

# Knowledge, Food and Place. A Way of Producing, a Way of Knowing

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## Abstract

This article examines the dynamics of knowledge in the valorisation of local food, drawing on the results from the CORASON project (A 'cognitive approach to rural sustainable development the dynamics of expert and lay knowledge'). It is based on the analysis of several in-depth case studies on food relocalisation carried out in 10 European countries (Ireland, Scotland, Sweden, Germany, Norway, Poland, Italy, Portugal, Spain and Greece). In the different fields of rural studies (rural sociology, geography, anthropology) there is currently a wide debate about the relocalisation of food production and consumption. Born out of a critique of the 'conventionalisation' of organic agriculture, attention to local food has grown in recent years to assume the features of a new orthodoxy or paradigm that is now undergoing, as is suitable to any orthodoxy, deep and critical scrutiny. Many points are discussed, from the definition of 'local' to its transformative role in the current agri-food system and rural community, whether relocalisation of food is a sustainable strategy and whether its character is radical or merely reformist. The perspective adopted here, which is relatively neglected in the literature, derives from the overall focus of CORASON on the role of knowledge in rural development. We look at the valorisation of local food as a knowledge-based practice that mobilises the various forms of knowledge embodied in both rural and non-rural actors. Following knowledge in the valorisation of food leads us to differentiate between patterns of food relocalisation across Europe and to analyse the interplay among knowledge forms and actors in the contested construction of the local food project.

## Introduction

In the different fields of rural studies (rural sociology, geography, anthropology) there is currently a wide debate on the relocalisation of food production and consumption. Born out of a critique of the 'conventionalisation' of organic agriculture (Buck *et al.* 1997; Lockie and Kitto 2000; Guthman 2004; Holt and Amilien 2007), attention to local food has grown in recent years to assume the features of a new orthodoxy or paradigm that is undergoing, as is suitable for any orthodoxy, deep and

critical scrutiny (Goodman 2003; Hinrichs 2003; Kirwan 2004; Holloway and Kneafsey 2004; DuPuis and Goodman 2005; Morgan *et al.* 2006; Day and Truninger 2007; Holloway *et al.* 2007). The discussion starts from the definition of 'local' and finishes with its transformative role in the current agri-food system and rural community, whether relocalisation is a sustainable strategy or not, and whether its character is radical or merely reformist.

Goodman (2003) and Holloway *et al.* (2007) distinguish between a North American (that is, a USA/Canadian) and a European perspective on local food. The former understands local food to be driven by a political agenda that opposes the organisation of the industrial agri-food system and is directed at establishing an alternative food economy based on the principles of social justice and environmental sustainability. The European perspective is considered to be more reformist in nature, aiming mainly at incorporating into economic development small rural farms and businesses and marginal agricultural economies.

Adopting a post-structuralist approach and actor-network theory (ANT) (Latour 1987; Callon 1988; Law and Hassard 1999; Murdoch 2000), the recent literature incorporates consumers as agents in the construction of local food projects (Goodman 2004; Holloway and Kneafsey 2004; Day and Truninger 2007; Watts *et al.* 2007). Localness and food quality as well as power relations are seen as being constructed by the many actors and actants in the food network. Among those who try to give a more complex and relational account of food production and consumption, Holloway *et al.* (2007) propose a methodological framework that allows us to go beyond a simplified and dichotomised representation of local food initiatives as 'conventional' or 'alternative', and invites us to recognise 'the relational contingencies of what is regarded as alternative at any one time and in any one space' (Holloway *et al.* 2007, p. 5).

In the same vein, but adopting a political ecology approach, Qazi and Selfa (2005) stress the importance of regional agro-political discourses and agro-industrial history and find that the 'transformative capacity of alternative food networks is locally contingent, shaped by political ideologies and consumer acceptance of existing social constructions of agricultural systems' (Qazi and Selfa 2005, p. 46).

Relational and 'place' contingencies are at the core of our analysis of local food across Europe, which has, in addition, the purpose of bringing a new dimension into the debate. Approaching local food from the perspective of knowledge forms and dynamics, we aim to contribute to the exploration of the role of rural areas and rural actors in the construction of the knowledge society.

The empirical basis of the article derives from fieldwork carried out by national teams in 10 European countries as part of the CORASON (A cognitive approach to rural sustainable development: the dynamics of expert and lay knowledge) work package on the dynamics of knowledge in the valorisation of local food. The fieldwork was structured around a common approach through provision of an input paper (Fonte 2006b) that constructed a conceptual framework based on a relational understanding of the producer-consumer relationship.

Each project team was invited to explore two typologies of local food networks, differentiated as local production 'for local consumers' and 'for distant consumers'. In the first category 'local' was understood as social proximity aiming at reconnecting producers and consumers in the same place. In the second 'local' referred to the

special conditions of food production and the valorisation of its origin in distant markets.

For each category we agreed to explore the characteristics of the network (including the actors and actants involved, the objectives and the strategies pursued) and to identify the forms of knowledge mobilised by the rural actors as well as the way they changed and interacted over time. We were particularly interested in differentiating 'expert' (understood as scientific and managerial, see Tovey and Mooney 2007) and local (lay, traditional, tacit, contextual) forms of knowledge, giving special attention to their status and to the asymmetries of power in their interplay.

Of the many examples selected in each area, one was analysed more deeply by the authors and considered to be more representative than the rest of the local food project of the area. This article is mostly based on the findings of these more representative case studies. They show that the long-term agri-food history and the context in which food relocalisation initiatives are carried out varies across regions in Europe and influences what is meant by and what is pursued in rural sustainable development. Furthermore, they show that food relocalisation is an exception to the trend towards homogenisation in agriculture and agri-food techniques and implies that local knowledge needs to be re-evaluated as an important resource in the management of agriculture and natural ecosystems.

### Food, place and the agri-food context

We can identify a roughly dual perspective on local food networks. One perspective takes into account grass roots initiatives for relocalising the food system that aim at rebuilding the link among producers and consumers in an 'interpersonal world of production' (Morgan *et al.* 2006). We will call this the reconnection perspective.

Since the 1990s, especially in northern Europe and the USA, many initiatives led by social movements representing groups of producers and consumers or by local institutions arose with the objective of reappropriating food at the local level. Examples are community supported agriculture' (CSA), the farmers' markets movement (USA, UK, Ireland, Scotland), local food-buying groups, farm direct selling, city food circles (Hendrickson and Heffernan 2002) or food policy councils (Friedmann 2007). This model of food relocalisation often develops in a context of longstanding export-oriented agriculture and the loss of food culture, where food is provided only by big supermarkets and there is no outlet for local agricultural production (a 'placeless foodscape' according to Morgan *et al.* [2006], or 'food deserts', according to Wrigley [2002] and Reynolds [2005]).

The second perspective repositions local food production in relation to values associated with territory, tradition and pre-industrial production practices. The classic reference here is the range of regional speciality products protected by their designation of origin in Europe, but those are only one part of a much bigger and diffused universe that comprises various forms of certified and not-certified local food, rooted in a pre-industrial tradition that was marginalised but never became completely extinct. We call this the 'origin of food' perspective. In this perspective the initial economic context is different. The territories concerned, like the Mediterranean countries, were latecomers to industrial development and never fully completed their 'great

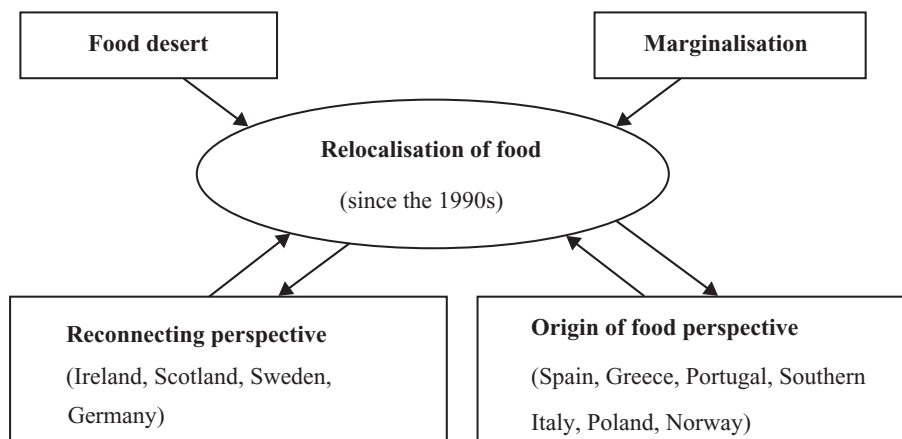


Figure 1: *Models of food relocalisation*

transitions'. Rather, they have passed through a process of economic and social marginalisation (marked by depopulation) that they are now trying to reverse through strategies of territorial rural development in which traditional agricultural techniques and products are recovered and valorised.

Our case studies confirm the existence and character of this dual perspective. The tendency towards relocalisation of food is quite clearly stated, pervasive and evident in policy guidelines at European, national and regional levels, as well as in producer and citizen-consumer initiatives. But the strategies through which food relocalisation is pursued are different. Figure 1 summarises the two different patterns extrapolated from the analysis of the case studies: the reconnection perspective, analysed in case studies from Ireland, Scotland, Sweden and Germany; and the origin of food perspective, analysed not only in case studies from the Mediterranean countries (Greece, Spain, Portugal, Italy) but also from Norway and Poland, agri-food realities which are characterised by the persistence of small farms and strong local food cultures.

The agri-food contexts and the sustainability discourse of the two perspectives are analysed in the next paragraphs.

### **The reconnection perspective: from 'food deserts' to sustainable rural communities**

The reconnection perspective supports food that is produced, retailed and consumed in a specific area, appealing primarily to social justifications (as a way of empowering and revitalising local communities) and environmental justifications (as a way of reducing pollution caused by transporting goods). Local food initiatives are promoted in opposition to what are perceived to be the disempowering social and economic effects of globalisation. Reducing the physical distance between producers and consumers is thought to revitalise rural communities, benefiting local farmers on the one side and consumer and environmental health on the other.

The context in which the relocalisation movement originates is what, in a very effective image, has been called a 'food desert':<sup>2</sup>

Are you living in a food desert? You do if ... you live in an area where healthy food is either non-existent or too expensive. This is likely to be the case if your only 'local' food shopping option is a supermarket, and you have no good small independent local shops, farmers' markets or box schemes serving your area. (Reynolds 2005)

While in the 1970s organic food was seen as the main alternative to conventional food, since the 1990s dissatisfaction with organic agriculture and organic certification has grown for two reasons. Firstly, people are dissatisfied with the so-called 'conventionalisation' of commercial practices and the growing involvement of multinational retailing industries in the organic market (Buck *et al.* 1997; Guthman, 2004; Blythman, 2005). Secondly, certification is seen as encouraging non-local food consumption, raising costs for producers and prices for local consumers (Tovey 2006). Organic products are increasingly 'aimed specifically at consumers with a high disposable income. These products, through distance travelling and plastic wrapping, displace part of the organic environmental discourse' (Moore 2004, p. 5).

Out of this critique of organic agriculture originated a new 'movement' for relocalising food. It may be considered a 'post-organic' movement focusing on local, chemical-free food sold directly to the consumer (Moore 2004). The target of this movement is not only agriculture but the whole supply chain, especially the distribution system. It aims to extend sustainability discourse not only to include chemical-free agriculture but also transformation, packaging, transport of food and social relations.

The movement for relocalisation of food is linked to civic/environmental and domestic conventions (Boltanski and Thévenot 1991). Local food is seen as a way to both protect the environment and respatialise and resocialise food, establishing direct contact between farmers and consumers and generating a link of trust and reciprocal benefits between them. The way local food is exchanged is believed to be important for the social life and local identity of the community.

Four case studies offer empirical evidence on which to ground the analysis of this model in our research: the Cahir Farmers' Market in Ireland, the Skye and Lochalsh Horticultural Development Association (SLHDA) in Scotland, the Eldrimner<sup>3</sup> initiative in Sweden and the Netzwerk Vorpommern in Germany. They are briefly described in Table 1.

The research areas in which the case studies are based in Ireland, Scotland, Sweden and Germany are characterised by an export-oriented agriculture, food provision organised by large supermarkets and the lack of a strong local food culture.

Agri-food development in Tipperary (Ireland) belongs to the 'agro-industrial' model described by Marsden (2003). Since the colonial period beef and butter production have been organised as export industries. Farms are large by European standards (36 to 60 ha), and productivity-oriented. A local food culture is not at all diffused and most Irish people regard food as fuel:

[I]n Cahir, Clonmel and other rural towns: fairs and markets have largely disappeared, corner shops are decreasing, and food supply is dominated by the expansion of national and international retail chains which have systematically displaced (although not entirely removed) other food outlets. (Tovey 2006, p. 4)

The same model prevails on Skye (Dargan 2006). Scotland in general does not have a strong culinary tradition and traditional cuisine has been based around simple

Table 1: *Case studies in the reconnecting perspective***Ireland**

The Cahir Farmer Market in Tipperary, south east Ireland was established by the Cahir Development Association, a civil society organisation, with the aim of attracting people to the village of Cahir on Saturdays and to promote the sale of a wide range of local products.

**Scotland**

The Skye and Lochalsh Horticultural Development Association in Scotland was set up in 1995 by an economic development officer of the Highland Council. It is a network of actors committed to supporting horticulture on Skye and teaching local farmers horticultural skills that have gradually become lost.

**Sweden**

The Eldrimner initiative is a rural network for the small-scale refinement of agricultural products centred in Rösta in the municipality of Ås in Jämtland. The project is targeted to meet the needs of local small-scale food producers, farmers and entrepreneurs in the food-refinement business and aims at creating better conditions for small-scale production and distribution in the region.

**Germany**

Netzwerk Vorpommern is a voluntary association started in 1995 by a group of active citizens who were organic food consumers. To start with they founded a food co-operative with the aim of establishing a regional network for environmentally conscious consumers, promoting the creation of local market channels for organic products and strengthening the relations between organic producers and consumers. The initiative gradually grew, with various activities supporting new projects for a sustainable local and regional development.

dishes cooked plainly, using meat, potatoes, fish and grains as staples. With regard to the marketing of food, supermarkets and mass retailers play a major role, even in small town and villages:

Two local supermarkets get their supplies, not necessarily fresh produce, from central depots on the mainland, a local wholesaler gets it from a market in Glasgow (210 miles), consumers in turn depend on that wholesaler or other delivery services operated from Inverness (130 miles) and Fort William (120 miles). The obvious solution for this highly unsatisfactory situation – a local distribution system – could never get off the ground – so everybody thought – because of economies of scale: the large area of 2,700 sq km with a population of only 12,000 results in a very low population density of 4.4 (UK average 242.2) which seems to rule out a viable local distribution service. (Scottish Government n.d.)

Nonetheless, since the 1990s there has been a growing trend towards relocalisation of food production and consumption. There is a weekly farmers' market in Portree (Skye's largest settlement), while a project called the 'food link van' is operating, in which a van picks up and distributes local produce around Skye twice a week in summer and once a week in winter. This project has been vital in developing and maintaining a local market for local produce.

The agro-industrial strategy pursued by the national authority (the Scottish Executive) is resisted at local level by regional agencies. In fact, the Highland Council and Skye and Lochalsh Enterprise (SALE) set up an initiative aimed at encouraging local food production for local markets, demonstrating the potentialities of horticulture in Skye and recruiting growers to cultivate land. SALE has played a key role in promoting

Skye produce more generally, through the press, awards systems, staging of festivals and events and school educational programmes.

Jämtland, the area researched in Sweden, is a rural area remote from industrial and metropolitan centres and markets with a weak economy. Because of its peculiar natural and climate conditions, the proportion of agriculturally used land is very small and farms (which have an average size of 21 ha) are scattered around the territory with large distances between them. Even the population is dispersed over a large area. Jämtland does not exhibit a distinctive quality-oriented, locally rooted food culture (Bruckmeier *et al.* 2006).

The Mecklenburg-Vorpommern region in Germany has a long-established tradition of standardised export-oriented production. Collectivisation and industrialisation characterised agricultural development under the communist regime. After reunification, further intensification has been encouraged by the Common Agricultural Policy (CAP), while food processing facilities have been integrated into multinational companies. However, the agricultural sector still has a large average farm size and produces for an export-oriented food industry (food exports are more than twice imports in volume). 'Supply chains are quite long and anonymous, the origin of products is more or less meaningless, the quality aspects are in conflict with efficiency and competitive cost structures' (Siebert *et al.* 2006, p. 16).

In such contexts, initiatives to rebuild local food systems respond to a strong and reflexive commitment to social sustainability goals. Areas where such initiatives are located tend to have a strong history of involvement in community development and the co-operative movement. Constructing local markets where food exchanges are shaped by interpersonal relationships of knowledge and trust (as in the Irish, German and Scottish cases) or developing associations among producers (as in the Swedish and Scottish cases) is understood to be a way to create strong networks across the territory and to foster local social sustainability.

The Cahir Farmers' Market (Ireland) was first established with a 'focus on bringing people into town on Saturdays because the town of Cahir every Saturday was practically deserted' (Tovey 2006, p. 10). A vegetable grower and stallholder at the Cahir Farmers' Market gives his personal account of the market atmosphere that, according to him, may also function as a favourable environment to further local development:

[P]eople were coming there and stopping and talking in little groups, and that's something that's totally missing when you go to supermarkets or anything like that.... Nobody is in a hurry out there, they are all chatting away, you know that's something in a rural area that you need, and it's from, it's there that development begins. (Tovey 2006, pp. 21–22)

An explicit goal of the Eldrimner initiative is 'networking, co-operation, mobilisation of local people' (Bruckmeier *et al.* 2006, p. 15), while in Germany the Netzwerk Vorpommern initiative is considered 'more important for regional identity, empowering self-learning capacities and social capital than for employment' (Siebert *et al.* 2006, p. 15).

Environmental concern about global 'food miles' shapes the production and distribution practices of the relocalisation movement. But in the cases we analysed that dimension of sustainability was not stressed. Only the Eldrimner initiative explicitly mentions protection of the local environment through small-scale organic production

as one of the local actors' goals. Many of the Cahir Farmers' Market stallholders are post-organic (they belonged to the organic movement and they use organic methods, but they not do not seek certification). In the Scottish and German cases, 'organic' and 'local' are intertwined characteristics of the complex quality of the food consumed, which must be fresh and tasty, as much as safe.

The economic dimension of sustainability is given less attention in these initiatives, perhaps because they tend to be strongly driven by a consumer perspective on food. Direct selling is seen as a convenient way to increase income, but actors see it more as a way to diversify the local economy than to make a full living. The very first objectives of the local actors involved in the local food initiatives is maintaining a living rural community.

### **The origin-of-food perspective: from marginalisation to integrated rural development**

In the origin-of-food perspective, 'local' refers not only to the dimension of space (zero miles), but also to the dimension of time, then tradition and history, the complex of characteristics that gives birth to the socioeconomic concept of 'territory' (Sylvander 2004). Proximity refers to a common place but also to a common history, a common belonging that is solidified in collective norms and regulations. Raw materials, taste and dishes constitute a food tradition and culture that are closely tied to the territorial identity and linked to specific religious or social occurrences and celebrations (Bessi re 1998). Food is not only fuel and not only an occasion for sociability, but a patrimony and, as such, a strong element of local identity and culture, as described in our case studies (Table 2):

Table 2: *Case studies in the origin of food perspective*

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#### **Portugal**

Barrancos cured ham (PDO certified and not certified)

#### **Spain**

Utiel-Requena PDO wine

Requena sausages Protected Geographic Indication

#### **Greece**

Mavro Messenikola wine production 'Quality Wine Produced in Specific Region' (VQPRD)

Nemea wine production (VQPRD)

#### **Italy**

The construction of the 'Aspromonte National Park Product' certification

Olearia San Giorgio olive oil firm

Palizzi IGT wine

Canolo local economy

#### **Poland**

Oscypek cheese

Norway

Valdres rakfisk brand (traditional fermented fish)

Kurv fr  Valdres BA (traditional salami)

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Making half-fermented trout has been a food tradition since the 16<sup>th</sup> century or earlier, where the producers fished trout in local lakes (in Norway). (Kvam 2006, p. 9)

[The Oscypek cheese] is an important part of the shepherding tradition with a history going back to the XV century. For hundreds of years it was produced in the mountains by local shepherds. (Gorlach *et al.* 2006, p. 43)

The Utiel-Requena area has a long tradition in the production of wine that dates from the prehistoric times. (Buciega Arévalo *et al.* 2006, p. 8)

The Alentejo-breed pig raised in an extensive montado–montanhaeira system has constituted the basic type of food for local people over the centuries due to the range of products supplied and the ease of preservation. (Veiga and Rodrigo 2006, p. 12)

The agri-food context of these initiatives is characterised by the persistence of a traditional, marginalised agri-food system with a strong presence of small-scale family farms.<sup>4</sup>

In Aspromonte (Calabria, south Italy) agricultural activities are traditionally based on small household farms. Production is sold through local markets and is partly self-consumed or exchanged in gift or barter relations. The fact that Aspromonte, like many other areas in the South of Italy, remained at the margin of industrial development influenced the survival of traditional food production practices and consumption patterns. A local food culture has also been generally preserved in rural areas of Italy because of the low activity rate and the late entrance of women into the workforce.

Similar features are present in other Mediterranean and southern European countries. In much of southern Europe the association between territory, tradition and food quality is taken as self-evident (Papadopoulos 2006). In the Greek case studies this is evident from both the large number of products with an EU or national certification of provenance and the presence of much food produced in small farms and on a cottage-industry basis which are sold either to local consumers in local markets or in distant markets to customers who may be in some way linked to the producers by personal relations.

In the Portuguese region of Lower Alentejo bread, olive oil, wine and meat from the Alentejo breed of pig are produced and processed in family farms or in small firms through artisan methods and are traditional components of the local communities' diets. Here too, a relevant feature of agriculture is the presence of small farms<sup>5</sup> (Veiga and Rodrigo 2006).

In Utiel-Requena (Spain) wine and meat production have long traditions. Butchering and meat consumption are deeply rooted in the area, as witnessed by the fact that children used to go into butchers' shops to ask for small pieces of *fuet* (thin sausage) for free, as if these were sweets (Buciega *et al.* 2006).

Both the Spanish and Portuguese fieldwork provides case studies of pork meat transformation. In both of these areas (and also in many Italian rural areas), pig-slaughtering was an important cultural, social and economic event for families and communities. Though it is less important now in economic terms the practice is still a cultural and anthropological component of social life, involving shared effort and fostering solidarity in the community.

Besides the Mediterranean countries, regions in both eastern and northern Europe display a strongly persisting local food culture. In Valdres, Norway, typical food has a long history. Two products were studied here: fermented trout and salami. Half-fermented trout is a national food tradition and nowadays, most Norwegian half-fermented fish is still produced in Valdres. Similarly, cured and dried salami is a typical local product in the area. People used to make their own salami using family recipes, with a variety of practices, using elk, reindeer, sheep, goat and other meats in different mixtures. The salami was an important component of the local diet and was eaten with bread or with thinly sliced bread and beer (Kvam 2006).

In a very different context, regions with a strong food culture are found in central and Eastern European countries such as Podhale in Poland. Despite the standardisation promoted under communism, traditional family culinary culture and local food diversification survived. For this reason the transition to market capitalism and a more general westernisation of life-styles is experienced as more 'dangerous':

[A]fter decades of isolation and empty shelves, the national market was flooded by large amounts of foreign and relatively cheap food. The patterns of consumption in Polish society shifted towards the 'western' victuals as symbols of the new reality. The appearance of the international supermarket chains that conquered the retailing sector has additionally strengthened this trend. The rapid 'westernization' of food habits turned into a negative influence on the local food production. (Gorlach *et al.* 2006, p. 42)

In initiatives to valorise the origin of food sustainability discourse appears to link sustainable livelihoods and sustainable communities tightly together into an organic whole. Here, the economic valorisation of local specificities of the territory and its products is the dominant dimension of sustainability in a strategy of integrated rural development for marginalised and impoverished areas. This economic objective relates to other dimensions of sustainability in a complex and often contradictory way.

With respect to the environmental dimension, the valorisation of local specificity is often based on the special characteristics of a local variety of plant or breed of animal. Valorising local food in these cases means protecting and valorising agri-biodiversity, often local plants or animals at risk of extinction (Fonte 2006a). But introducing or extending market logic in the valorisation of local specificities involves some compromises with standardisation of production, especially in the case of certification of local products. For instance, of the many local cultivars that have survived in the abandoned vineyards of traditional peasants in Palizzi (Aspromonte, Italy), only two are cultivated for the production of Palizzi protected geographical indication wine by the Qualiter co-operative. In the same area the Olearia San Giorgio olive oil firm has had to change the traditional landscape of stately old trees by pruning them or substituting them with younger, smaller trees in order to improve the quality of the oil (Fonte and Agostino 2006).

In relation to the social dimension of sustainability, strategies to valorise a local food through valorising its territory require a collective effort that activates mechanisms of social co-ordination and cohesion in the community. Collective institutions are generated and networked, territorial links are strengthened and reflexivity over local identity is stimulated. The effort to valorise the Requena sausages (Spain) through the organisation of an annual fair has involved many local actors, inhabitants,

institutions and producers. In Valdres (Norway), too, establishing the local brand *Valdres rakfisk BA* has been very positive for most local actors and has pushed the local authorities to set up initiatives in favour of family farms that were previously excluded from any development efforts at local and national levels.

Certification of the local product may also produce negative social effects. New forms of social exclusion may be enacted, especially when the valorising initiative is taken by scientific knowledge and non-local actors. In the case of Barrancos cured ham, local cottage-industry manufacturers have been marginalised in the social process of Protected Designation of Origin (PDO) construction which was led by university scientists. In the Mesenikola zone in Greece local wine producers were not able to profit from the opportunities provided by the emergence of a quality-certified wine production, led instead by non-local actors who transferred their business into the PDO area. In the Polish case of Oscypek cheese small producers risk social and economic exclusion with the implementation of certification because they find it difficult to adhere to hygiene norms or because their production techniques are not considered 'authentic' and are not included in the production protocol.

### Local food and local knowledge

CORASON's overarching objective was to locate rural sustainable development in the context of the changing knowledge society (Tovey and Mooney 2007). It argued that there are different forms of knowledge (scientific, managerial and lay) and that the relations between them are influenced by relations of power and status. Which forms of knowledge are at play in rural development? How does the interplay among them affect rural areas and rural people? In one part of the CORASON research these questions were explored through studies of local food.

We refer to Tovey and Mooney (2007, pp. 6–9 and 100–106) for a general discussion of the approach on science and knowledge adopted in the project, but want to emphasise here a differentiation in the concept of local knowledge that is especially relevant to our discussion, namely that concerning lay and tacit knowledge.

Tacit knowledge is understood 'as the sort of knowledge which we use, more or less unconsciously, to manage our interactions with other people' (Tovey and Mooney 2007, p. 102). Created through normal processes of socialisation, this is a form of knowledge transmitted pre-discursively in a community through its social norms and habits. It is important in rural development since it helps to strengthen informal social networks and social relations, promoting trust and social cohesion.

Lay knowledge is instead 'about 'objective reality', practical causal connections or 'how things work' (Tovey and Mooney 2007, p. 103). It is a technical form of knowledge acquired through particular experiential circumstances and transmitted by specific 'local experts' in informal situations of learning. It differs from 'scientific' knowledge in that it is neither standardised nor formal. Its variability (linked to specific places and cultures) has earned it an inferior status in relation to 'scientific' knowledge.

In the case of local food, lay knowledge refers to the technical knowledge utilised by farmers and producers to grow or to prepare food in the specific agri-ecological context in which they operate. It includes knowledge about production and

preparation techniques, local natural environmental processes and the characteristics of the product.

With the development of industrial agriculture and its technocratic structure in the public or private extension service (Ploeg 1986; Benvenuti *et al.* 1988), lay knowledge was generally identified or typified as 'traditional', meaning something outdated, static and no longer useful.

Intuitively, 'relocalisation of food' implies a mobilisation of knowledge. At first glance this mobilisation may be considered a move back from scientific towards local forms of knowledge, a radical inversion of the historical trend that has brought the agro-industrial food system to dominate Europe (Marsden 2003). The dynamic between scientific and local knowledge is enlightened today by the diffusion of biotechnology applied to agriculture.

Biotechnology, a science-based technology, brings agriculture to the forefront of the knowledge society, while opposition to its diffusion in defence of typical food and biodiversity is often considered obscurantism and an opposition to the progress of science. However, the substitution of the biological knowledge base for the chemical one that previously prevailed in the agro-industrial model of agriculture (Byé and Fonte 1993), calls attention back to traditional knowledge, especially in developing countries where knowledge of biodiversity is rich and diversified. The pharmaceutical industry and public research centres organise numerous bio-prospecting missions to collect and appropriate local biodiversity and traditional knowledge, while several cases of bio-piracy (Shiva 1999) show how social and institutional arrangements, including intellectual property rights, determine the asymmetry of power among different forms of knowledge.

A wide debate has developed in international fora (the United Nations Conference on Trade and Development [UNCTAD], the World Intellectual Property Organisation [WIPO], the World Trade Organisation [WTO] and numerous non-governmental organisations like the Action Group on Erosion, Technology and Concentration (ETC) Group or GRAIN on the value of traditional knowledge and the necessity to protect it. In these contexts traditional (lay) knowledge is characterised as knowledge that generally, it 'is not produced systematically, but in accordance with the individual or collective creators' responses to and interaction with their cultural environment' (WIPO 2002, p. 1). It does not perform a specialised function in society, but instead represents cultural values as an element that is integrated in a vast and mostly coherent complex of beliefs and knowledge, generally collectively held and transmitted orally and by common practices from generation to generation. In this account, the term 'traditional' qualifies a form of knowledge

only to the extent that its creation and use are part of the cultural traditions of communities. 'Traditional', therefore, does not necessarily mean that the knowledge is ancient. 'Traditional knowledge is being created every day, it is evolving as a response of individuals and communities to the challenges posed by their social environment. In its use, traditional knowledge is also contemporary knowledge. (WIPO 2002, p. 1)

The CORASON research sought to discover in what forms local knowledge persists in European rural areas, if and when it persists and whether it is characterised as outdated and useless, or whether it is still in use. It also investigated whose knowledge

is at play in rural development and what relationships determine the interplay of local with scientific knowledge in different patterns of food relocalisation.

In the perspective of knowledge dynamics, local food networks may not only represent a resistance to the global, placeless reorganisation of food chains, but may also challenge a continuous trend towards the simplification and homogenisation of agricultural techniques and agri-ecosystems and lead to re-evaluating traditional/local forms of knowledge and techniques as a specific and important resource in the management of agricultural and natural ecosystems.

However, different agri-food contexts strongly influence the forms of local knowledge that we find used in initiatives to relocalise food and the way they interact with expert knowledge. In the next section we characterise local knowledge and its dynamic evolution by the two types of food relocalisation, 'producer-consumer reconnection' and the 'valorisation of the origin of food'.

### Local knowledge in the reconnection perspective

In the food desert created by export-oriented agro-industrialisation and the food processing and retailing industries, much lay or uncodified knowledge about how to produce food crops and how to prepare them for consumption has been lost:

[A]rtisan production and processing of food has existed before, but the modernization of agriculture during the past century led to an 'intellectual expropriation' of the local producers and farmers and their tacit knowledge about agriculture and food production. (Bruckmeier *et al.* 2006, p. 12)

Local knowledge and skills in food production have widely vanished also among rural populations. (Bruckmeier *et al.* 2006, p. 18)

Many years of engaging only in livestock rearing had meant that a lot of the lay knowledge around growing fruit and vegetables had been lost, and it was a key aim of the SLHDA to restore that knowledge. (Dargan 2006, p. 16)

The knowledge that small artisan producers in these networks need is first of all about production techniques: learning how to grow food (Tovey 2006). Initiatives to relocalise food systems include both attempts to educate or self-educate food growers, and conscious attempts by growers to re-educate consumers about food and food consumption. In the Scottish and Swedish cases a key objective of the project organisers was to teach agricultural skills and agri-food practices that had been lost in the area.

One of the SLHDA goals is to teach horticultural skills to local farmers, mainly through two 'formal' agencies: SALE, that provides business or managerial training about how to prepare produce for markets or to start a business, and the Scottish Agricultural College (SAC) that provides agronomic training, that is, suggestions about varieties that might be grown on Skye, soil and plant treatments and agricultural techniques (Dargan 2006).

The scientific knowledge provided by the SAC is not always considered appropriate by local farmers for either their scale of production or their specific and very difficult growing conditions. So while SAC continues to dispense advice when it is needed, farmers routinely prefer to make use of local expertise from other farmers, as the first

local growers now have accumulated considerable knowledge around what works on Skye.

The expert knowledge from SAC was, therefore, combined with the small pool of lay knowledge on Skye – the ‘expert’ provided some advice on varieties and treatments, while a local person was recruited as a mentor to new growers to advise on how to best prepare the land, and how to adapt expert advice to local conditions. (Dargan 2006, p. 14).

In this way, new combinations of lay and expert knowledge were produced, and local growers, over time, came to be recognised as ‘experts’. This new knowledge was then shared with other local growers through word of mouth, through mentoring schemes, and through printed materials such as SLDHA newsletters (Dargan 2006 p. 16).

The Eldrimner initiative in Sweden included setting up a resource centre to transfer local knowledge about small-scale food production and food processing (cheese-making, pork butchering and jam-making) to wider groups of local actors. Like SALE in Scotland it provides courses on how to improve product quality and assists with the procedures involved in starting and managing small enterprises. In this case the ‘expert’ is not a scientific expert, but someone with experience, ‘somebody who has already done it’. To revitalise local knowledge various methods have been followed: knowledge is compiled from elderly people in local communities, as well as

from many other sources, through contacts with local producers in other countries, in literature as well in archives, and through the information and networking in the project which often resulted in new members that had special knowledge joining the project. (Bruckmeier *et al.* 2006, p. 18)

In Ireland many stallholders at the Farmers’ Market are, or have been, members of the organic movement. To them this is an important source of knowledge about how to produce using small-scale, environmentally friendly techniques. Also important are other informal and formal sources of knowledge, including older farmers, experience and common sense, books, courses, networks and contacts with ‘experts’.

Consumers are involved in exchanging knowledge about food quality and ways to prepare food, especially at the point of purchase through interaction with the grower/seller, but also in other events like food tasting, exhibitions and school programmes.

These cases show that scientific knowledge is not sufficient in the effort to relocalise food and that there is a need to recreate a new local lay knowledge on how to produce and to prepare food. Local lay knowledge is rebuilt through experience and exchanges among equals, with local knowledge in other (national and international) regions. New social networks are created and activated and different sources and occasions are used in the process, both formal and informal. These include exchanges with other growers, farmers’ markets and contacts with non-local experts.

Local lay knowledge, often exchanged and circulated through informal social networks, is the dominant form of knowledge used. It is clear that scientific, general and theoretical perspectives are not the most relevant to these experiences: the best experts are not scientists from universities or bureaucratic-managerial experts from government development agencies. Scientific knowledge may only be a starting point but it needs to be integrated, adapted and mediated by those with expertise and trained in specific traditional and artisan modes of food production, and by those who know the ‘place’.

## Local knowledge in the origin of food networks

Initiatives to reconnect producers and consumers show how re-localising food production requires re-localising knowledge. Where local lay knowledge has been lost, it needs to be re-built from the beginning. In the initiatives to valorise origin foods, instead, local knowledge appears first in the form of traditional knowledge. This is part of the local culture about how to produce, grow and prepare food in a specific local agri-ecosystem. It is about techniques of production, knowledge of local ecosystems that gave rise to local varieties of plants or local breeds of animals and ways to transform and to cook agricultural products. Cultivars adapted to the specific locations are the result of centuries-long collective work on domesticating and adapting plants and animals to the geographical micro-habitat. They incorporate both characteristics of geographical places and the empirical knowledge of generations of farmers.

Undervalued and dismissed during the agro-industrial era by the technocratic structure of national and local development agencies (Ploeg 1986; Benvenuti *et al.*, 1988), traditional lay knowledge attracts new interest from experts and development agents today, when markets and policies in Europe express a demand for quality and regional diversification in food. A marginalisation that lasted for decades has blocked the co-evolution of traditional knowledge in response to changing functions of food and habits of consumption. In this sense we find in our case studies that marginalised, traditional lay knowledge is, for certain types of production, outdated. Initiatives to valorise the origin of food call for both the recovery and revitalisation of traditional lay knowledge, which often leads to confrontation with other forms of knowledge, especially expert knowledge.

Certification has become one of the dominant routes for recovering, codifying and valorising lay knowledge embodied in typical products. Two case studies from Portugal (the certification of Barranco's cured ham) and Italy (the construction of the Aspromonte National Park certification) provide particularly clear insights into how that process develops. In both cases the interest in certification first emerged among groups external to the producers, the Department of Zootechny at the University of Evora in the Portuguese case and the managers of the Aspromonte National Park in the Italian case. Both proceeded by selecting one or several exemplary farmers, observing their production practices, suggesting some improvements or modifications in production (especially in relation to hygiene) and then compiling production protocols (codification). Thus, the construction of a certified food product of local origin involves a process of collection, analysis and selection from the available stock of local traditional knowledge and its integration with expert knowledge.

When the certification process is not controlled by local actors, or at least when local actors do not participate in the process with a recognised equal status, certification may lead to the expropriation of local knowledge and the benefits deriving from its valorisation by external actors, rather than integration or synthesis of local and scientific knowledge.

The Barrancos cured ham case in Portugal provides detailed information on the appropriation process set in motion by the experts through the certification process. The University of Evora launched an initiative to valorise the Barrancos cured ham, a traditional product of the Alentejo region. The first step (1989–1990) of the research

project was to select one local manufacturer out of three indicated by the Mayor of Barrancos and to start producing the ham experimentally, using two varieties of pig: the traditional Alentejo breed and a crossbreed. During the first year the academic researcher 'merely recorded the various stages of manufacture and unexpected events occurring, not getting involved in the technological matrix' (Veiga and Rodrigo 2006, p. 13). A technological register and a list of all the problems noticed in the transformation process was then compiled. In the second year (1990–1991) scientists carried out a validation process of the local knowledge by setting up experiments:

[A] manufacturing unit was set up in Évora to evaluate whether or not the climatic conditions of Barrancos had an influence on the characteristics of the ham. By the end of the second year the study concluded that the pig-breed was important ... and that climatic conditions ... did influence the characteristics of the ham. (Veiga and Rodrigo 2006, pp. 13–14)

In the third year (1991–1992) the production protocol was completed. Following this, the expropriation of knowledge was ratified by the expropriation of production. Hams were no longer produced at the local manufacturer's factory but in a special premises provided by the Barrancos Municipal Council. Once certification was obtained, the university promoted the construction of a network of big manufacturers (Barrancarnes) that in a short time gained the monopoly control of the certificated Barrancos cured ham up to the point when the company was sold to a big agri-food group, first in Portugal and later in Spain. Scientific knowledge allied with industrial business has finally appropriated and codified local lay knowledge, excluding small producers from the benefits of the valorisation of the product.

Barrancos Cured Ham is today distinct from the cured ham produced by traditional manufacturers. The oral tradition of knowledge has now been recorded, a process that took some years, and this knowledge has been used by new actors in the market. The technological innovations introduced are not radical in nature, and are limited to the control of temperature, humidity and ventilation at certain stages of the production process, but are still important in terms of the emergence of new quality parameters (salty taste, mould) which are more in tune with the requirements of consumers.

Traditional knowledge may be appropriated not only by non-local experts but also by other local producers. The complex relation between a traditional product, traditional knowledge, rural development and certification is well illustrated by a case study concerning the valorisation of the Oscypek cheese from the Podhale region in southern Poland. This cheese belongs to the shepherding tradition of the Tatra Mountains, as it is produced using non-pasteurised sheep milk in summer in mountain sheds, by shepherds for their own consumption and for sale in the local villages. 'The recipe is passed on from generation to generation in an unwritten form', so that 'there is one technique of production and many recipes' (Gorlach *et al.* 2006, p. 43).

The economic evolution of the 1990s, in particular the fall of the communist regime, the decrease of sheep stock and the development of mass ski tourism in the Tatra Mountains brought a great transformation of the economy of the Oscypek cheese. Gorlach *et al.* (2006) distinguish three different networks built around the Oscypek cheese after the 1990s. Oscypek for the mass tourists produced by local people, although extraneous to the shepherd tradition, is a short chain characterised



by weak ties between producers and consumers. The cheese is no longer made from sheep milk, nor is it made in the mountains: it is made on any farm using cow's milk and is delinked from the highlander tradition and from seasonality. It is a 'commercialisation of tradition': the imitation Oscypek is sold at low price to tourists in street stalls and food markets.

The second network leads to the industrialisation of tradition. An industrial cheese made out of pasteurised cow milk and that resembles the original Oscypek in colour, shape and name is packaged and sold all over Poland in supermarkets at a very accessible price. Actors in this network are small and middle-sized dairies from the Podhale region. There is also an elite version of this cheese that is more consistent with the original recipe and is sold to luxury restaurants and to organic food shops, which involve a few 'modern' herdsman in the production.

Finally the third network is linked to the efforts of the local authorities to make the Oscypek cheese the symbol of the Tatra Mountains and to valorise it through a certification scheme. While the certification will be a return to its origin, giving its reputation and knowledge back to the traditional owners, the highlander shepherds, Gorlach *et al.* (2006) wonder what the effects will be on the local economy (and actors in the first and second network) when the Oscypek cheese will be protected by a denomination of origin.

The risk of appropriation of local knowledge by experts and big manufacturers is greater when products have the potential to become 'global' products, that is, when production reaches a minimum quantity sufficient for industrial production and the link to the local consumers and the local food culture is weakened. In many other cases, for small niche products, while it may be considered useless by development agencies from a strict economic point of view, certification may constitute an important element in the activation of an integrated rural development strategy by local actors. This is the case in the valorisation of Requena sausages (Spain), where local producers and citizens are the promoters of the certification scheme as part of a more comprehensive initiative for the valorisation of the local cuisine through fairs and festivals to attract tourists, especially former residents who have migrated to other parts, into the area.

Other initiatives to valorise the origin of food (wine and olive oil production in Greece, Spain and Italy) show the limit of traditional lay knowledge in the face of the professionalisation of agricultural practices. Local varieties of vines (Mavro Messenikola in the Lake Plastiras area and Agiorgitiko in the Nemea area in Greece; Bobal in Utiel-Requena, Spain; Nerello Mascalese and Nerello Cappuccio in Palizzi, Aspromonte, Italy) have adapted over centuries to their specific agri-natural locations thanks to the work and empirical knowledge of generations of farmers. But the knowledge used in winemaking and olive oil production has been increasingly professionalised and standardised and the experts now are the scientists who understand the process of wine fermentation or the chemical characterisation of olive oil in a technical way. Set apart from the evolution of the markets and the function of the product, lay knowledge is considered outdated:

Traditionally wine was produced for self-consumption and for the local market: it responded to different functions and tastes compared to today. It was an energetic drink, targeted for

consumption within the year, rather than ageing. Only new techniques can create the conditions to keep and even improve wine characteristics during ageing. (The president of Qualiter Co-operative in Fonte and Agostino 2006, p. 21)

In the case of the Utiel-Requena (PDO) wine (Spain) the limit of traditional lay knowledge in wine-making is attributed to the fact that the area had in the past a different specialisation, the production of 'double paste', used for adding colour to other wines. Furthermore, with the creation of oenology schools since the 1960s technical and expert knowledge have taken the lead in the process of wine-making, marginalising local knowledge.

In Greece, the diffusion of an agro-industrial and productivist logic, with its stress on high yields and increased quantities, has meant the loss of local lay knowledge for vineyard cultivation and wine-making:

In the past, vineyard yields were lower and wine quality much better, while not only wine, but other joint products, were elaborated with the remains of grapes (i.e. *tsipouro*).... The former (lay) knowledge becomes disembedded from its local social and economic context due to farmers' adaptation to the need of the highly mobile large wine companies. (Papadopoulos 2006, p. 23)

In wine-making and olive oil production, initiatives to valorise the origin of foods push towards an integration of the traditional lay form with new technical and scientific knowledge.

In the case of the olive oil valorisation in Aspromonte a useful dialogue was started by a local producer with scientific experts leading to the adoption of technical changes in the production process, while new lines of research were started in the university. In the valorisation of the Palizzi wine (Italy), change proceeded slowly and confrontation with experts was hindered by different codes of communication. This case is illustrative of the role of tacit knowledge in facilitating or obstructing communication between different social and knowledge systems.

All vine growers in the south of Italy (and maybe everywhere in the world) are convinced that they makes the best wine in the world. To criticise their wine may be perceived as a lack of respect. When one of the leaders of the initiative to valorise the Palizzi wine wanted to raise awareness about wine-making techniques in the village, he felt he could not play the main role. Because telling local wine-makers that their wine was not good would be considered an offence, he invited a friend from Tuscany, a famous oenologist, to stay for a few days in the village where he could meet and discuss informally with people. At the end of the stay a wine-tasting event was organised. The oenologist was ready to taste the best wines from the best producers in the village. As a foreigner, but also as a recognised authority in the sector, he was able to condemn the local wine without any reservation, telling local producers that they had to change their techniques completely if they wanted to improve the quality of their product. This shocking event did not totally convince the old generation of producers but younger people were more receptive to the expert advice (Fonte and Agostino 2006).

In other cases external expert advice was rejected as not relevant to the objectives of the producers. In the Kurv frà Valdres case (Norway) a consultant recommended that producers use bacteria cultures as a starter for the fermentation process in order

to obtain a more standardised and even quality of their traditional salami. The producers rejected the advice since they thought it was important to keep the richness of taste and distinctiveness imparted by the different methods of each producer (Kvam 2006).

Finally, valorising the origin of food implies setting in motion the rich stock of traditional lay knowledge that still persist in many rural areas of Europe. Its valorisation is a complex phenomenon that involves an effort to restore the food itself, but also to re-elaborate and codify lay knowledge, while confronting other (scientific and managerial) forms of knowledge. Economic valorisation of the origin of food may lead to a reflexive appropriation of the territorial identity of local people or simply to the commercialisation of tradition through agri-piracy, or even to an exclusionary process of expropriating local knowledge to the benefit of scientific and managerial experts.

## Conclusions

A relational approach to local food may help us to understand how different strategies of food relocalisation stem from different contexts and are generated and appropriated by different social networks. The diversity of strategies may express the capacity of rural areas to generate different solutions to different problems, each with their own strengths and weaknesses in respect to sustainable rural development and consequently each needing to be monitored for its social, environmental or economic effects.

The perspective on local food here adopted derives from analysing the knowledge dynamic between the informal, variable, place-dependent systems of lay knowledge and the more mobile, codified system of scientific knowledge. A rich stock of lay knowledge is a patrimony of European rural areas, but its evolution has been stopped by the process of restricting knowledge to the 'scientific' that has been brought about by the industrialisation of agriculture. Initiatives to relocalise food mobilise again local forms of knowledge and may contribute to enhancing, valorising and recreating that patrimony. That trend is reinforced by a redefinition of the social functions of agriculture and food and by new pressing objectives of environmental sustainability and ecosystem management.

Knowledge dynamics are very different in the two patterns of food relocalisation analysed in the article. In the reconnection type, local lay knowledge of how to grow food in the local agri-ecosystem and local food culture have been largely lost. An effort is in place to rebuild it, through the experience of the producers, their practical hands-on expertise and adapting expert knowledge to local conditions. In the initiatives aiming to valorise the origin of food, farmers are still using agricultural practices based on traditional lay knowledge. But this usually remains locked in pre-industrial times while the technocratic structure has endorsed a standardised 'scientific' approach to knowledge. The challenge of these initiatives is to mobilise traditional lay knowledge, maintaining a primary role for local farmers and actors in the process of local food valorisation.

Relations of power in the knowledge networks shape the way in which different types of knowledge interact and whether the interaction will lead to a new synthesis among different forms of knowledge or to appropriation and new hierarchies of power.

Local control of knowledge dynamics is favoured by one factor over all: a peer relation of learning among actors. This seems quite straightforward in the producer-consumer reconnection strategy: local actors are trying to rebuild local knowledge through networking as equals, shared experiences, discussions and observation. Scientific knowledge may be a starting point but it needs to be evaluated, adapted and integrated, according to local circumstances. A reflexive attitude towards 'scientific' knowledge leads local farmers to 'resist' codification and certification (especially the Irish post-organic farmers) or to decodify the expert advice handed out to them (the Scottish and the Norway initiative to valorise the origin of food).

Initiatives to valorise the origin of food often imply a stricter interaction with 'experts'. They are the scientists and technicians who know how to control complex processes of transformation and fermentation or the managers and experts on regulation and certification schemes. Certification is a process of codifying local knowledge but it is also something more: it is a process of constructing a new knowledge network in which two ways of knowing and two ways of producing confront each other. Opportunities for a diversified model of rural development are great, but the case studies show that more reflexivity on the role of expert and science is needed in order to avoid risks of appropriation of local knowledge by the expert system and the expropriation of the local community from the benefits of the valorisation process.

## Notes

- <sup>1</sup> This is an arrangement by which consumers pay an annual membership fee to farmers, to cover the production costs of farming. In exchange they receive a weekly box of fresh food (Wilson's College n.d.).
- <sup>2</sup> In the late 1990s deprived areas of British cities with poor access to the provision of healthy affordable food became known as 'food deserts'. The metaphor was used in ministerial statements defining food deserts as areas lacking the appropriate food retail provision within roughly a 500-m radius. Policy interventions, such as the Food Poverty Bill, in 2001 were inspired by this metaphor. Some authors contested the existence of food deserts (Cummings and McIntyre 2002), but much empirical research was inspired by it (Wrigley 2002). Here the expression is used in general to indicate an area that has no access to local food and is deprived of a local food culture.
- <sup>3</sup> The name 'Eldrimner' is derived from old Nordic mythology: 'Eldrimner' is the cooking pot in which the pig 'Särinner' was prepared as food. As Särinner had the special ability to resurrect every time it was consumed the Asa-gods and the humans could always have food for a feast in Valhalla. The name eldrimner is used for the project, that of särinner for the annual fair that the project is organising (Bruckmeier *et al.* 2006).
- <sup>4</sup> This is not to say that agro-industrial model has not pervaded Mediterranean countries. The Greek report stresses the co-presence of an agro-industrial system in the plains and a traditional agriculture in the hilly internal areas. In the Greek region of Karditsa, for example, the hegemony of the agro-industrial model in the most productive zone of the wider study area coexists with the presence of a defensive, marginal rural development model on the mountainous part of the region. This is true also of the other Mediterranean countries.
- <sup>5</sup> The average farm size in lower Alentejo is much larger than the national average (62.2 ha versus 9.8 ha) but these data hide a bimodal distribution: a large number of small farms occupy a small area and a small number of large farms account for most of the total farm area, while there are very few medium-sized farms.

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