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Steak up to the horns!

The conventionalization of organic stock farming: knowledge lock-in in the agrifood chain

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Abstract Recent conversations concerning organic food systems have focused on the conventionalization hypothesis, which posits that the organic food sector has become increasingly bifurcated between "historical" players in the organic movement on one side, and on the other by distributors and industrial operators recently arrived in the sector, who practice a more conventionalized form of organic agriculture which is now on the ascendancy. The most prominent explanations for the growth and dominance of a conventionalized organic food system have been economic, based in the logics of input costs, especially land rent. We use the cases of the Belgian Blue commodity system and the Belgian organic beef commodity system to argue that conventionalization is also cognitive. To understand the role of cognition in the ascendance of the conventional organic food sector, we utilize concept of "*référentiel*"—or *system of cognitive references*—as developed by Muller and Jobert. We believe that comparing organic and conventional practices as two systems of cognitive references makes a deeper understanding of conventionalization possible in two ways: first because it makes it clear that the two systems coexist on a cognitive level, understood in a broad sense as tightly knit sets of knowledges, beliefs, standards, and images. Secondly, the concept of référentiel enables one to understand how the conventional system can become irreversible (lock-in effect) and thus incompatible with the development of the organic system.

Keywords Knowledge systems · Organic conventionalization · Food chain lock-in · Stock farming · Belgian Blue cattle

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The case of Belgian organic cattle farming: a contested boundary between systems

> Recent conversations concerning organic food systems have focused on the conventionalization hypothesis, which posits that the organic food sector has become increasingly bifurcated between "historical" players in the organic movement on one side, and on the other by distributors and industrial operators recently arrived in the sector, who practice a more conventionalized form of organic agriculture which is now on the ascendancy. (Buck et al. 1997; Guthman 2004a)

Starting from the case study of Organic Belgian Beef, we argue that the economic forces central to the

political economy argument are not enough. Over and above economic forces, we argue that knowledge, in a broad the sense, is also a mechanism that locks the organic food chain into an increasingly conventionalized system. Therefore, we find that the concept "*référentiel*"—a system of cognitive references—offers another important way to conceptualize the empirical and theoretical problem of bifurcation, for two main reasons. First, because it enables researchers to understand commodity food systems as a tightly knit set of knowledge, beliefs, norms, and images, Second, the concept of *référentiel* allows for an understanding of how cognitive systems lock-in specific sets of knowledge's and their associated practices that make conventional and organic systems incompatible with each other, and therefore the transition between conventional and organic particularly difficulty. We argue, at the conclusion of our paper, that using the concept of *referential* is not only superior as a mode of explanation but that *référential,* as a perspective, also has quite *practical* implications about the transition toward truly organic practices.

Our discussion draws on several years' study of the Belgian organic cattle farming sector. The change that the sector has undergone in recent years appears significant because it concerns both the European context within which Belgian organic agriculture is expanding and the organic stock-farming resources that the Belgian sector has at its disposal to cope with these changes. Specialized beef cattle farming in Belgium effectively developed following the 1983 milk quotas reform, but it did not include specialized organic stock production, an activity for which there was no recent commercial precedent (Darnhofer 2006). The National (1998) and European (1999) legislation concerning livestock products, adopted several years later than that concerning vegetable crops (1991), was pushed through in the wake of various food crises. These European, national and regional agricultural policies extended support to organic agricultural production, including organic stock farming, resulting in an influx of conventional stock farmers (accounting for more than 80% of all operators) into organic agriculture. Despite this large influx of new organic stock farmers, only 15% of the organic beef they produce is sold as organic. This is possible because the profitability of organic stock farming activity is secured by the European organic subsidy. In sum, European policy combined with food crises boosted the organic meat market and encouraged the entrance of new players in the organic commodity system including stock farmers, retailers and industrial processors from the conventional sector, as well as a new type of consumer more attuned to risk within the food supply.

Nevertheless, these new players were all steeped in the technical and economic model of the Belgian Blue commodity system—the conventional model of beef production—with which historical organic agriculture had to contend. In addition, this confrontation was highly asymmetrical, with Belgian Blue production being rigidly specialized to produce meat alone, while organic production was far less so. Behind this asymmetrical situation, the specialization raised a deeper question: does the historical organic system have the ability to answer the new demand for organic meat brought by the food crisis without giving up a much more integrated crop and animal beef production.

Our empirical point of entry into the question of conventionalization was located in a series of discrepancies seen in the field between Belgian organic standards (or specifications) and the practices of farmers who had converted to organic stock farming. Four of the main specifications for organic standards are a combination of European and Belgium regulations, involving pasturing, diet, disease prevention, and choice of breed. We found that organic breeders moved their practices towards the more conventional Belgium production system based on animal confinement for finishing, rations based on feed concentrates, the preventive use of allopathic medication, and systematic caesarean sections. These discrepancies, observed during semi structured interviews of 35 organic stock farmers in 2002, demonstrated how conventional practices encroach on the organic production system in the four areas which typify the Belgian Blue conventional production system: pasturing, diet, disease prevention, and breeding (Jamar et al. 2006). In terms of pasturing, we found that the grazing obligation set by the organic specifications was rarely met by organic producers. Organic bulls to be fattened were for the most part confined to the barn in their second year of fattening-finishing and regularly exceeded the three months of confinement specifically permitted for finishing. As a result, organic producers also rarely met organic diet regulations, since the percentage of

concentrates in the cattle feed often exceeded the allowed maximum of 40%. In terms of disease prevention, we found that complying with the organic system's preventive approach to animal health, especially the definition of the term "preventive" itself, and thus the ban on the preventive use of allopathic medicines, remained in dispute. Finally, the confusing gap between the two-year period necessary to convert animals to organic operation and the five-year exemption to the ban on systematic caesarean sections that are specific to the typical Belgian breed—the Belgian Blue—led to a gradual phased-in of the C-section regulations, allowing organic producers to conserve some of the advantages of the systematic C-section practices typical of Belgian Blue breeding. These tendencies to conventionalize organic production enabled farmers to transform the Belgian Blue breed—the cornerstone of an intensively productionist and industrial meat production system in the region—into an organic product. The fact of their use in organic production, however, smoldered underground; it gave rise to no debate, even though some of the institutional players in organic agriculture validated it. How should one interpret these discrepancies and their non-problematic natures?

Conventionalization

There is a great deal of controversy about conventionalization theory in term of whether organic can truly be defined as an alternative food system, given the forces of dilution, appropriation, and bifurcation. At the political level, it is thought that national and international regulation will lower organic standards and consequently lead to a dilution of the very sense of organic agriculture that necessitated new regulation in the first place (Lockie et al. 2000; Vos 2000). In economic terms, it is claimed that the entry of capital-intensive players into the sector will lead to what Goodman et al. (1987) termed "appropriation." This appropriation is linked to either the entry of "capital-intensive" players in production (the case of California) or, more conventionally, to the shift in economic rents farther downstream in food chains, phenomena reinforced through institutionalized certification processes (Mutersbaugh 2005). The effectiveness of conventionalization may also be linked to the captive nature of the consumption market, as is the case for fruits and vegetables in California (Guthman 2004a). Conventionalization, then, is the process by which organic agriculture is brought into a productive logic suited to agribusiness, but it does not necessarily follow that non-conventional organic production must disappear forever. It is possible that two separate paths will coexist, and that the more intensive path linked to agribusiness would not affect the historical organic movement and its alternative markets fundamentally (Campbell and Liepins 2001; Hall and Mogyorody 2001).

However, Guthman (2004b; see also Lockie and Halpin (2005) and Bess (2007), argues that in the case of California two pathways cannot coexist. This incompatibility is due to the historical logic of more intensive land use in California and the consequent shift of value-added in organic into ground rent, a process that is intensified through profit-centric agribusiness practices. The inevitable consequence of shifting rents is the intensification of agricultural production per acre: farmers are forced to specialize in high value crops, a fact which alters the very essence of the agro-ecological and social aims of organic agriculture. Unlike the cases in Canada (Hall and Mogyorody 2001), New Zealand (Campbell and Liepins 2001) and Australia (Lockie and Halpin 2005), where the real estate contexts and degrees of market openness are distinct, in the case of California it is not possible "…that a shallow (or lite) version of organic production can leave room for others to pursue a deeper path." This third mechanism (the significance of increasing ground rent) increases the likelihood that "…agribusiness involvement amplifies already existing dynamics that constrain the ability for even the most committed organic growers to farm in more sustainable ways" (Guthman 2004a, p. 307).

We wish to build on the conventionalization theory of Guthman but not solely related to land use. Instead, we assume that the incompatibility between the two pathways (one occupied by historical organic farmers and the other by agroindustrial newcomers to organic production) does not solely relate to land use. In the case described here, there are also incompatibilities, but they are primarily cognitive, in the sense that there is a large set of knowledge, norms, beliefs, and guiding images that stabilizes a productive system and that cannot simply

be applied to another kind of production. Problematizing the issue of conventionalization in terms of knowledge systems is, from the theoretical point of view, a way to both reconstruct the link between food sociology and agrifood studies (Goodman and DuPuis 2002; Tovey 1997) and to address the injunction to unpack the continuing black boxing of the missing guest, the consumer (Lockie et al. 2000). In the view of Kaltoft (1999), Morgan and Murdoch (2000), Hassanein (1999), and Campbell and Liepins (2001), the alternative practices that are linked to sustainable agriculture amount to a struggle to build and conserve alternative knowledge systems.

The knowledge system argument often becomes a counter to the conventionalization hypothesis, in that it posits the ability for alternative food systems to exist due to their embeddedness in alternative forms of knowledge which are shared all along the food chain, from producer to consumer. For example, according to Goodman and DuPuis (2002, p. 15) "How the consumer goes about 'knowing' food is just as important as farmers' knowledge networks in the creation of an alternative food system. By linking these struggles over knowledge, we begin to see the politics of the food system as involving alternative modes of ordering, in which food is an arena of contestation rather than a veil of reality." We agree with these authors that systems of cognition are important to the existence of alternative production systems as new modes of orderings. This idea of modes of orderings, developed by John Law and often referred to by those who argue for organic as an alternative production system, is based on an acknowledgement of the heterogeneousness of systems and networks which possess, Law suggests "fairly coherent and large scale ordering patterns in the networks of the social. It is, in other words, plausible to look for orderings which—to the extent that they are performed—generate, define, and interrelate elements in relatively coherent ways" (Law 1994, p. 107). Law's concept of modes of ordering modes has been taken up in empirical studies in the areas of fair trade (Whatmore and Thorne 1997, p. 295), farm products (Stassart 2003, pp. 279–339), and agro-industrial organic food chains (Lockie et al. 2000). Ordering modes are anchored in the networks' material organization and players' practices, and so can be distinguished from similar concepts such as "ideology" and "discourse" in other sociological theories (Law 1994, p. 109). While ordering modes are uncertain a priori, they make it possible to understand a posteriori how the resources that are generated collectively will affect the group's historical trajectory by becoming principles of action that will direct its path. In this way, the contestability of knowledge systems is confirmed a priori while historicity is introduced a posteriori, which then connects the cognitive dimension to a narrative dimension. How, then, in light of this debate over conventionalization, can we explain the observed differences in pasturing, feeding, and health practices and specifications in our Belgian case?

The first aspect of the conventionalization hypothesis concerns the dilution of standards. In an administrative and legalistic perspective, the observed discrepancies between organic standards and actual practices would call for either laxer standards or tougher enforcement. Pragmatists would suggest adapting organic specifications to fit market demands, while purists, on the contrary, would object that tougher monitoring and inspections would be the only way to guarantee effective implementation of the rules. We determined that such an administrative and legalistic interpretation is inadequate because, as we shall show farther on, it does not allow for the fact that the organic stock farmers are trapped by the Belgian Blue commodity chain *référentiel*.

The second aspect of the conventionalization hypothesis concerns appropriation within the commodity chain, i.e., the observed discrepancies either result from the entry of capital-intensive players into organic production, or the dominant position of the newcomer, especially the downstream slaughterhouses and distributors, to the organic sector. We did indeed see these two phenomena. For example, the slaughter industry managed in some cases to serve both conventional and organic consumption markets by reserving the prime cuts of meat for the latter, while the rest of the carcass's yield was channeled into the conventional circuit. These same industrial players also tried to make use of their capital to enter organic production networks, for example by systematically buying out farmers in bankruptcy and then converting their operations to organic stock farming. However, industrial players make up a small and decreasing part of the organic beef commodity system, only accounting for approximately 10% of organic beef output in 2005 (Aertsens and Van

Huylenbroeck 2007, pp. 17, 47–53). Finally, our observations of short food chains (e.g., direct farm sales or farmers' markets) invalidated the appropriation hypothesis, for while the direct contacts between stock farmers and consumers in such cases shut out agribusiness players, not only did the observed discrepancies with regard to grazing and feed remain within the sector, but we also saw more marked failure of organic producers to comply with the ban on caesarean sections. Since observation of the ban would have prohibited production of the traditional conventional breed, organic stock farmers and consumers thus found agreement, somewhat amazingly, on their assessment of the superior quality of the double-muscled Belgian Blue. In other words, systems of cognitive references in terms of breed and beef quality, rather than the traditional conventionalization logics posited by political economists, moved organic production toward the conventional mode.

The fact of continuity of productive process within two ostensibly distinct productive models shows us to what extent the Belgian Blue model stock farmers, whose initial technical and economic model was fairly incompatible with organic standards, could not envision a change because they were caught in the requirements of the commodity system in the broad sense, requirements that referred to the Belgian Blue's *référentiel*. This incompatibility was not solely technical, for some stock farmers, for example, knew how to keep their organically raised bulls out on the range. The incompatibility concerned the norms and standards that affect the product's definition. Now, we have just shown that one cannot understand these norms and standards from the angle of either political or economic interests. To understand them one must thus return to the cognitive systems shared by the commodity system's players. This is where we mobilize the theory of the *référentiel* in order to connect standards and knowledge.

The theory of the *référentiel* or reference framework

Référentiel theory comes from French political sociology. Jobert and Muller (1987) hypothesized that politics are expressed through the production of frameworks that are a combination of policy, knowledge's, practices, identities and multiscale framing. They refer this multiscalar political assemblage as *référentiels*, a way to interpret the world.[1] The production of these *référentiels* is a process for making sense of reality that involves a process of producing truth about what the world is and a process of producing norms for what the world should be (Muller 1995, pp. 163–165).

The idea of *referential* has some similarities and difference with other theories about system knowledge and politics. For example, in its attempts to theorize the ideological processes behind public policies, *référentiel* theory could in its early stages of development be conflated with theories of "advocacy coalitions," i.e., "an advocacy coalition at all levels of government that shares a set of basic beliefs (policy goals plus causal and other perceptions) and seeks to manipulate the rules, budget, and personnel of government institutions in order to achieve the goal over time" (Sabatier and Jenkins-Smith 1993, p. 5, quoted by Muller 1995). *Référentiel* theory is nevertheless different from this perspective, which is also close to that of framing theory (Mooney and Hunt 1996), in two ways. First, a *référentiel* is not an ideological resource. Far from taking the form of a debate of ideas only, the process of a *référentiel's* emergence and spread is often contested and actors can defend their frame of references even to the extent of physical violence. The *référentiel* is therefore constitutive of the collective identities of the players involved (Muller 2000, p. 196). Moreover, this notion can be mobilized in order to analyze the process of industrial sectoral transformation, whereas the more simple notion of framing describes simply the dynamics of social movements (Benford and Snow 2000).

A *référentiel* is an arena of meaning that enables one to see the world in a particular way. In a perspective shared by Heclo (1978) and Majone (1989), Sabatier and Jenkins-Smith (1993, p. 5) considers the

[1] Muller called this structure of meaning a "référentiel" by analogy with the mathematical concept of a set of elements constituting a reference system and its use in the area of training (*référentiel de métier* or the trade's set of references or manual). This notion differs from that of the set of technical references that is used in agricultural science to describe a set of reference data that has come out of experimentation conducted under specified conditions and aimed at production and which is actually a translation of the norms, images, and knowledge that surround practices. (de Bonneval, 1993).

construction of public policies to be on a par with the construction of belief systems: "They involve value priorities, perception of important causal relationships, perception of the state of the world (including the magnitude of a problem), perception of the efficacy of policy instruments, and so on." Belief systems are both integrative due to their global-local dimension and self-referring due to their historicity. *Référentiel* theory strives to integrate the global dimension, which appears to unavoidably affect the rationales at work in public policy changes, while also highlighting the players' roles in constructing frames of interpretation. This dual perspective gives rise to the concrete implementation of the global-sectoral dialectic (Muller 2000, p. 199). For example, Airbus's arrival as a competitor in aviation markets was interpreted to indicate a shift from the military arsenal *référentiel* in which the French aviation industry previously operated to a commercial *référentiel* (Muller 1989), and the 1992 CAP reform was associated with a transformation of professional forum (the Committee of Professional Agricultural Organizations) generated by new scientific/economistic ideas ascendant within the OECD (Fouilleux 2003).

While it adopts the achievements of cognitive sociology, *référentiel* theory does not take the perspective of methodological individualism. In what can be described as a process of translation (Callon 1986), the cognitive matrices that are produced by the interactions of individuals or other players tend to become independent from their construction processes and prevail as models for interpreting the world. The theory of the *référentiel* thus incorporates historicity as a self-referencing process, in the sense that a *référentiel* generates goals and normativity from its own interpretive framework and does so relatively independently from a changing environment (Muller 1995, p. 168).

Analysis by *référentiel* thus led us to consider organic agriculture from two standpoints: its global and local dimensions. The global dimension is asserted through an interpretive framework developed by the International Federation of Organic Agriculture Movements (IFOAM) as well as national and European government regulations. The global scale is connected to a local scale that consists of the practices and discourse of the players in the specific food chains.

From an empirical point of view, we trained our analysis on the confrontation between the conventional *référentiel*, that of the conventional Belgian Blue cattle commodity system, and the new stock farming *référentiel* that the organic commodity system was attempting to establish. It then became necessary to analyze the conventional system as an interdependent system of links between partners stretching all the way to consumers rather than as a traditional production system (Coopman et al. 2001). The next two sections describe the confrontation between the organic and the conventional *référentiels*, the hypothesis being that the observed incompatibility in practices stemmed from this cognitive level.

The conventional *référentiel* of "lean and tender"

A *référentiel* articulates, within an overarching structure of meaning, several levels of perception of the world that can be distinguished from one another even though they have obvious connections with each other. These different levels of perception consist of norms, beliefs, knowledge, and narratives (Muller 1995, p. 158). In proposing the commodity system *référentiel* concept, we want to insist first of all on the shared and connected natures of the levels of perception. The shared nature of the *référentiel* is revealed through its translation (in the latourian sense) through the commodity system into the "desired product," a product that makes it possible to rally all of the players around a common principle of action that will keep the system intact, despite the heterogeneity and specialization of its agents. We have described this translation process in relation to the Belgian beef market in detail elsewhere (Stassart 2005, pp. 31–37). The translation culminated in a principle of action that defined the product according to two simple criteria, namely, leanness and tenderness.[2]

Constructing the articulation between the different players (stock farmers, butchers, retailers consumers) within the *référentiel*[3] then involves a process of

[2] The lean-and-tender norm that applies to Belgian beef is diametrically opposed to, for example, the marbling criterion that prevails in certain markets in English-speaking countries.

[3] Such analyses require some temporal depth at the intersection of discourse and practices; data were collected for the period running from 1997 to 2007 (Stassart, 2003; Stassart et al. 2007; Stassart et al. in press).

knowledge generation and production of norms surrounding the "lean and tender" principle of action that indicate simultaneously what the world is and how it should be. So, starting with the development of veterinary knowledge about systematic caesarean sections, the development of a complex socio-cognitive system (including elements of selection/insemination/competition—that is, of the realities of genetics and animal husbandry) around the mainstreaming of the double-muscled character of the Belgian Blue,[4] as well as the development of *savoir-faire* around an exclusively "anatomical" way of cutting the carcass, the Belgian meat system managed to redefine the European carcass grading standard. It added the *S* (for *Superculard*, or super double-muscled) category to the European E-U-R-O-P[5] standards, which thus became SEUROP. This redefined the old carcass-grading standard, in which "E" was formerly the top category. Through the development of a shared cognitive system (among veterinarians, stock farmers, and butchers), a recodification operation thus took place, thanks to which the breed's double-muscled character, the caesarean section, and new Belgian cutting system became intelligible and acquired meaning. The recodification operation then defined the "S" (super double-muscled) objective and standardized it through the European classification grid. This codification/recodification operation (Muller 1995, p. 158) and the *S* standard that it produced thus connected the various components of the commodity chain. This mediation process between the generation of knowledge and production of standards existed throughout the commodity system and connected its components: culinary categories connecting butchers' know-how and consumers' competency (Van der Aa 1992), cutting schemes connecting the stock farmers' and butchers' respective knowledge (Stassart 2005, pp. 31–33, Stassart and Whatmore 2003), and linear grading connecting the respective knowledge of the insemination centers and stock farmers (Coopman et al. 2001).

In defining the lean-and-tender *référentiel* in this way, the stock farmers, veterinarians, and butchers asserted their vision of the world and the clear advantages that each was supposed to obtain as a consequence. The ideal of the *S* grade guaranteed lean meat for consumers worried about their cholesterol and offered the stock farmers incomparable carcass yields (Hanset 1996). This beautiful picture was not without its clouds, however. As a *référentiel* comes into common use, it becomes in part implicit, for it works by making some elements visible and erasing others. The systematic C-section, which was so prevalent in the production area, was invisible at the point of consumption. Indeed, consumers were largely unaware of the practice. And if the question was occasionally raised, it was translated very reassuringly into the terms of animal comfort, "…since the cow resumes chewing her cud peacefully with the operation barely behind her" (Hanset 2002). The systematic character of the C-section, however, does indeed challenge the limits of technical intervention in animal husbandry (Lips et al. 2001). The same goes for current research extensions into the genome, where efforts now emphasize production of calves in which the double-muscle gene will not be expressed until after birth (Grobet et al. 2003). This implicit dimension shows how, in producing and codifying the common sense that surrounds the product, the *référentiel* also produces spokespeople and power.

Such processes of speaking up and erasure express, in reality, an erasing ordering mode (Law 1994, pp. 112–114) that, through its narrative dimension and the guiding images that it produces, enables the *référentiel* to project a system's players into the future. Such colorful expressions as preferring massive "horse rumps," or the need for "keeping the beasts up to weight," "closing the zipper" (surgical closure after the Caesarian operation), getting steaks out of the animal "up to the horns,"

[4] In addition to the dominant double-muscled Belgium Blue breed, which accounted for 90.5% of the meat breed in Belgium, there is a marginal Belgian Blue mixed breed with a normal mixed conformation, the purpose of which is to preserve the breed's originally mixed (beef and dairy) production capacity. This marginal branch accounted for 14% of the Belgian Blue breed in 2002 and is decreasing (*Service Public Fédéral Economie, P. M. E., Classes Moyennes et Energie*, 2003).

[5] Regulation (EEC) 1208/81 defined a EUROP carcass classification based on the quality of the carcass form, which in turn was based on the development of muscle mass profiles. The grades went from E (most compliant carcasses) to P (least compliant carcasses). Regulation 1026/91 added the S grade of carcasses for "super double-muscled Belgian Blue" carcasses. As a result, EUROP became SEUROP with carcasses in the (super) double-muscled Belgian Blue S grade at the top of the hierarchy.

and offering "meat of irreproachable quality" that can be "cut with a fork" are remarkable implicit vectors of norms and knowledge. So, while the image of "steak up to the horns" refers to the extraordinary increase possible through the Belgian Blue breed in the quantity of prime and second-choice cuts (especially in the forequarters where prime and second-choice cuts have increased by +55% [Sonnet 1982]), the expression also conveys faith in technical modernization as a source of nearly limitless progress in carcass yield. These image-ideas immediately make sense, without requiring a long discursive detour, because they point in stylized fashion to the *référentiel*'s key elements. Their strength lies in their materiality. The weekly trade papers feature competition photos cropped to display especially the "naked" hindquarters of these extraordinarily stylized animals, their "horse rumps" shaved closely for maximum display of muscle mass. The image-idea of the *S* carcass and the endless series of curvaceous carcasses hanging from hooks in the refrigerated chambers of Belgium's slaughterhouses are thrown insistently in the farmer's face, to the point where this ideal becomes almost an obsession. How, then, can the two *référentiel*s coexist? What chance has the embryonic organic *référentiel* got in comparison to the mighty lean-and-tender *référentiel*, which draws such strength from its system of shared implicit and articulated knowledge?

The organic *référentiel* versus the conventional *référentiel*: deficiency and irreversibility

In order to describe the emergent organic *référentiel*, we examined the degree to which the practices and discourses of local players in the organic sector corresponded to regulations originating with the International Federation Organic Agriculture Movements (IFOAM) and European government. We used the distinction proposed by Friedland (2005, pp. 31–33) to distinguish between the national sectoral scale (the commodity system) and the chain of exchanges or "food chain" that goes from stable to table and in which the players are linked by contracts and other stabilized forms of market relationships. The food chain that we studied accounts for 55% of the Belgian organic beef market and is managed by a distributor and an organic stock farmers' cooperative of 20 stock farmers.[6]

IFOAM's declaration of principles states, "The main aims of organic agriculture are…to work compatibly with natural cycles and living systems through the soil, plants, and animals in the entire production system; to recognize the wider social and ecological impact of and within production and processing systems" (IFOAM 2005). This declaration extends from IFOAM's strong belief in the equilibrium of living systems and natural cycles. The European Regulation on livestock production stipulates, "Livestock production must contribute to the equilibrium of agricultural production systems…By utilising renewable natural resources…the cropping/stockfarming system and the pasturage systems allow soil fertility to be maintained and improved in the long term and contributes to the development of sustainable agriculture…Organic stockfarming is a land-related activity…and the number of animals per unit of area must be limited to ensure integrated management of livestock and crop production…" (Council Regulation (EC) No 1804/1999 of 19 July 1999). Belgian organic regulations ban systematic caesarean sections but they do not ban the Belgian Blue breed. What are termed "traditional" breeds are encouraged: "The use of breeds in which calving difficulties require caesarean sections must be avoided: The caesarean section is allowed only to save an animal's life or to avoid its suffering… This rule is deemed to be observed for the beef herds of a given farm if the number of natural births five years after the start of conversion is and remains greater

[6] European Union Organic Regulation has provoked in Belgium an important move to organic conversion among beef stock farmers from 1992 to 2000. They represent today 85% of the converted area to organic production in Belgium. Nevertheless, only a small part, about 15% of the organic stock farmers "finished" their cattle to market them on the organic market. The remaining 85% organic stock farmers sell their cattle on the conventional market that finish the cattle in traditional feed-lot. This is only possible because the EU provides subsidies for organic stock farming but does not require that these cattle remain on the organic market. Moreover, the organic beef market structure is oligopolistic: one of the main Belgium retailers has about 55% of the market share and his food chain is furnished by only 20 Belgium beef stock farmers. The analysis of the organic beef commodity system at national level food chain "*référentiel*" therefore rests on the data collected on the 20 farmers who sell to the organic market.

than 80% of the year's births…" (Ministerial Order (*arrêté*) of 30 October 1998). The ban on caesarean sections should exclude the trend for double-muscled animals, and ultimately exclude the double-muscled Belgian Blue. The breed shift is occurring primarily in favor of a close French breed, the Limousin, in which natural calving was maintained as a selection criterion. Moreover, this introduction is supported by the principal distributor of organic beef because it is an effective vector of differentiation on a market where the Belgian Blue has a de facto monopoly.

This strategy of breed shift is not merely adaptive, however. Indeed, the grazing obligation and limit on the use of feed concentrates seem incompatible with the actual adoption of the organic model. In the organic *référentiel*, the grazing obligation and limit on concentrates in feed extend from the belief in agricultural equilibrium that is described in the principles that IFOAM's Assembly General adopted in September 2005. IFOAM states its support of:

- a principle of the indivisibility between humans and non-humans or a "*principle of health:* organic *Agriculture* should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible…"
- a principle of ecological equilibrium between crops and livestock or a "*principle of ecology:* where organic Agriculture should be based on living ecological systems and cycles, work with them, emulate them and help sustain them."
- a principle of equilibrium between individuals and the herd or "*principle of fairness:* insists that animals should be provided with the conditions and opportunities of life that accord with their physiology, natural behavior and well-being."

Giving up concentrates for grazing and hay is a requirement that runs counter to the competency in "fattening" that many recently converted organic stock farmers acquired in conventional stock farming, with its practice of early finishing with high-grain rations in a confined space. As a consequence there is a cognitive deficit for the organic stock farmers, one that is difficult to overcome because doing so would require unlearning first of all. How can a farmer give up what accounts for the technical and economic efficiency of his or her production *and* the Belgian Blue breed reputation. Even if farmers gave up their productive systems and identities, the pasturing requirement nearly prohibits that organic stock farmers in the system would be able to achieve the lean-and-tender "S" grade performance levels despite the fact that the processors, distributors, and consumers are all clamoring for this grade. How does one choose to disregard what was the most important market indicator, the most significant piece of information on the farmer's slaughterhouse delivery slip? It becomes too costly to withstand being locked into the standard that is imposed by the S (double-muscle) grade at the top of the beef carcass-grading scheme.

Evolutionary economists define technological lock-in as part of the mechanism of path dependency through which the value of a technological choice (in this case, selection of the double-muscle gene) increases with the degree of its adoption (Cowan and Gunby 1996). Lock-ins typically occur because the coordination costs within a particular system decrease as it is more widely adopted and because technologies improve through use and so reduce the radical uncertainty that typically characterizes new commodity systems (beef farming in this case) (Stassart and Jamar forthcoming). As a result, once a firm or a food chain adopts a particular path, this path becomes easier to follow: self-reference, dependence and lock-in take root. Lock-in mechanism has been identified through examination of a series of historical micro-sequences and their effects on conserving resources, creating economies of scale, and accelerating the integration of new techniques (Ruttan 1997). Lock-ins occurred in the development of the railroad and coal in the nineteenth century; the automobile, roads, and gasoline in the 1960s, and nuclear power and electricity (in France) in the 1970s. Wilkinson (2006) describes the stalemates and impasses of the fisheries sector in a similar way.

The socio-technological lock-in of the lean-and-tender model in *S* grade ideal can be summed up briefly in this way: in 1956, a double-muscled bull was introduced into a Belgian selection center on the initiative of a small group of pragmatic Belgian breeders (Baret 2005). Belgium's butchers were immediately interested by the extraordinary yields of this muscle-bound type (25% more than ordinary yields) and developed their specific cutting system: the "anatomical cut" This new kind of cut in turn defined a "lean and tender" product norm, which resulted from the less fatty carcasses (50% less fat),

which was in turn linked to the double-muscled gene and the early age at which the penned young bulls were slaughtered. The Belgian Blue commodity system, coordinated by the new Belgian Blue herdbook, was founded in 1973 on the achievement of double-muscling. It expanded in the 1980s under the impetus of the movement to specialize in beef farming that was induced by the European institution of milk quotas. The path was finally sublimated by the systematic use of hormones for fattening purposes at the time (Stassart and Whatmore 2003). Meanwhile, other options with long-term potential were abandoned. These included the production of fatter and more mature cattle, and thus more flavorful meat; diversified cutting charts that played up the advantages of non-double-muscled carcasses (Thrift 2003); and, finally, selecting breed so as to eliminate caesarean sections (Coopman et al. 2001). But why were the lean-and-tender path and *S* grade ideal together established as the standard within the entire organic beef commodity system? Did not the threefold dimension of the grazing obligation (concerning pasturing, feed, and breed), with its intimations of assuring "natural" conditions of production, amount to an acute question that the consumer addressed to the food chain?

Determining the taste of "the conventional consumer" as defined by the conventional *référentiel* according only to two simple criteria, leanness and tenderness, is to constitute a consumer who is blind to the consequences of these criteria on production. The result is the figure of a consumer by default, or a deskilled consumer (Jaffe and Gertler 2006). The idea of "flawless meat" or disembodied meat (that has no reference to real animals) that can be cut without a knife is a key qualifier for the lean-and-tender credentials. It describes meat that is uniform, rather pale (certainly not too red) in color, free from all fatty spots or marbling, and trimmed of all fascia and other neural tissue. This is a qualification by default, which refers to the image of "perfect food" and accommodates contemporary fat-averse dietetic standards quite well. The figure of the organic consumer, who was initially constituted through interpersonal relationship with, and thought to trust in, the producer, is poorly armed (or "equipped") to assess the relative merits of lean and tender meat. The matter of flavor, which is emblematic among organic consumers because it is seen as an expression of the product's naturalness, remains unstable, or poorly secured, in organic beef circuits. Seen from a normative point of view, interpretation of the fact that consumers perceive organic foods to be more savory can vary (Guthman 2002). What is more, while consumers commonly believe that organic products should be tastier than conventional ones, the reality is far more controversial. As a rule, organic products do poorly in taste tests (Bourn and Prescott 2002). While the difference in taste between an organic and conventional carrot may be relatively straightforward, appreciation of organic beef faces the complex difficulties of the qualification of meat products in general and beef in particular (Stassart 2003). If appreciation of the specific taste of organic beef can be developed, it will be fragile and likely related first to other criteria that are relevant to consumers (such as grazing and animal welfare) by more competent consumers who can appreciate this difference.

In addition to cognitive and normative deficits, the organic consumer's competence is further hobbled by the absence of a narrative, complete with guiding images about organic stock farming and eating organic meat, that would enable the necessary cognitive matrices to take shape. The exception that confirms the rule is the world of biodynamics, which has managed to create a story around the cropping-herding system in which the animal plays a key role, connecting pasture quality, herd life, and product quality (especially in relation to dairy products). However, this tale, in which the animal is headed for the slaughterhouse only after a long and productive career, is rarely heard outside of the world of biodynamics (McMahon 2005). Beyond steak "up to the horns," what story creates a place for the Belgian organic stock farmer of Limousin or Angus cattle? Into what story can the stock farmer and consumer be jointly projected? How does one translate all the work upbuilding the relationship between the stock farmer and the herd into qualities esteemed in the organic marketplace? These missing tales correspond to deep incomprehension among Belgium's organic stock farmers concerning the potential of other *référentiels* like those of their organic neighbors in France, which Belgian farmers consider to border on amateurism. The phenomenon of irreversibility thus is not limited to the techno-normative lock-in of the super double-muscled (*S* grade) ideal. The lock-in is also narrative and

concerns the story in which knowledges are located and circulate. The effect of the lock in is that the organic consumer has trouble establishing a product-specific difference because the food chain itself is poorly equipped with the knowledges necessary to qualify such products. We are thus indeed confronted with a *référentiel* that is plagued by cognitive deficiencies in the broad sense and so must borrow some resources from the lean and tender model. Such was the case of the Salers (a hardier French breed) stock farmers who decided to cross their herds with a double-muscled Belgian Blue bull to meet butchers or consumers' demands. The conventional *référentiel*'s cognitive arsenal is not only incompatible with that of the organic *référentiel*, but, ultimately, (1) the lock-ins that are set up inhibit consideration of other potential links between product and production patterns; (2) this "unthinkability" prevents the development of an alternative cognitive system (an alternative *référentiel*) in the broad sense as well as its strictly narrative dimension; and (3) the nature of this system and these lock-ins are what ultimately prevent the *référentiel*'s transformation and reinforce its implicit dimensions, i.e., the incompatibility between the twin expectations of leanness and flavor for the consumer and the incompatibility between the double-muscled young bull fattening scheme and range fattening for the organic farmer.

Conclusions

We have shown that the issue of conventionalization in organic agriculture is both an empirical and theoretical question. In the case of Belgian beef farming, it is a question of the coexistence of broad knowledge systems. These systems are cognitive matrices or *référentiels*, the stability of which depends on the norms and stories that they generate. As such, they appear to be akin to John Law's concept of ordering modes. The self-referencing or lock-in processes that occur at the interfaces within the beef commodity system lead to incompatibilities between cognitive systems and consequently act to the exclusion of emerging or alternative systems. The case of Belgian beef farming and the gaps and/or contestation that is observed at the boundaries between beef commodity systems then raises the question of the boundaries that would allow alternative knowledge systems to emerge. The vulnerability of such notions as the grazing obligation, addition of feed concentrates, and the "preventive/curative" nature of care is what fuels the cognitive struggle between the conventional and organic beef cattle systems in Belgium.

At the end of the day, might this not be a somewhat surrealistic Belgian snafu, in which the double-muscle gene, the popular plate of steak and Belgian fries, and caesarean sections come together? Without letting ourselves be locked up in the usual description of the competitive interactions of the conventional model's agents (Godard and Hubert 2002), we posit that battles over cognitive frameworks are found throughout food systems. Several examples come readily to mind. First, it appears that the lean-and-tender *référentiel* has spread from the Belgian Blue to other typical Belgian pig and sheep breeds, namely, the Piétrain (Stass 2007) and Belgian Texel. Second, observations and analyses in the organic potato sector lead us to believe that the Bintje *référentiel* plays the same reference role for potatoes as the Belgian Blue does for meat, preventing in particular the emergence of a new *référentiel* based on hardier varieties (Smit et al. 2006). Similarly, but on an even wider scale, we can wonder about the opacity effects of the global dairy *référentiel* that holds sway, notably through the hegemony of the Holstein model and its implicit production dimensions (Landais 1996; Micoud 2003), as well as the model's other consequences, such as the possible link with the increasing prevalence of allergies to cow's milk in young children (Riedler et al. 2001).

More broadly, the very specific case of the Belgian meat sector shows how difficult it is to build alternative agrifood production-consumption chains. The problem is not only one of incompatibility between systems, but also that of the destruction of alternative pathways due to powerful cognitive lock-in mechanisms that are hidden in the dominant system. This analysis thus led us to open up a coordinated research site involving agricultural science, technical research, and collective action. Our aims as researchers are to question our ability to overcome these lock-ins and self-referencing phenomena, which have managed to close so many doors that could potentially lead to other paths of agricultural development/change. This potential can develop only if emerging knowledge systems are equipped

with the necessary resources to enable them to overcome stalemates.

We could have told you another story here about the dilution of organic beef systems in Belgium, in terms of farmers not "living up to" organic standards. However, the reality is more complex. We are not saying that actors in the Belgian organic food chain are simply being dishonest when they move their production systems toward the Blue Belgian referential. We are also not arguing that the solution to their problems of knowledge lock-in is simply stronger regulation. Instead of judging organic actors in terms of compliance or non-compliance, creating an alternative agrifood commodity system depends also on designing research intervention projects that implement mutual learning approaches between all parties in the food chain.

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References

Aertsens, J., & Van Huylenbroeck, G. (2007). Characteristics of the Belgium organic beef sector. In P. Stassart, M. Mormont, D. Jamar, D. Stilmant, J. Aerstens, & G. Van Huylenbroeck (Eds.), *How can organic farming contribute to sustainable production and consumption patterns* (pp. 15–21). Brussel: Belgian Science Policy.

Baret, P. (2005). *Le Blanc Bleu Belge: Un paradoxe génétique* (p. 3). Louvain La Neuve.

Benford, R. D., & Snow, D. A. (2000). Framing process and social movements: An overview and assessment. *Annual Review of Sociology, 26*, 611–639.

Best, H. (2007). Organic agriculture and the conventionalization hypothesis: A case study from West Germany. *Agriculture and Human Values, 25*(1), 95–106.

Bourn, D., & Prescott, J. (2002). Critical reviews. *Food Science and Nutrition, 42*, 1–34.

Buck, D., Getz, C., & Guthman, J. (1997). From farm to table: The organic vegetable commodity chain of Northern California. *Sociologia Ruralis, 37*(1), 3–20.

Callon, M. (1986). Eléments pour une sociologie de la traduction. La domestication des coquilles Saint-Jacques et des marins-pêcheurs dans la baie de Saint-Brieuc. *L'Année sociologique, 36*, 169–208.

Campbell, H., & Liepins, R. (2001). Naming organics: Understanding organic standards in New Zealand as a discursive field. *Sociologia Ruralis, 41*(1), 21–39.

Coopman, F., Van Zeveren, A., & Peelman, L. (2001). Ontstaangeschiedenis van het Belgisch Witblauw Rundvee en de rol van genetica in de verdere ontwikkeling van dit ras. *Vlaams Diergeneesckundig Tijdschrift, 70*, 88–103.

Cowan, R., & Gunby, P. (1996). Sprayed to death: Path dependence, lock-in and pest control strategies. *Economic Journal, 106*(436), 521–542.

Darnhofer, I. (2006). *Organic farming between professionalisation and conventionalisation. The need for more discerning view on farm practices*. Odense: European Joint Organic Congress. http://orgprints.org/7390/. Accessed 24 June 2008.

de Bonneval, L. (1993). *Systèmes agraires, systèmes de production: vocabulaire français-anglais avec index anglais*. Paris: INRA Éditions.

Fouilleux, E. (2003). *La politique agricole commune et ses réformes; une politique à l'épreuve de la globalisation*. Paris: L'Harmattan.

Friedland, B. (2005). Commodity systems: Forward to comparative analysis. In N. Fold, & B. Pritchard (Eds.), *Cross-continental food chains* (pp. 25–34). London: Taylor & Francis Group.

Godard, O., & Hubert, B. (2002). *Le développement durable et la Recherche Scientifique à L'INRA*. Paris: INRA.

Goodman, D., & DuPuis, E. M. (2002). Knowing food and growing food: Beyond the production-consumption debate in the sociology of agriculture. *Sociologia Ruralis, 42*(1), 5–22.

Goodman, D., Sorj, B., & Wilkinson, J. (1987). *From farming to biotechnology*. Oxford: Basil Blackwell.

Grobet, L., Pirottin, D., Farnir, F., Poncelent, D., Royo, L. J., Brouwers, B., Christians, E., Desmecht, D., Coignoul, F., Kahn, R., & Georges, M. (2003). Modulating skeletal muscle mass by postnatal muscle-specific inactivation of the myostatin gene. *Genesis, 35*, 227–238.

Guthman, J. (2002). Commodified meanings, meaningful commodities: Re-thinking production-consumption links through the organic system of provision. *Sociologia Ruralis, 42*(4), 295–311.

Guthman, J. (2004a). The trouble with 'organic lite' in California: A rejoinder to the conventionalisation. *Sociologia Ruralis, 44*(3), 301–316.

Guthman, J. (2004b). *Agrarian dreams: The paradox of organic farming in California*. Berkeley: University of California Press.

Hall, A., & Mogyorody, V. (2001). Organic farmers in Ontario: An examination of the conventionalization argument. *Sociologia Ruralis, 41*(4), 399–322.

Hanset, R. (1996). Le Blanc-Bleu Belge face à la nouvelle donne économique. *Les Elevages Belges, 3*, 12–21.

Hanset, R. (2002). Le Blanc Bleu Belge et la Césarienne. *Publication Herd-Book BBB, 3*, 1–27.

Heclo, H. (1978). Issue networks and the executive establishment. In A. King (Ed.), *The new American political system*. Washington DC: American Entreprise Institute.

IFOAM (2005). *The principles of organic agriculture*. http://www.ifoam.org/about_ifoam/principles/index.html. Accessed 18 November 2007.

Jaffe, J., & Gertler, M. (2006). Victual vicissitudes: Consumer deskilling and the (gendered) transformation of food systems. *Agriculture and Human Value, 23*(2), 143–162.

Jamar, D., Decruyvenaere, V., Stassart, P., & Stilmant, D. (2006). Reconversion to organic farming, between organic rules and agro-food chain referential: How to fit out the organic fattening referential? In C. B. Andreasen, L. Elsgaard, S. Søndergaard, & G. Hansen (Eds.), *Proceeding of European Joint Organic Congress*, Odense, May 30–31, Organic Eprint: http://www.orgprints.org.

Jobert, B., & Muller, P. (1987). *L'état en action, politique publiques et corporatismes*, Paris: PUF.

Kaltoft, P. (1999). Values about nature in organic farming "practice and knowledge". *Sociologia Ruralis, 39*(1), 39–53.

Landais, E. (1996). Elevage bovin et développement durable. *Courier de l'environnement, 29*, 59–72.

Law, J. (1994). *Organizing modernity*. Oxford: B. Blackwell.

Lips, D., De Tavernier, J., Decuypere, E., & Van Outryve, J. (2001). Ethical objections to cesareans: Implication on the future of the Belgian White Blue. In M. Pasquali (Ed.), *EurSafe 2001, food safety, food quality, food ethics* (pp. 291–294). The Third Congress of the European Society for Agricultural and Food Ethics, 3–5 October, Florence, Italy, Preprints.

Lockie, S., & Halpin, D. (2005). The 'Conventionalisation' thesis reconsidered: Structural and ideological transformation of Australian organic agriculture. *Sociologia Ruralis, 45*(4), 284–307.

Lockie, S., Lyons, K., & Lawrence, G. (2000). Constructing green foods: Corporate capital, risk, organic farming in Australia and New Zealand. *Agriculture and Human Values, 17*, 315–322.

Majone, G. (1989). *Evidence, argument and persuasion in the policy process*. New Haven: Yale University Press.

McMahon, N. (2005). Biodynamic farmers in Ireland. Transforming society through purity, solitude and bearing witness? *Sociologia Ruralis, 45*(1–2), 98–114.

Micoud, A. (2003). Ces bonnes vaches aux yeux si doux. In F. Dubost, & B. Lizet (Eds.), *Bienfaisante nature* (pp. 217–236). Paris: Le Seuil.

Mooney, P. H., & Hunt, S. A. (1996). A Repertoire Of Interpretations: Master frames and ideological continuity in U.S. Agrarian mobilization. *The Sociological Quarterly, 37*(1), 177–197.

Morgan, K., & Murdoch, J. (2000). Organic vs. conventional agriculture: Knowledge, power and innovation in the food chain. *Geoforum, 31*(2), 159–173.

Muller, P. (1989). *Airbus, l'ambition européenne. Logique d'Etat, logique de marché*. Paris: L'Harmattan.

Muller, P. (1995). Les politiques publiques comme construction d'un rapport au monde. In A. Faure, G. Pollet, & P. Warin (Eds.), *La construction du sens dans les politiques publiques. Débat autour de la notion de référentiel* (pp. 153–179). Paris: L'Harmattan.

Muller, P. (2000). L'analyse cognitive des politiques publiques: Vers une sociologie politique de l'action publique. *Revue Française de Sciences Politique, 2*(50), 189–209.

Mutersbaugh, T. (2005). Fighting standards with standards: Harmonization and social accountability in certified Agrofood networks. *Environment and Planning A, 37*(11), 2033–2051.

Riedler, J., Braun-Fahrländer, C., Eder, W., Schreuer, M., Waser, M., Maisch, S., & et al. (2001). Exposure to farming in early life and development of asthma and allergy: A cross-sectional survey. *The Lancet, 358*, 1129–1133.

Ruttan, V. W. (1997). Induced innovation, evolutionary theory and path dependence: Sources of technical change. *The Economic Journal, 107*, 1520–1529.

Sabatier, P. A., & Jenkins-Smith, H. (1993). *Policy change and learning and advocacy coalition approach*. Boulder: Westview Press.

Smit, A., Driessen, P. P. J., & Glasbergen, P. (2006). Constraints on the conversion to sustainable production: The case of the Dutch potato chain. *Business Strategy and the Environment*. http://www3.interscience.wiley.com/cgi-bin/abstract/112773392/ABSTRACT?CRETRY=1&SRETRY=0. Accessed 17 November 2007.

Sonnet, R. (1982). Analytical study on retail cuts form the double muscled animal. In J. W. B. King & F. Ménissier (Eds.), *Muscle hypertrophy of genetic origin and its use to improve beef production* (pp. 565–574). The Hague: Martinus Nijhoff

Stass, S. (2007). *«Tant que Piétrains et sélectionneur collaborent»*. Departement of Environmental Sciences and Management. Arlon, Université de Liège. DEA Environmental Sciences and Management, 152 p.

Stassart, P. (2003). *Produit Fermier: Entre qualification et identité*. Brussels: Presses Interuniversitaires Européennes Peter Lang.

Stassart, P. (2005). Construction d'un marché alternatif de viande bovine fermière. *Economie Rurale* (286–287), 28–43.

Stassart, P., & Jamar, D. (forthcoming). Conventional dynamics: Missing protocol and legitimacy systems, relationship between organic stock farmers and retailers in transition towards sustainability. *Sociologia Ruralis*.

Stassart, P., Mormont, M., & Jamar, D. (in press). Recherche Intervention pour une Transistion vers le Développement Durable. *Economie Rurale, 308*.

Stassart, P., Mormont, M., Jamar, D., Stilmant, D., Aerstens, J., & Van Huylenbroeock, G. (2007). *How can organic farming contribute to sustainable production and consumption patterns* (p. 182). Brussel: Belgian Science Policy.

Stassart, P., & Whatmore, S. (2003). Metabolizing risk: Food scares and the un/re-making of Belgian beef. *Environment and Planning A, 35*(3), 449–462.

Tovey, H. (1997). Food, environmentalism and rural sociology: On the organic farming movement in Ireland. *Sociologia Ruralis, 37*(1), 21–37.

Thrift, N. (2003). Qualification de l'origine des viandes bovines selon les manières de produire. Dissertation in

Zootechnic Sciences, Departement Animal Sciences. INAP-G, Paris, 442 p.

Van der Aa, W. (1992). *Manuel du boucher charcutier*. Deurne: MIM.

Vos, T. (2000). Visions of the middle landscape: Organic farming and the politics of nature. *Agriculture and Human Values, 17*(3), 245–256.

Whatmore, S., & Thorne, L. (1997). Nourishing networks: Alternative geographies of food. In D. Goodman and M. Watts (Eds.), *Globalising food* (pp. 287–304). London: Routledge.

Wilkinson, J. (2006). Fish: A global value chain driven onto the rocks. *Sociologia Ruralis, 46*(2), 139–153.