

European quality agriculture as an alternative bio-economy

Les Levidow

1. Introduction

Agri-biotechnology has been a focus of intense conflict and broad public opposition in Europe. Agbiotech products have also faced a commercial boycott by food retailers, seeking to protect their reputations and sales. Widely known as 'GM food', agbiotech has been widely stigmatised as a symbol of multiple threats – economic globalisation, environmental risks, genetic pollution, biopiracy, etc.

These attacks had a basis in government efforts to promote agbiotech as an instrument of a specific political-economic agenda. European policies have promoted capital-intensive technological innovation as an essential means for more efficient production methods, more lucrative products, and thus a competitive advantage in the global economy. This agenda corresponds to a series of policy slogans – the 'Biosociety' in the 1980s, the 'knowledge-based economy' in the 1990s, and the 'Knowledge-Based Bio-Economy' (KBBE) in the current decade.

In this policy context, Europe has had little discussion of 'alternative agri-biotechnologies', much less as a means to assist the rural poor (the topic of this conference). Within the KBBE framework, 'alternative agri-biotechnologies' could denote non-food uses, e.g. the extraction of industrial or pharmaceutical substances from crops. European agri-food alternatives rarely use the language of technology, though there are exceptions (e.g. Almekinders and Jongerden, 2002: 19-22).

For food agriculture, current alternatives are promoted as quality products and cultivation methods. 'Quality' agri-food products relate to agri-ecological methods, specific territorial characteristics, and/or special aesthetic qualities such as distinctive taste or freshness. Conventional retail chains have increasingly incorporated 'quality' products as a means to appropriate the extra market value from food producers. Sometimes these have been called alternative *agri-food* networks, emphasising quality food products. Without truly alternative networks, quality products may lose their alternative character. Organic producers in particular have undergone such pressures (Smith, 2006; Rigby and Bown, 2007).

By contrast to those conventional markets, alternative agri-food *networks* have more directly linked consumers with producers, as a means to enhance and capture market value for food producers. Product 'quality' is defined by the networks which sustain those relationships, as much as by any tangible characteristics. Examples include the following:

- Quality foods, linked with specific localities, are promoted through retail systems such as *prodotti tipici* in Italy or *produits de terroir* in France.
- *Teikei*, meaning 'cooperation' or 'joint business', is a system of community-supported agriculture in Japan, where consumers purchase food directly from farmers. This model has been extended through distinctive local products (Ikejima and Hisano, 2007).
- Organic products promoted through special retail chains, as well as by the International Federation of Organic Agriculture Movements, www.ifoam.org.

As a short-hand, AAFNs will denote alternative agri-food *networks* in this paper. AAFNs have been promoted through Europe-wide organisations and networks, for example:

- Alimenterra, the European Network for Sustainable Food Systems, where 'sustainable' means diverse agri-food production linked to the seasonality and uniqueness of each locality.
- Coordination Paysanne Européenne (CPE), representing a collective identity as 'peasants' who develop relatively less intensive, more skilled production systems.
- Agri-food networks around the European Social Forum, raising the slogan, 'Another Agriculture is Possible.'

This paper discusses the following questions:

- In EU policy on the 'knowledge-based bio-economy' (KBBE), especially for agriculture, how are some knowledges favored over others?
- How do AAFNs develop resources for a different kind of knowledge-based bio-economy?
- How are different human and natural resources being commoditised in the two models? How do AAFNs provide an extra option – and perhaps an opposition?
- What underlies the conflict between these types of bio-economy?

Answers are brought together in the concluding paragraph and summarised in Table 1 there.

2. Contending bio-economies: analytical concepts

In answering the above questions, the paper will draw upon several analytical concepts: discursive frames, master narratives, naturalised futures and agricultural paradigms.

Controversies can be generally analysed as contending ways to frame issues and to define the problems that need solutions. As a link between ideas and practices, 'framing is a way of selecting, organising, interpreting, and making sense of a complex reality to provide guideposts for knowing, analysing, persuading and acting' (Rein and Schön, 1991: 263). Power can be exercised through discursive accounts of reality, by promoting one future vision over others. New story-lines can bring together actors into coalitions. 'Political change may therefore well take place through the emergence of new story-lines that re-order understandings' (Hajer, 1995: 55-56).

Likewise, master narratives frame societal problems in ways that promote particular solutions. Through such narratives, some possible futures become imaginable or even inevitable, while others are marginalised or excluded. Master narratives often conflate societal progress with technological advance. For example, it is asserted, Europe will fall behind globally in productivity gains unless we capitalise on new technological developments. Such narratives convey imagined and promised European futures, 'in order to justify interventions and pre-empt disruptive public responses', according to a critical report (EGSG, 2007: 75).

Some narratives represent science as the proper basis of government policy, thus equating science with official expertise. In practice, expertise is selected and guided according to dominant policy frameworks. For an alternative approach, a democratically-committed 'knowledge society' would work out how multiple social worlds and visions could creatively interact with a freer, more diverse science (*ibid.*: 78).

Illustrating a master narrative in European policy discussions, biotechnology has been elaborated as a solution to numerous problems since the 1980s. Societal problems were attributed to genetic deficiencies of human and crops, as a basis to propose remedies through a European 'Biosociety' (Gottweis, 1998: 228). European companies could not adequately compete in an increasingly global market, so they must be converted into competitive multinational companies. For this economic aim, alongside a more efficient use of resources, an essential tool would be the application of modern biotechnology to European agro-food industries (*ibid.*: 170).

Since the late 1990s biotech has symbolised a larger 'bioeconomy', likewise promoted as a response to the dual threats of biological vulnerability and economic competition. This bioeconomy depends on new types of capital flows and commodities, whose value derives from expected economic returns. Such biovalue originates from perceived failures of biological vitality; bioscience research identifies illness or morbidity which can be attributed to genetic deficiencies, thus warranting biotechnological treatments (Birch, 2007: 94).

Such narratives have been most prominent in biomedical science. Such research attempts to identify genetic bases for 'normal' variability in bio-vitality, e.g. longevity or sexuality, thus blurring the distinction between illness and health (Rose, 2001: 21). Analogous narratives also feature in agbiotech: genetic deficiencies explain crop vulnerability to pests, disease, adverse climates, etc., while bio-vitality can be found only in laboratory solutions.

Through promised remedies, capitalist accumulation mobilises biological resources, while testing the potential and limits of such appropriation.

'...that capitalist promise is counterbalanced by wilful deprivation; its plenitude of possible futures [is] counter-actualised as an impoverished, devastated present, always poised on the verge of depletion' (Cooper, 2007: 28).

Natural resources are constructed in the image of laboratory solutions, through narratives of a deficient, vulnerable nature needing correction. That problem-diagnosis actively constructs scarcity (Xenos, 1989), thus stimulating new markets. Some biological knowledges are demarcated as economic assets that can be incorporated into current or new markets. At the same time, broader patent rights manufacture scarcity in these resources by favoring a research focus on patentable knowledge, while deterring further research which may be subject to patent disputes. Discourses of economic competitiveness naturalise research priorities which seek genetic solutions; this naturalisation provides a self-fulfilling prophecy through institutional changes which reinforce the priorities (Birch, 2006: 7-9).

Thus a particular type of 'bioeconomy' is turned into an objective imperative – necessitated by biological morbidity, genetic deficiency, and market forces. Given such problems and threats, solutions must come from laboratory-based knowledge. Otherwise Europe will suffer from productive inefficiency, poverty and backwardness. This combined threat and promise leaves no alternative: 'In this dominant political conception, the economism of globalisation discourse is combined with an authoritarian technological determinism' (Barben, 1998: 417).

Agbiotech research focuses on knowledge-intensive products, e.g. GM seeds, enzymes, fatty acids and amino acids produced by microbiological methods. This industrial appropriation facilitates control from a distance by multinational companies of agricultural activities, e.g. decisions over what crops are

grown, how they are cultivated, etc. These knowledge-intensive inputs produce ignorance at farm level, thus creating a new market for information and inputs (Ruivenkamp, 2005: 13-14).

Master narratives promoting agbiotech have intersected with a prior conflict over agricultural futures, especially in Europe. This conflict has been theorised as 'food wars' between the 'Life Sciences Integrated' paradigm versus the 'Ecologically Integrated' paradigm (Lang and Heasman, 2004). In analogous ways, Marsden and Sonnino (2005) theories a competition among three paradigms. As the dominant one, complementing a neoliberal policy framework, the agri-industrial paradigm promotes globalised production of standardised food commodities for international markets. In the post-productivist paradigm, rural spaces become consumption spaces for urban and ex-urban populations. In the agrarian-based rural development paradigm, agricultural production is relocalised, by embedding food chains in highly contested notions of place, nature and quality.

Given these contending paradigms, 'rural space within Europe has become a 'battlefield' of knowledge, authority and regulation' (*ibid.*; also Sonnino and Marsden, 2006). At the same time, synergies can develop among rural activities such as quality agriculture, off-farm sales of products, agri-tourism, recreational activities, and agri-environmental schemes (Marsden and Smith, 2005: 441; Magnaghi, 2005: 96). Thus there can be a complementary relation between the post-productivist and agrarian-based rural development paradigms. Through quality agri-food chains, agrarian-based development has extended to rural-urban links through quality agri-food chains and even to urban agriculture (Jongerden, 2006).

Contending agricultural models can be seen as a specific case of EU narratives on the 'knowledge-based economy' (KBE). Through discourses of threat and opportunity, this concept helps to justify EU interventions into more policy areas, e.g. in the name of defending a European KBE from globalisation. The interventions empower some interests, while disorganising or demoting others (Burfitt *et al.*, 2006). Indeed, they favor neoliberal policy frameworks of economic competitiveness. At the same time, the KBE concept has scope for counter-hegemonic versions:

'...once accepted as the master narrative with all its attendant nuances and scope for interpretation, it becomes easier for its neo-liberal variant to shape the overall development of the emerging global knowledge-based economy [...] This said, we should not neglect the scope for counter-hegemonic versions of the knowledge-based economy and for disputes about the most appropriate ways to promote it (Jessop, 2005: 157).

By drawing on the above perspectives, this paper will analyse how the European agbiotech controversy extends prior conflicts over the agri-industrial paradigm. Master narratives promoting agbiotech encounter oppositional narratives of quality agriculture. This antagonism provides threats and opportunities for alternative agri-food networks.

3. EU policy for a neoliberal bio-economy

In European Commission policy, biotechnology has been long promoted as an essential tool for productive efficiency, economic competitiveness, wealth and the quality of life. Such benefits have been uniquely attributed to biotech, implying that only genetic modification techniques can provide them. This possible future has been naturalised as an objective necessity, while turning agbiotech into a symbol and instrument of a wider political-economic agenda.

The 1992 Maastricht Treaty promoted an integration of public and private sectors. By 1990 EC funds for biotech research became dependent upon industry partners committing resources to any project proposal. Research was given a clear economic function, especially in the private sector, with 'more careful attention to the long-term needs of industry ... The most vital resource for the competitiveness of the biotechnology industry is the capacity to uncover the mechanisms of biological processes and figure out the blueprint of living matter', according to managers of the DG-Research Biotechnology Division (Magnien and Nettancourt, 1993). Through such metaphors of mechanical engineering, GM techniques and molecular knowledge were naturalised as the basis of an entire industry.

Policy language blurred any distinction between conventional and GM techniques, as a discursive means to promote the latter. According to the European Commission's White Paper on *Growth, Competitiveness and Employment*, 'biotechnology' has a direct impact on sectors which comprise 9% of value-added in the EU. The global revenues of 'the biotechnology industry' was foreseen to reach 100bn ecu by the year 2000. Given these competitive pressures, 'perhaps only modern biotechnology has the potential to provide significant and viable thrusts...' The entire agro-food industry became discursively 'based on biotechnology' (CEC, 1993: 100-103). Within this narrative, all biological processes and products became economically dependent upon biotech for success in market competition. Therefore government had to remove any obstacles to the maximum exploitation of agbiotech.

In such ways, the 1993 White Paper counseled European adaptation to competitive pressures: 'The pressure of the market-place is spreading and growing, obliging businesses to exploit every opportunity available to increase productivity and efficiency' (CEC, 1993: 92-93). Moreover, Europe 'must exploit the competitive advantages associated with the gradual shift to a knowledge-based economy' (*ibid.*: 58).

This imperative was linked with technological innovations: 'The European Union must harness these new technologies at the core of the knowledge-based economy' (*ibid.*: 7). For the agricultural sector, priority was given to knowledge of genetic characteristics which could enhance productive efficiency or produce high-value substances. Institutional changes were promoted to turn that narrative into a self-fulfilling prophecy, towards making European agriculture dependent upon GM techniques and genetic knowledge.

Such knowledge was literally valorised by broader patent rights. Following a decade-long debate, the 1998 EC Patent Directive allowed broad patents on 'biotechnological inventions', even if they comprise new varieties of plants. Invention was broadly defined: 'Inventions which are new, involve an inventive step and are susceptible of industrial application are patentable even if they concern a product consisting of biological material' (EC, 1998). These broader patent rights gave financial incentives for public-sector research to seek lucrative genetic information and develop GM techniques for production of novel organisms.

A concept from the 1993 White Paper, the 'knowledge-based economy', was extended at the 2000 Lisbon summit of the EU Council. According to its 'Lisbon strategy', by 2010 Europe will be 'the globally most competitive knowledge-based region in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion'. In this master narrative, research and scientific innovation would be the driving force behind wealth creation. Agbiotech has been promoted as a key element of that strategy. When the Commissioner for Enterprise and Industry presented the Commission's new biotech strategy in 2005, he stated that it was his most important goal: 'It is my objective to ensure that

we create the conditions so that Europe becomes the natural home for biotechnological innovation'. Conversely, agbiotech has been naturalised as progress, potentially as a self-fulfilling prophecy, while pre-empting alternatives.

This naturalisation has been promoted through a master narrative of future Europe as a Knowledge-Based Bio-Economy, the topic of a major conference held in 2005. This narrative features terms such as Mother Nature's innovations, nature's toolset, biotech pistons, cell factories, food factory, nature's bounty, etc.; these metaphors link biology, mechanics and cornucopias. Industrialisation is attributed to inherent properties of Nature, while any economic activity involving biological material is classified as 'the bio-economy'. GM techniques are associated with specialty products: 'Biotechnology is opening up new possibilities in terms of tailor-made foods targeted at specific consumer needs'. The KBBE narrative has emphasised the extraction of 'renewable bio-resources', within a model similar to the agri-industrial food factory (CEC, 2005) – by contrast to the wider European debate over rural multifunctionality, imagining diverse socio-economic roles of agriculture.

The KBBE initiatives were applauded by the main industry organisation:

'Biotechnology can make a major contribution to Europe becoming more sustainable and economically dynamic. There is a whole new industry just emerging that can develop these clean and competitive materials' (EuropaBio, 2005).

Here 'clean' denotes an input-output efficiency of resource usage.

Around the same time as the KBBE 2005 conference, the OECD launched a global agenda for a bioeconomy. This meant economic activity 'which captures the latent value in biological processes and renewable bioresources to produce improved health and sustainable growth and development' (OECD, 2005: 5). According to a subsequent report from an expert group, the main driver is new biological knowledge: 'The bioeconomy is made possible by the recent surge in the scientific knowledge and technical competences that can be directed to harness biological processes for practical applications'. Potential benefits may be lost or delayed unless government decision-making procedures are adapted to those rapid advances; product safety remains the only grounds for any doubt to be overcome (OECD, 2006: 3).

Public need supposedly drives a bioeconomy in the agriculture sector. According to the OECD expert report:

'The main drivers for using biotechnologies in the agriculture sector are increasing population (in developing countries) and rising standards of living creating demand for higher input foods, products and services, along with urbanisation pressures on land availability and the negative side-effects of trying to increase production via traditional means. Biotechnologies allow crops to be grown in less favorable conditions, and help meet consumer demands on food quality, e.g. regarding pesticides and shelf life. Biotechnology can also be used to transform plants into 'factories' that can produce everything from modified foods to commodity chemicals' (OECD, 2006: 7-8).

From the problem-definition of sub-optimal productivity, traditional agricultural methods are portrayed as inefficient – by contrast to GM crops, which enhance productivity and add market value. 'Increasing value will be added at the level of primary production – though it is by no means certain whether the

proportion of the value taken by the primary producer will also change...’ (*ibid.*). This euphemistic phrase acknowledges doubts about the social distribution and benefits of extra market value, as if any societal inequities were incidental. OECD reports downplay commercial drivers – e.g. strategies for the agri-food chain to appropriate more value from farmers, even to control their production choices and methods.

The KBBE pervades the Commission’s Framework Programme 7, featuring this definition: ‘The term ‘bio-economy’ includes all industries and economic sectors that produce, manage and otherwise exploit biological resources and related services, supply or consumer industries, such as agriculture, food, fisheries, forestry, etc.’

The KBBE provides a general code for the thematic priority on ‘Food, Agriculture, Fisheries and Biotechnology’. For example, GM crops for industrial uses are linked with trade liberalisation, thus modelling the global South as an agricultural factory for exporting bio-resources. New opportunities for GM crops are sought through non-food uses (CEC, 2006). Framework Programme 7 offers some funds for organic agriculture, seen as a minor exception to the dominant paradigm, though not for other alternatives.

As a policy narrative, then, the KBBE selectively favors some knowledges as if responding to societal needs or objective imperatives. This narrative gives priority to laboratory knowledge of genetic characteristics which can be marketed for higher-value inputs or outputs. Extending the earlier policy of the European Commission, the KBBE links agbiotech with neoliberal agendas – for extending industrial agriculture, commoditising natural resources through laboratory knowledge, marketising public-sector research and providing new regulations to facilitate such changes. The drive to maximise profits through intensification goes hand-in-hand with a flexible labour market in the agricultural sector, promoting super-exploitation of migrant labour in particular (e.g. Lawrence, 2004).

This agenda has appropriated the language of sustainable agriculture. GM crops will promote the ‘sustainable intensification of agriculture’, according to Novartis. This agri-industrial model emphasises input-output efficiency, as a basis for individual producers to compete more effectively in global markets. Regulatory standards have facilitated approval of GM crops which extend the normal hazards of intensive monoculture, especially by supplementing the ‘pesticide treadmill’ with a genetic treadmill (Levidow, 2005).

Such links between agbiotech and neoliberal agendas have provided a vulnerable target for European opponents (Levidow, 2008). Anti-biotech protest eventually limited the commercialisation of GM products, especially when European supermarket chains excluded GM grain from their own-brand products in the late 1990s. At the same time, opponents have demanded and promoted alternatives to intensive industrial agriculture.

4. European quality agriculture: drivers and constraints

Long before agbiotech became controversial in Europe, many farmers were developing ‘quality’ alternatives to the agri-industrial system of standard bulk commodities. These alternatives gained impetus from a general European crisis of conventional intensive, productivist agriculture. This crisis features various drivers for quality alternatives and constraints upon their development.

Farmers have been trapped in a technological-economic treadmill, through dependency upon a series of commodity inputs in order to maintain or increase productivity for competitive advantage. Farmers have submitted to this treadmill and/or had greater difficulty in maintaining their income. Peripheral, less favored rural regions have faced threats to their livelihoods, driving farmers into debt and poverty. A technological determinism drives farmers into dependence upon market pressures. By contrast, economic success has been gained by innovative peasant practices which maintain a distance from such pressures (Van der Ploeg, 2003).

As a positive basis for alternative markets, consumers have had many reasons to prefer 'quality' food. Globalised, agri-industrial economies have anonymised the relations of production. Consumer distrust has resulted from various food scandals – e.g. *Salmonella*, dioxin residues, pesticide residues, and especially the 'mad cow' crisis (bovine spongiform encephalopathy or BSE). Beyond consumer safety, there has been greater public sensitivity to environment, health and rural livelihoods – under threat from productivist, globalised food systems. Alternatives have gained greater interest and support, especially since the BSE crisis.

All these issues have intersected with a prior debate over how to reform the Common Agricultural Policy (CAP), which has generally spent about half the EU budget. Impetus for CAP reform came mainly from WTO rules, which prohibited agricultural subsidy linked with production. Until the early 1990s CAP funds were spent mainly on price support to guarantee farmers a minimum price for their products; the more they produced, the greater the subsidy they received. In 1995 the EU started to pay rural development aid, designed to diversify the rural economy and make farms more competitive. Since the late 1990s reforms have partly decoupled subsidies from production levels, instead linking payments to food safety, animal welfare, and environmental standards.

In a 1997 proposal for reform, *Agenda 2000*, the environment was broadly defined to encompass the overall socio-economic effects of agriculture, not simply agrochemical pollution. The proposal emphasised rural livelihoods, the quality of food production, and its 'environmental friendliness'. In passing, it suggested: 'The development of genetic engineering, if well controlled, could enhance production but may raise questions of acceptability to consumers' (CEC, 1997: 27, 29).

By the late 1990s *Agenda 2000* aimed to secure 'a multifunctional, sustainable and competitive agriculture', partly as a means to justify extension of subsidies. According to the Commission, agriculture can harm the natural environment, but 'abandonment of farming activities can also endanger the EU's environmental heritage through loss of semi-natural habitats and the biodiversity and landscape associated with them'. Consequently, 'The CAP's objectives include helping agriculture to fulfil its multifunctional role in society: producing safe and healthy food, contributing to sustainable development of rural areas, and protecting and enhancing the status of the farmed environment and its biodiversity' (CEC, 2003: 2; also in EU, 2000).

The Commission also made food quality the new key to farming policy. A rural development policy encouraged farmers to diversify their production and marketing: 'Europe is known for the diversity of its farming and its agricultural products, which derive from its natural environment and farming methods developed over centuries'. Commission policy has favored 'the freedom to farm to market demands', i.e. to produce according to consumer preferences. This means contradictory pressures; farmers are

expected to be 'efficient and sustainable,' while guaranteeing quality, food safety and environmental protection (CEC, 2004: 1).

Those policies indicate a shift from quantity to quality, potentially towards an agrarian-based rural development, yet the CAP still favors agri-industrial methods. Subsidies are still spent mainly on direct subsidies according to the land area and animal units in production. Farmers can also benefit from agri-environmental schemes, especially by removing the least productive or least profitable land from production, while continuing intensive cultivation methods on the rest. Subsidy goes mainly to the biggest farmers, i.e. large agribusinesses and hereditary landowners, who receive the largest proportion of the funds.

Consequently, the CAP reform maintains social and geographical inequities. Half of all direct payments go to the largest beneficiaries in the more productive and competitive areas, such as the Paris basin, Lower Saxony and East Anglia. These are mainly export-led farms, contracted to multinational firms (Sarasuà and Scholliers, 2003). Price support measures of the CAP give organic farms 20-25% less benefit than comparable conventional farms (Häring *et al.*, 2004). The demand exceeds supply for locally produced organic products, thus generating lower-cost imports.

Despite significant demand for quality agriculture, then, the agri-industrial paradigm still prevails in European policy. According to a proponent, farm subsidies should be reduced and transferred to 'funding to sustain and enhance the environment', while 'ensuring that environmental regulations do not stifle global competitiveness' (Haskins, 2002). Moreover:

'... where European agriculture can be competitive, this competitiveness should, within environmental limits, be maximised. Where it cannot be competitive, farming per se should be downgraded behind good environmental husbandry as the linchpin of a subsidy/welfare system' (*ibid.*: 7-9).

In that scenario, subsidies would become conditional upon measures for environmental conservation beyond agriculture. As the EU lowers the support prices, farmers would need to produce competitively at world prices. In this way, trade liberalisation complements the further industrialisation of agriculture.

Small-scale producers have attacked that agenda, especially the plan for lower support prices. This policy would make farmers more dependent upon direct payments for their overall income. This 'will benefit agri-industry and the distribution sector rather than consumers', argued the Coordination Paysanne Européenne (CPE), representing farmers that rely on relatively less-intensive production systems. Under the reform, European taxpayers will continue to 'pay huge subsidies to huge farms, while driving the small ones out of business [and] support increasingly industrial farming methods, to the detriment of employment and the environment', according to the CPE (1999).

In the *paysan* view, the dominant reforms encourage large-scale farms to continue their intensive methods and (at best) to steward an 'environment' outside farming. This would 'accelerate the disappearance of multi-functional family farms'. *Paysans* advocate instead de-intensification measures, based on 'remunerative agricultural prices and sustainable family farming, with multiple benefits for society' (CPE, 2001). In other words, multi-functional skills should be sustained within farming communities, not simply outside agriculture. Thus the Coordination Paysanne Européenne counterposes a rural development paradigm to the agri-industrial paradigm.

Those proposals were echoed by the European coordination of consumer cooperatives:

‘Social criteria for sustainable development means that the rural policies should take into account the issues of employment, cultural diversification, regional development, living rural areas, etc. From the Consumers’ point of view, the social criteria also imply that the CAP has to serve as a way to improve food quality and safety’ (Euro Coop, 2002).

Although the CAP reform claims to support ‘sustainable agriculture’, tensions continue between its incentives and quality products. In some countries, dependence on the CAP perpetuates industrial agriculture. In Italy, success in creating quality networks corresponds to the degree of distance from the CAP, its certification system and its bureaucratic criteria. Thus quality networks need to defend their spatial and social boundaries from the CAP (Marsden and Smith, 2005: 449).

The CAP reform extends a split between two agricultural models:

‘It seems likely that we are headed for a two-track agriculture. One track is a largely “competitive” free-market industrialised agriculture that can only survive in the EU and in large parts of the U.S. with massive subsidies, which, to be acceptable to the WTO, have to be recast as direct supports, independent of production. The second track is a small, designer quality/organic sector that produces highly priced niche goods for those who can afford it and who wish, for health, environmental and taste reasons, to escape the dangers of mass-produced fare’ (Kuper, 2007: 78).

Although these models may co-exist, the quality sector faces both threats and opportunities from the agri-industrial system, as analysed in the rest of this article.

5. Re-localising agri-production through quality

Since the 1990s European agri-food systems have developed an ‘economy of quality’, by analogy to the viniculture system of *appellation d’origine contrôlée*, whereby local characteristics provide a basis for long-distance markets. This economic model differentiates among qualities rather than increasing productive efficiency. Such innovations valorise diverse qualities whose market value has a symbolic, immaterial character as well as a basis in material resources; their market value remains dependent upon consumer satisfaction and thus vulnerable to reputational crises (Allaire, 2002: 172-176).

Diverse notions of ‘quality’ include the following: an identifiable place of origin, a regional reputation, aesthetic characteristics of a product, nutritional quality, social justice, etc. (Sonnino and Marsden, 2006). Through such qualities, small-scale producers attempt to differentiate their products as a means to obtain added value, rather than compete for ever-higher productivity of global commodities (Ilbery and Kneafsey, 2000).

Quality also relates to methods which re-peasantise European farming (Van der Ploeg *et al.*, 2000: cited in Goodman, 2004: 6-8). Retro-innovation appropriates traditional methods through a backward-forward technological adaptation. Sources include traditional types of animal slaughter, curing techniques, pest management, etc. (Marsden and Smith, 2005: 450). For example, agronomic changes can mean farming in more economically and ecologically ways, by using on-farm resources rather than commodity-inputs, thus also reducing costs. These methods link two aims that were previously competing – environmental protection and farmers’ income. Not simply reducing pollution, this means recasting the ‘environment’

as cultural values, both within and beyond agriculture. As another strategy, farmers can also produce high-quality products which add value to the market price (Goodman, 2004).

Based on special cultivation methods and/or product characteristics, diverse 'qualities' are socially validated through alternative food supply chains (Murdoch *et al.* 2000: 122). These have linked producers more closely with consumers. In this way, products can gain market value and allocate this value to primary producers. Short supply chains depend upon direct local links (Renting *et al.*, 2003). As means to connect producers with distant consumers, alternative supply chains also depend upon territorial quality labels; they develop 'spatially extended networks, which are selling brands, labels and seriously commodifying their culinary repertoires' (Marsden, 2004: 138-39).

Short supply chains have been stimulated by local government policies. Many large cities (London, Rome, Munich, Copenhagen, New York, Vienna) or regions (Wales, Andalusia, Tuscany) have official strategies which link support for nearby farmers with general objectives for the whole population (e.g. water quality, biodiversity, health). Those policies share common principles: namely, that market signals from public or private sectors can effectively complement subsidies. Short supply chains are a vector for those signals, especially through regular box schemes, as well as public purchase for catering in schools, hospitals, elderly homes, etc. In a detailed case study, bread production has been analysed as a short-supply chain; this revealed the expansion, specialisation and concentration process within the Austrian food system, as well as its impacts on landscape (Penker, 2006).

'Local' food provides a general basis for short-supply chains. They have linked local with quality food, especially for three characteristics: freshness, taste and provenance. The latter relates to trusted local sources, which could be extended beyond a locality through trusted networks (Ilbery *et al.*, 2005b: 7).

Alternative agri-food networks (AAFNs) re-localise food networks by linking food more directly with local farming practices, rural nature, landscapes and resources. AAFNs are territorially based networks, dependent upon active involvement of diverse actors – farmers, food processors, local distributors, local NGOs, restaurants, consumers, local and regional authorities – who interact mainly through informal contact (Roep, 2002; Renting *et al.* 2003). In the UK such initiatives are located mainly in rural areas, though concentrated in specific areas near urban centers and access to particular trunk roads, as well as near a specific geography of farming types and alternative lifestyles (Ilbery *et al.*, 2005a). In Brittany AAFNs are located more in peri-urban areas, which indicate a new paradigm in town-countryside relations, as well as an experimental arena for sustainable development practices.

There are divergent, even competing definitions of quality, both between and within countries (Renting *et al.*, 2003). In France, Italy and Spain for example, AAFNs build on regional traditions and direct sales to consumers. In southern Europe more generally, quality is shaped by the production context, e.g. culture, tradition, terrain, climate, local knowledge system. In northern countries like the UK, Germany and the Netherlands, 'quality' emphasises environmental sustainability or animal welfare, as well as retailer-led forms of marketing (Sonnino and Marsden, 2006). In such northern European countries, AAFNs reconcile agricultural production and environmental protection along lines which can be theorised as ecological modernisation (Evans *et al.*, 2002). The latter can mean an emphasis on less-intensive methods rather than distinctive quality products.

Some alternatives illustrate a general strategy of territoriality, whereby a locality builds upon a distinctive history and identity, as an approach to sustainable development. This involves 'positive relationships between the three components whose reciprocal interactions produce territory: the natural environment, the urban environment, and the social and human environment'. In this strategy, agricultural producers expand their roles towards the production of common goods, e.g. hydro-geological conservation, land reclamation, rural tourism, craftsmanship, etc. (Magnaghi, 2005: 83, 87).

Some Italian localities illustrate convergence between agrarian-based and post-productivist development models. Organic farming has increased through agri-tourism, rural guesthouses, etc., as well as from urban interest in educational projects linking quality agriculture, local cultures and cultivars, agri-parks, etc. (*ibid.*: 96). A viticulture cooperative has returned to organic methods, which provide a basis for an agri-teaching project, agri-tourism and recreational activities. Italian livestock and milk producers have proposed a territorial strategy for alternative agricultures; this would develop short production-consumption chains, with quality labels indicating the place of origin, and animal breeding methods which respect animals. This means a real economy rather than a fictitious one (Dalla Costa and De Bortoli, 2005).

In all those ways, new socio-economic networks develop 'alternative geographies of food production' (Whatmore and Thorne, 1997; Maye *et al.*, 2007). Their success depends upon political alliances between farming and other interest groups in the agri-food chain, as well as with consumer and environmentalist interests around issues of food quality, safety and ecology. Such alliances have challenged the policy consensus around agri-industrial productivist systems (Whatmore, 1994: 59-60).

6. Oppositional roles of AAFNs

Through such alliances, alternative agricultures have been increasingly counterposed to industrial agriculture. In some cases, 'quality' schemes are promoted as a form of opposition.

'Here labels are employed to draw attention to the environmental, social and distributional processes associated with particular products, and to distance them from the perceived negative consequences of product standardisation, mass marketing, environmental degradation, and health and safety concerns. For example, organic, bio-dynamic or integrated farming and fair-trade labels, together with a number of "sustainable farming" schemes in Europe and North America, are driven largely by such concerns and are proselytised as alternatives to more classic forms' (Ilbery *et al.*, 2005a: 120).

In some EU member states, some farmers' organisations have played a major role in opposing agri-industrial systems. Europe-wide opposition to agbiotech came initially from the Coordination Paysanne Européenne, defending farmers' skills and quality production along lines much broader than organic agriculture (Seifert, this volume). *Paysan* activists have drawn analogies between *paysans* in Europe and the global South; they all seek independence from the global market for standard commodities, symbolised by GM crops (Bové and Dufour, 2001). That conflict was extended through a series of Europe-wide conferences linking regional authorities and stakeholder groups.

The first major conference on 'GMO-free zones' was held in Berlin in January 2005. Organised by the Foundation for Future Farming, the conference criticised the European Commission policy on

the 'coexistence of GM, conventional and organic agriculture'. Several regional authorities there linked 'GMO-free zones' with food sovereignty, quality labels on food products and regional-cultural biodiversity. With the slogan, 'Our Land, our Future, our Europe', their charter identified GM crops as a threat to 'sustainable and organic farming and regional marketing priorities for their rural development' (FFA, 2005). In particular:

'Most European regions have made the promotion of sustainable and organic farming and regional marketing priorities for their rural development... Most Europeans don't want GM-food. To serve this demand is part of a region's food sovereignty and an important economic chance. Regional authorities must be able to protect quality labels, purity standards, organic production and designations of origin at competitive prices' (FFA, 2005).

At a subsequent conference in Florence, speakers more explicitly promoted a geopolitical alliance for a 'sustainable' future agriculture against agbiotech. As conference host, the Tuscany Regional President linked the precautionary principle, zero tolerance for the presence of GMOs, and uncertainty about their compatibility with environmental protection:

'We wish to avoid any standardisation of products which no longer have anything to do with their place of production. In Europe there must be room for a model of agriculture which is based on a genuine identity, cultural characteristics, high-quality GMO-free products' (AER/FoEE, 2005).

The Florence conference resulted in 'The charter of regions and local authorities of Europe on the coexistence of GMOs and conventional and organic crops', which in turn started the Network of GMO-free Regions. According to the charter, specific 'coexistence' plans would be based on in-depth feasibility studies examining the environmental, socio-economic and cultural impact of GMOs. Areas could be designated as 'GMO free' in order to protect any added value of certified quality products.

A larger conference broadened the network for alternative futures. Entitled 'Safeguarding Sustainable European Agriculture: Coexistence, GMO free zones and the promotion of quality food produce in Europe', the conference was sponsored by the Assembly of European Regions and Friends of the Earth Europe. It aimed 'to define the most appropriate EU legal framework for an efficient coexistence regime' (AER/FoEE, 2005). Moreover, local environments were framed as cultural-economic assets under threat from GMOs. In their declaration, the organisers sought:

'To allow regions to determine their own agricultural development strategy, including the preservation and development of regionally adapted genetic resources and the right to prohibit GMO cultivation' (*ibid.*).

At the conference numerous regional representatives elaborated that agri-development theme, which was counterposed to agri-industrial methods including GM crops. They described their 'natural' environment or special cultivation methods as a basis to market local products and services. According to a speaker from southwest England, for example, their local authority is committed to 'treating the environment as a highly valuable capital asset to be managed intelligently for long-term economic benefit' (FoEE, 2005). According to a report on the conference, the speakers had emphasised 'how their local specialised agriculture was a precious resource that plays a vital role in marketing their region' (*ibid.*: 15).

An even larger conference promoted 'GMO-free regions' to a broader public during International Green Week in January 2006 in Berlin. By this time, 'GMO-free' declarations had come from more than 160 regions, 3500 municipalities and local authorities, and tens of thousands of farmers in Europe. According to the Network, they were reclaiming their rights to local and regional self-determination – with regard to their landscapes, eco-systems, agricultural practices, food traditions and future economic development. Moreover, farmers and food processors cooperated to find sources of non-GM animal feed for their GM-free animal products, thus increasing the pressures to segregate distinctive markets for grain (AER, 2006).

In those ways, a new coalition has sought a competitive advantage for alternative agricultures. Their counter-narrative links several themes: precaution, environmental risk, socio-economic regionalism, market competition, consumer choice, rural development and *paysan* identity. Through these discursive links, a new coalition brought together diverse stakeholders: farmers, agronomists, grain traders, regional administrators, politicians, consumer organisations and some early opponents of agbiotech.

Those initiatives were followed up with a stronger emphasis on alternatives for agricultural biodiversity and rural development. The 2007 'GMO-free' conference emphasised these threats and opportunities:

'The erosion of biodiversity, independent farming, and regional quality food production arising from the exclusive control of seed by fewer and fewer companies. The challenges for rural development, biodiversity, food culture and food security arising from the global competition between food and fuel production' (GMO-free regions, 2007).

Speakers there demanded greater access to genetic diversity, traditional seeds and farmer-bred varieties, as a means to improve quality and pest resistance on the local level. They attacked European Commission policy for limiting such access, while instead favoring novel seeds from GM and hybrid techniques: 'Seeds grow from the bottom up. Laws usually come from the top down', according to Hannes Lorenzen, speaking for the Green Group in the European Parliament, as well as for PREPARE, the partnership for rural Europe network. In his view, the Commission's research policy favors research institutes, seed specialists and gene banks, towards conserving genetic diversity mainly as resources for genetic modification technology (*ibid.*).

Organic agriculture has become an arena for struggle between different agri-food models, which take the form of contending standards. When the EU Agriculture Council adopted new standards in June 2007, several issues were contentious. 'GM' labelling would not be required unless GM material exceeds 0.9%, i.e. the same as for conventional food. Labelling must specify the place of production but not the producer's name. Organic producers must quantitatively analyse their use of conventional agricultural inputs and materials. According to the Coordination Paysanne Européenne, that costly requirement will penalise small-scale producers, while disfavoring natural agri-inputs and traditional seeds. Overall the EU policy was putting organic agriculture 'in danger of contamination and industrialisation', claimed the *paysan* critics (CPE, 2007).

On economic as well as environmental criteria, quality alternatives have been counterposed to agbiotech by an NGO critique, *The EU's Biotechnology Strategy: mid-term review or mid-life crisis?* This report emphasised the socio-economic benefits of organic agriculture and agri-environmental schemes, on the one hand, by contrast with agri-food biotech, on the other. Benefits were quantitatively compared in

terms of industrial competitiveness, market diversity, resource impacts and job creation. On all those parameters, agbiotech have provided less benefit, thus conflicting with the strategic objectives of the Commission's Lisbon agenda; by contrast, organic farming within a rural development policy provides a competitive alternative (FoEE, 2007). That report focused on organic agriculture because relevant statistics were more readily available than for quality alternatives in a broader sense.

In sum, alternative agricultures have been increasingly promoted in opposition to agri-industrial methods. In particular, agbiotech has been cast as both a liability and diversion of resources. This conflict arises most sharply wherever quality alternatives gain local support (Levidow and Boschert, 2008). GM crops are portrayed as a threat to the image of 'quality' products and their regional sources, as well as a diversion of resources; conversely, 'GM-free zones' brand entire regions as sources of quality.

7. Conclusion: contending bio-economies

EU policy features a master narrative of the Knowledge-Based Bio-Economy (KBBE), which marginalises the 'quality' narratives of alternative agri-food networks (AAFNs). Each narrative promotes contending paradigms for rural space. Each has different ways of defining agricultural problems, devising solutions, relating producers to consumers, adding value and commoditising resources, as shown in Table 1.

The KBBE portrays traditional agri-methods as backwards and less efficient. By contrast, AAFNs portray agbiotech as an economic liability, societal threat and illusory promise. Wherever AAFNs gain local support, sometimes backed by national or regional governments, these different narratives are in economic competition, even in political conflict.

Within an agri-industrial paradigm, the KBBE favors capital-intensive technological innovation as the reference point for relevant knowledge. Through its circular reasoning, agricultural problems arise from depleted agricultural resources, productive inefficiency, a morbidity of weak crops, etc. – whose remedy lies in agbiotech products (cf. Cooper, 2007; Birch, 2007). Their success depend upon neoliberal policies which reshape European institutions – for commoditising natural resources through laboratory techniques, restricting access through broader patents based on 'invention' claims, creating new forms of scarcity, intensifying competition for productivity, and marketising public-sector research.

These neoliberal policy changes are promoted and naturalised along with the promise of biotechnological remedies. Thus the KBBE promotes a self-fulfilling prophecy through institutional changes favoring some knowledges, especially those which can be privatised, while pre-empting alternatives. Within this paradigm, AAFNs remain an extra, marginal option – and perhaps a backwards, obsolete one.

The KBBE narrative intersects with a prior conflict over priorities for European agriculture and government subsidy. At issue has been how to enhance the competitiveness of European agriculture; whether to sustain or supersede intensive agriculture; how to enhance the quality of food products, farmland and regional development. In reforming the Common Agricultural Policy, the system for EU subsidy, new criteria aimed to accommodate diverse agricultural futures; yet CAP reform has extended conflict between the agri-industrial versus agrarian-based development paradigms. This antagonism arises from political-economic threats to quality alternatives, which undergo pressures of incorporation and marginalisation by conventional agri-food chains.

Table 1. Contending bioeconomies, their narratives and coalitions.

	KBBE: knowledge-based bio-economy	AAFNs: alternative agri-food networks
Narrative		
Institutions	European Commission, Europabio, industrial farmers (COPA), European People's Party MEPS, OECD.	Coordination Paysanne Européenne (CPE), environmental NGOs, Assembly of European Regions, Alimenterra, Green MEPS.
Paradigm	Agri-industrial development.	Agrarian-based rural development (including post-productivist too).
Issues	<p>Agricultural-economic threats</p> <p>Agri-environmental weakness (diagnosis)</p> <p>Knowledge and resources as assets</p> <p>Value-added sources</p> <p>Markets</p> <p>Subsidy criteria</p> <p>Agriculture to sustain what?</p>	<p>Standardised commodity production, economic-technological treadmill, farmers' dependence on multinational companies.</p> <p>Intensive monoculture attracting pests and diseases, while undermining local resources.</p> <p>Local resources as bio-vital strengths, e.g. biological methods of pest control, immaterial environmental characteristics, aesthetic qualities of food products, and farmers' skills in using these resources.</p> <p>Quality agri-food chains as means for primary producers (especially farmers) to gain from the value that they add.</p> <p>Consumer-producer links through alternative networks, quality reputations and collective knowledge.</p> <p>Use subsidy to maintain high prices that can support rural livelihoods from diverse, quality agriculture.</p> <p>Sustaining local community networks through quality processes and products.</p>

MEPS: members of European Parliament.

COPA: Committee of Agricultural Organisations of the EU.

AAFNs promote high-quality, high-skill agri-production, which can also provide a basis for eco-tourism. AAFNs depend upon cooperative social networks which link food producers with consumers. These networks give 'quality' meanings to immaterial characteristics of agricultural processes and products. Here 'quality' depends upon commoditising various local resources which symbolise bio-vitality, as a commons to be developed through communities and collective knowledge. Civil society actors are mobilised around new supply chains – potentially involving 'traditional' methods, aesthetic qualities of products, socio-political commitments beyond economic interests, and local networks. AAFNs re-localise production through short supply chains, while also providing a specific territorial basis for longer-distance specialty markets.

As defined through AAFNs, quality agriculture implies an alternative type of knowledge-based bio-economy. These networks create, add and capture market value for the benefit of primary producers, especially farmers, by contrast to the technological-economic treadmill of agri-industry. Quality agriculture valorises local resources through diverse inputs, outputs and societal benefits. Agricultural labour is re-professionalised, while products are re-differentiated, in ways which build local reputations and networks. This can involve retro-innovation, e.g. re-appropriating traditional methods. By contrast, the agri-industrial system may re-professionalise labour and re-differentiate products in ways which favor laboratory-based, proprietary knowledge.

In all those ways, agri-industrial systems and AAFNs promote contending bio-economies. Beyond simply an alternative, AAFNs have been turned into a counter-narrative: 'Another agriculture is possible' – and necessary. AAFNs challenge the dominant neoliberal form of capitalism, if only in order to avoid being incorporated or marginalised. Alternatives portray agbiotech as a multiple threat of symbolic contamination, globalisation, economic competition and corporate political domination over government policy.

Through regional authorities, a Europe-wide 'GM-free' network brands regions as sources of quality agri-food products, by contrast to agri-industrial systems. This counter-narrative challenges the supposedly objective imperatives of global competition for bulk commodity production. Through this challenge, at once discursive and practical, new alliances can play an oppositional role.

In this struggle for hegemony between two forms of bioeconomy, policy coalitions operate across several arenas: narratives diagnosing agricultural problems in ways which favour specific future developments; rural development strategies for land use, employment and communities; subsidy criteria of the CAP and national implementation; markets structuring relations between production and consumption; rules on GM labelling, segregation and coexistence; civil society actors and their roles. The outcome will depend upon struggles across all those arenas, with all their EU-wide diversity.

Questions for further analysis:

- What are the dynamic relations between competing bio-economies in the agri-food sector?
- How do AAFNs stimulate and validate 'quality' characteristics of agri-food products?
- How do such products undergo pressures to be incorporated or marginalised by conventional food chains?
- How do AAFNs avoid or resist those pressures, e.g. by opposing agri-industrial systems?
- What are the prospects and limits of such opposition?

Acknowledgements

This paper draws upon a background literature survey from a research project, 'Facilitating Alternative Agro-food Networks (FAANs): Stakeholder Perspectives on Research Needs', coordinated by the Inter-University Research Center for Technology, Work and Culture (<http://www.ifz.tugraz.at>). It involves partners in several member states, with funding from the European Commission, during 2008-2010. It will coordinate partners in several member states, with funding from the European Commission, starting in spring 2008. Thanks for comments on this paper from Sandra Karner of the IFZ, as well as from Keane Birch, Melinda Cooper, Bernhard Gill, Steve Hincliffe, Joost Jongerden and Bron Szerszynski. Also helpful were comments at the conference on 'Reconstruction Agro-Biotechnologies for Development', held in November 2007 in Kyoto.

References

- AER/FoEE (2005). Safeguarding Sustainable European Agriculture: Coexistence, GMO free zones and the promotion of quality food produce in Europe, 17 May conference, www.a-e-r.org.
- AER (2006). 2nd Berlin conference of GMO-free regions, Assembly of European Regions, www.a-e-r.org.
- Almekinders, C. and Jongerden, J. (2002). On Visions and New Approaches: Case studies of organizational forms in organic plant breeding and seed production. Working Paper, Technology and Agrarian Development, Wageningen University. Available at: http://library.wur.nl/wasp/bestanden/LUWPUBRD_00321165_A502_001.pdf
- Allaire, G. (2002). L'économie de la qualité, en ses secteurs, ses territoires et ses mythes. *Géographie, Économie, Société* 4(2): 155-180.
- Barben, D. (1998). The political economy of genetic engineering. *Organization and Environment* 11(4): 406-420.
- Birch, K. (2006). The neoliberal underpinnings of the bioeconomy: the ideological discourses and practices of economic competitiveness. *Genomics, Society and Policy* 2(3): 1-15, www.gspjournal.com.
- Birch, K. (2007). The virtual bioeconomy: the 'failure' of performativity and the implications for bioeconomics. *Distinktion* 14: 83-99.
- Bové, J. and Dufour, F. (2001). *The World is Not For Sale: Farmers Against Junk Food*. Verso.
- Burfit, A., Collinge, C. and MacNeill, S. (2006). The discursive constitution of regional knowledge economies: a case study of the European Lisbon Agenda. Available at: <http://www.eurodite.bham.ac.uk/Papers/WP1b/discourse%20paper.doc>
- CEC (1993). *Growth, Competitiveness, Employment: The Challenges and Ways Forward into the 21st Century*. Brussels, Commission of the European Communities.
- CEC (1997). Agenda 2000: For a Stronger and Wider Union. *Bulletin of the European Communities*, supplement 5/97, Brussels, Commission of the European Communities.
- CEC (2003). *Agriculture and Environment*. Brussels, Directorate-General for Agriculture. Available at: http://ec.europa.eu/agriculture/publi/fact/envir/2003_en.pdf
- CEC (2004). *The Common Agricultural Policy Explained*.
- CEC (2005). *New Perspectives on the Knowledge-Based Bio-Economy: conference report*. Brussels, DG-Research. Available at: http://ec.europa.eu/research/conferences/2005/kbb/report_en.html.
- CEC (2006). Food, Agriculture, Fisheries and Biotechnology. Work programme. Available at: <http://cordis.europa.eu/fp7/research.htm>
- Cooper, M. (2007). Life, autopoiesis, debt: inventing the bioeconomy. *Distinktion* 14: 25-43.
- CPE (1999). Agenda 2000 negotiations: the funding of the CAP. Brussels, Coordination Paysanne Européenne, www.cpefarmers.org.

- CPE (2001). To change the CAP. Brussels, Coordination Paysanne Européenne, www.cpefarmers.org.
- CPE (2007). L'agriculture biologique en danger de contamination et d'industrialization.
- Dalla Costa, M. and De Bortoli, D. (2005). For another agriculture and another food policy in Italy. *The Commoner* no. 10, Spring-Summer, www.thecommoner.org.
- EC (1998). Directive 98/44/EC of the European Parliament and of the Council on Protection of Biotechnological Inventions. *Official Journal of the European Communities*, 30 July, L 213: 13.
- EGSG (2007). *Taking European Knowledge Society Seriously*. Report of the Expert Group on Science and Governance, Brussels, European Commission, EUR 22700. Available at: http://ec.europa.eu/research/science-society/document_library/pdf_06/european-knowledge-society_en.pdf
- EU (2000). *Agenda 2000: Reform of the Common Agricultural Policy (CAP)*.
- Euro Coop (2002). Euro Coop believes the CAP has to be deeply reformed. Available at: <http://www.eurocoop.org/publications/en/position/Pac2002.asp>
- Europabio (2005). New bio-economy web portal launched, 15 Sept. 2005.
- Evans N., Morris C. and Winter M. (2002). Conceptualizing agriculture: a critique of postproductivism as the new orthodoxy. *Progress in Human Geography* 26 (3): 313-332.
- FFA (2005). Foundation Future Farming, Assembly of European Regions. Berlin Manifesto for GMO-free Regions and Biodiversity in Europe, January, www.are-regions-europe.org.
- FoEE (2005). Regions demand 'power-sharing' over GMO decisions. *FoEE Biotech Mailout*, July 15-16, 2005.
- FoEE (2007). The EU's Biotechnology Strategy: mid-term review or mid-life crisis? Friends of the Earth Europe. Available at: http://www.foeeurope.org/publications/2007/FoEE_biotech_MTR_midlifecrisis_March07.pdf
- GMO-Free Regions (2007). 3rd International Conference on GMO-Free Regions, Biodiversity, and Rural Development. <http://www.gmo-free-regions.org/>.
- Goodman, D. (2004). Rural Europe redux? Reflections on alternative agro-food networks and paradigm change. *Sociologia Ruralis* 44(1): 3-16.
- Gottweis, H. (1998). *Governing Molecules: The Discursive Politics of Genetic Engineering in Europe and the United States*. MIT Press.
- Hajer, M. (1995). *The Politics of Environmental Discourse*. Oxford, Oxford University Press.
- Häring, A.M., Dabbert, S., Aurbacher, J., Bichler, B., Eichert, C., Gambelli, D., Lampin, N., Offermann, F., Olmos, S., Tuson, J. and Zanoli, R. (2004). Organic farming and measures of European agricultural policy. *Organic Farming in Europe: Economics and Policy* 11. Hohenheim, Universität Hohenheim.
- Haskins, Lord (2002). *The Future of European Rural Communities*. London, Foreign Policy Center.
- Ikejima, Y. and Hisano, S. (2007). Rediscovering locality? A case of traditional vegetables in Kyoto, article in this collection, based on talk at the conference on 'Reconstruction Agro-Biotechnologies for Development', held in November 2007 in Kyoto. Available at: www.tailoringbiotechnologies.com.
- Ilbery, B. and Kneafsey, M. (2000). Producer constructions of quality in regional speciality food production: a case study from South West England. *Journal of Rural Studies* 16: 217-230.
- Ilbery, B., Morris, C., Buller H., Maye D. and Kneafsey M. (2005a). Product, process and place: an examination of food marketing and labelling schemes in Europe and North America. *European Urban and Regional Studies* 12(2): 116-132.
- Ilbery, B., Little, J.K., Kneafsey, M. and Gilg, A. (2005b). Relocalization and alternative food networks: a comparison of two regions. End of Award Report for ESRC project R000239980.
- Jongerden, J. (2006). The urban village: territorialization of sustainable development. *Tailoring Biotechnologies* 2(1): 95-104.
- Jessop, B. (2005). Cultural political economy, the knowledge-based economy and the state. *The Technological Economy*, In: (Eds. A. Barry and D. Slater), London: Routledge pp. 144-166.
- Kuper, R. (2007). European agriculture in the crucible of the WTO. *Capitalism Nature Socialism* 18(3): 68-80.

- Lang, T. and Heasman, M. (2004). *Food Wars: The Global Battle for Mouths, Minds and Markets*. London, Earthscan.
- Lawrence, F. (2004). *Not on the Label: What really goes into the food on your plate*. London, Penguin.
- Levidow, L. (2005). Governing conflicts over sustainability: agricultural biotechnology in Europe. In: *Agricultural Governance: Globalization and the New Politics of Regulation* (Eds. V. Higgins and G. Lawrence), London, Routledge, pp. 98-117.
- Levidow, L. (2008). Making Europe unsafe for agbiotech. In: *Handbook of Genetics & Society*. London, Routledge, in press.
- Levidow, L. and Boschert, K. (2008). Coexistence or contradiction? GM crops versus alternative agricultures in Europe. *Geoforum* (in press).
- Magnaghi, A. (2005). Local self-sustainable development: subjects of transformation. *Tailoring Biotechnologies* 1(1): 79-102.
- Magnien, E. and de Nettancourt, D. (1993). What drives European biotechnological research? In: *Biotechnology Review no.1: The Management and Economic Potential of Biotechnology* (Eds. E.J. Blakeley and K.W. Willoughby), Brussels, Commission of the European Communities, pp. 47-48.
- Marsden, T.K. (2004). The quest for ecological modernization: re-spacing rural development and agri-food studies. *Sociologia Ruralis* 44(2): 129-146.
- Marsden, T.K. and Smith, E. (2005). Ecological entrepreneurship: sustainable development in local communities through quality food production and local branding. *Geoforum* 36: 440-451.
- Marsden, T.K. and Sonnino, R. (2005). Rural food and agri-food governance in Europe: tracing the development of alternatives. In: *Agricultural Governance: Globalization and the New Politics of Regulation* (Eds. Higgins, V. and Lawrence, G.), London, Routledge, pp. 50-68.
- Maye, D., Holloway, L. and Kneafsey, M. (Eds.) (2007). *Alternative Food Geographies*. Elsevier.
- Murdoch, J., Marsden, T. and Banks, J. (2000). Quality, nature, and embeddedness: some theoretical considerations in the context of the food sector. *Economic Geography* 76(2): 107-125.
- OECD (2005). *Proposal for a Major Project on the Bioeconomy in 2030*. Paris, Organization for Economic Cooperation and Development.
- OECD (2006). *The Bioeconomy to 2030: Designing a Policy Agenda. Scoping paper*. Paris, Organization for Economic Cooperation and Development.
- Penker, M. (2006). Mapping and measuring the ecological embeddedness of food supply chains. *Geoforum* 37: 368-379.
- Rein, M. and Schön, D. (1991). *Frame Reflection: Toward the Resolution of Intractable Policy Controversies*. New York, Basic Books.
- Renting, H., Marsden, T. and Banks, J. (2003). Understanding alternative food networks: exploring the role of short food supply chains in rural development. *Environment and Planning A* 35: 393-411.
- Rigby, D. and Bown, S. (2007) Whatever happened to organic? Food, nature and the market for 'sustainable' food, *Capitalism Nature Socialism* 18(3): 81-102.
- Roep, D. (2002). The added value of quality and region: The Waddengroup Foundation. *Living Countryside. Rural Development Process in Europe: The State of the Art*. In: (Eds. Van der Ploeg D., Banks J., Long A.), Doetinchem, Elsevier, pp. 88-98.
- Rose, N. (2001). The politics of life itself. *Theory, Culture and Society* 18(6): 1-30.
- Ruivenkamp, G. (2005). Tailor-made biotechnologies: between bio-power and sub-politics. *Tailoring Biotechnologies* 1(1): 11-33.
- Sarasuà, C. and Scholliers, P. (2003). Technology, and Food Production, Distribution and Consumption: a research essay and agenda for Budapest. Available at: <http://www.histech.nl/tensphase2/Publications/Working/essayagr.pdf>

- Smith, A. (2006). Green niches in sustainable development: the case of organic food in the United Kingdom, *Environment and Planning C: Government and Policy* 24: 439-458.
- Sonnino, R. and Marsden, T.K. (2006). Beyond the divide: rethinking relations between alternative and conventional food networks in Europe. *Journal of Economic Geography* 6(2): 181-199.
- Van der Ploeg, J.D. (2003). *The Virtual Farmer*. Assen, Royal Van Gorcum.
- Van der Ploeg, J.D., Renting, H., Brunori, G., Knickel, K., Mannion, J., Marsden, T., de Roest, K., Sevilla-Guzmán, E. and Ventura, F. (2000). Rural development: from practices and policies towards theory. *Sociologia Ruralis* 4(4): 391-408.
- Whatmore, S. (1997). Global agro-food complexes and the refashioning of rural Europe. In: *Globalization, Institutions and Regional Development* (Eds. A. Amin and N. Thrift), Oxford, Oxford University Press, pp. 87-106.
- Whatmore, S. and Thorne, L. (1997). Nourishing networks: alternative geographies of food. In: *Globalising Food: Agrarian Questions and Global Restructuring* (Eds. D. Goodman and M. Watts), London, Routledge, pp. 287-304.
- Xenos, N. (1989). *Scarcity and Modernity*. London, Routledge.