (particularly the breeders that are also farm house cheese makers) do not care for biodiversity, as demonstrated by our first results on *Salers* PDO and our work in progress on *Saint-Nectaire* PDO.

We have studied the role of meadows' biodiversity in the working of farms involved in *Salers* PDO. A sample of twenty breeders that make *Salers* on farm has been surveyed (Berthelot, 2009). We have identified the factors affecting the choice of their practices notably in terms the grass-land management – Cf. Figure 3. The breeders' perception of biodiversity and their knowledge of the impacts of their practices over meadows biodiversity have been also studied. Information has been collected on their perception of the legitimacy of *Salers* PDO norms (in reference to the "*gerle controversy*") and on the degree of their involvement in collective action.

Figure 3. Interactions between the conception of the Salers PDO, the representation of biodiversity and agricultural practices (source: Berthelot, 2009).

Beyond the heterogeneity of positioning of the breeders that have been interviewed, the study has shown that their interest for and knowledge of biodiversity mainly concerns a "desirable biodiversity", which represents the target they try to reach through the practices they are implementing.

Such results indicate that the conservation of meadows biodiversity could be taken into account in the collective process of norm construction. However, a thorough analysis is still needed to determine which practical steps could be taken to reach such an objective because of the heterogeneity of both the farming systems and the breeders perception of the PDO, as well as their various degree of involvement in the PDO governance.

Conclusion

Our research on the importance and legitimacy attached to biodiversity conservation arguments in the French mountain cheese PDO *Saint-Nectaire* and *Salers* shows that they have little direct influence on the governance and formal organization of the supply chains. In both cases, the recent changes in PDO formal and informal specifications are mostly due to outside pressures - especially the enforcement of health regulations and the last reform of the French quality and origin policy- that have no unambiguous effects in terms of integration of biodiversity conservation. Such a conclusion is also valid for the *Salers* PDO which is commonly considered as having an outstanding

heritage value for the Auvergne region (Ricard, 1994). The heterogeneity of farming systems within the two PDO areas and the antagonistic interests of the stakeholders mainly due to the co-existence of two types of products -farmhouse and dairy ones- under the same PDO that impact the local institutional dynamics and the governance of the supply-chains, do not seem to favour the integration of such objectives in the ongoing construction of norms.

Several factors could affect considerably the present local balance in the near future: the cost of milk collection in the highlands, the evolving strategies of the local dairies which integration into national and international groups rapidly grows and the CAP reforms. Nevertheless, the social demand for sustainable agriculture and the foreseeable stronger integration of environmental concerns in public regulations might make it a sound strategy for *Saint Nectaire* and *Salers* to develop a differentiation based on a better integration of sustainability issues, including biodiversity conservation. The sensitivity to biodiversity issues of the breeders involved in the two PDO seems to offer opportunities for such an evolution. However, given the diversity within the PDO areas and the weakness of collective action structures that characterise the local context the appropriate changes may prove difficult without external support.

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