

GeneWatch UK response to the Environmental Audit Committee's inquiry on Sustainable Food

March 2011

Summary

1. The Government's localism agenda and DEFRA's business plan potentially provide an opportunity to reconnect people to the process of food production and supply. However, if this is to be done successfully, policy makers need to be aware of the factors that facilitate and hinder Local Food Systems and ensure that these are given adequate consideration.
2. The Government should:
 - support the bottom-up character and expansion of the Leader programme as a key part of the Common Agricultural Policy's Rural Development Programme;
 - investigate the forces that lengthen food supply chains and devise measures to help shorten those chains, so that producers can gain more of the value that they add;
 - ensure adequate ring-fenced funding for locally-led public health initiatives and encourage these to build on existing local food initiatives rather than starting again from scratch;
 - ensure that national and EU policies (including hygiene, planning and business regulations; and policies in innovation and education) are formulated in such a way that Local Food Systems are recognised and valued for the broad range of benefits they bring;
 - do more to facilitate local food procurement.
3. Support for local slaughterhouses, or mobile slaughterhouses, is essential for a genuinely sustainable, local meat supply. GeneWatch recommends that the committee takes time to look into this, and even considers taking evidence on it as a stand alone issue in more depth.
4. In addition, Government should support labelling and traceability schemes that encourage sustainability and high welfare standards through facilitating consumer choice; and oppose subsidies for environmentally damaging practices (such as the use of maize for large-scale biofuels production).

Introduction

5. GeneWatch UK is a not-for-profit group that monitors developments in genetic technologies from a public interest, human rights, environmental protection and animal welfare perspective. GeneWatch believes people should have a voice in whether or how these technologies are used and campaigns for safeguards for people, animals and the environment. We work on all aspects of genetic technologies - from GM crops and foods to genetic testing of humans.
6. GeneWatch's research has repeatedly highlighted how a number of aspects of the current food production and supply chain tend to drive R&D investments towards ineffective technological solutions to existing environmental, social and

- health problems.^{1,2} These approaches tend to be rejected by consumers and by society more broadly because they are not demand-led, tend to prioritise the interests of large companies in controlling markets, and often introduce new problems of their own. Because substantial public and private investments in such approaches are made behind closed doors, often several decades before products reach the market, many members of the public feel that they are fundamentally excluded from decision-making.³
7. In contrast, Local Food Systems (LFS) are networks of small local businesses, charities, social enterprises and voluntary groups driven by 'bottom-up' innovation at a local level. They include a diverse range of initiatives (such as box schemes, farmers' markets, community growing and Community Supported Agriculture) intended to develop closer links between consumers and producers. Local Food Systems have their roots in society and their strength lies in the people who create and manage them; the goodwill of consumers and producers; and in the strong motivation that lies behind them. They can help reduce the use of fossil fuels and other resources (through less food miles and lower use of agricultural inputs) and improve biodiversity (through a variety of organic, agro-ecological, low-input or permaculture farming methods); increase food security; give low income groups access to good food and healthy diets; strengthen local communities and economies; and sustain small enterprises and improve the viability of small farms. Although it is difficult to quantify benefits, greater community engagement and better diets can also have positive impacts on mental health; reduce loneliness in the elderly; speed up recovery times in hospitals; and help to reduce offending and anti-social behaviour.
 8. This submission draws heavily on GeneWatch's participation in the EC-funded research project Facilitating Alternative Agro-Food Networks (FAAN).^{4,5} The main objective of the FAAN project was to analyse how current policies facilitate, hinder or shape the development of Local Food Systems (LFS), using 'Co-operative research' which involved close cooperation between the five research institutions and five civil society organisations involved. The findings are based on empirical qualitative research on ten case studies in Austria, England, Hungary, France and Poland, and on literature studies and an EU-level workshop. The UK case studies were undertaken in Cumbria and Manchester, providing both rural and urban examples of how people are attempting to implement Local Food Systems in practice on the ground in a rural and an urban area.⁶
 9. A key finding of this research is that innovative local authorities across Europe have successfully supported Local Food Systems in a variety of ways, in order to support a wide range of social, economic, environmental and health benefits. On the other hand, at a national and EU level, Local Food Systems are largely invisible to policy-makers and are often hindered by policies and bureaucracy that fails to take their existence and needs into account.
 10. Participants in the FAAN project (people actively involved in growing, distributing or promoting local food) did not see their emphasis on locally produced, seasonal food as being capable of entirely replacing the existing industrial food system, but they did see significant potential for it to become more mainstream and for the

expansion of Local Food Systems to produce diverse social, economic, environmental and health benefits.

11. GeneWatch agrees that the Government's localism agenda and DEFRA's business plan potentially provide an opportunity to reconnect people to the process of food production and supply. However, if this is to be done successfully, policy makers need to be aware of the factors that facilitate and hinder Local Food Systems and ensure that these are given adequate consideration.
12. GeneWatch therefore welcomes the opportunity to input to this inquiry.

How can the environmental and climate change impacts of the food we choose to eat best be reduced? What are the land-use trade-offs that affect food production and supply and how should these be managed?

13. Changing agricultural practices and land use can have significant impacts on the social and economic circumstances of farmers and consumers, particularly in developing countries.⁷
14. The Royal Society's promotion of the concept of "sustainable intensification"⁸ glosses over many of these issues by taking a utilitarian approach in which scientific institutions (such as the Royal Society itself) are capable of weighing up and making decisions about what is best for farmers and consumers then somehow promoting these solutions worldwide. This contrasts with a rights-based approach to considering the ethical implications of sustainable intensification, and with 'bottom-up' approaches to decision-making, which may lead to very different decisions.^{9, 10, 11} This is one of the weaknesses of the Foresight report on Food and Farming Futures¹², which makes a blanket global statement about restricting the expansion of agriculture onto new land, without considering highly variable local circumstances and the politics and economics of how decisions will be made about land use in practice on the ground.
15. Where possible, these complex trade-offs are perhaps best made at a local level, where a variety of interests can be taken into account and knowledge of local circumstances is likely to be much more detailed. Within democratic countries, local authorities can play a key role in tackling land use issues in ways which support local food systems.
16. For example, the FAAN project found that Manchester Food Futures (a partnership set up in 2004 between Manchester City Council, the NHS and community voluntary and private sector groups¹³) has taken action to expand access to allotments and other land within the city, in response to growing demand and long-term campaigns by local people to make the city more sustainable. The Growing Manchester Programme then provides assistance to community growing programmes in the form of courses, support and advice, within the context of the Manchester Community Strategy.
17. In France, the FAAN project found that city of Rennes has taken an innovative approach to planning for the area around the city, in which thriving agriculture is seen as the best and most economical way to maintain the green belt. Rennes

Métropole's planning policy preserves the green belt land for farming and supports 'short-food chains' through a variety of policies, including local food procurement in schools and old people's homes and some funding for cooperative shops and advertising. Local economic data shows that the Rennes Métropole local food systems are clearly creating jobs, with a strong growth in AMAPs (which are similar to Community Supported Agriculture schemes), box schemes, co-operative shops and open-air markets. Agrocampus Rennes has estimated that about 300 jobs have been created, compared to fewer than 1,000 'classical' agricultural jobs in the region.

18. There are clearly also global issues which impact significantly on land-use and food supply. One important area is the use of grain in biofuels and to produce grain-fed meat: both practices which are widely recognised to be growing to a scale which is unsustainable. Tackling agricultural subsidies which support these unsustainable practices is therefore an example of a policy change which requires international rather than solely local, action.
19. Based on grain consumption figures calculated by the Food and Agriculture Policy Research Institute (FAPRI),¹⁴ Monsanto argues that production of grain for animal feed must increase by 50 million tonnes a year by 2017/18 to meet the expected increased demand for meat, and by 60 million tonnes a year to meet biofuels production targets, requiring more investment in intensive agriculture, including GM crops.¹⁵ Critiques of this view rest partly on doubts about the potential for GM technologies to increase yields^{16,17,18}, as well as disagreements about the downsides of the technology. However, the diversion of potential food-growing land to produce industrial-scale biofuels and animal feed is also part of the problem, not the solution, to global hunger.¹⁹ At the same time as promoting increasingly intensive agriculture, Monsanto and other companies have been actively lobbying for government subsidies for industrial-scale biofuels.²⁰ An estimated 40% of US GM maize production now goes into biofuels and perhaps as much as 90% of remaining GM production (i.e. not including cotton and biofuels) to animal feed (although reliable figures are difficult to come by).
20. The use of maize-based ethanol production in the US (which frequently uses GM maize) is more likely than not to exacerbate global warming, if indirect effects on land use are included in the assessment, and there are significant opportunity costs because there are better ways to achieve greenhouse gas savings.²¹
21. Grain-fed meat production is also significantly more resource intensive and damaging to the environment than pasture-fed meat production, so an emphasis on expanding GM maize and soya production for animal feed neglects important alternative steps that could be taken to make the production of meat and dairy products more sustainable. Grain-fed meat is also much less healthy than pasture-fed meat or game in its fatty acid content.^{22,23} The ratio of omega-6 fatty acids to omega-3 fatty acids has increased substantially in modern compared to traditional diets, partly due to increased use of sunflower and other oils; and partly due to intensive farming of cattle fed on grains²⁴.

How can the Government help to deliver healthy food sustainably, whilst also delivering affordable food for all? How can consumers best be helped to make more sustainable choices about food?

22. The FAAN project identified important roles for Local Food Systems in building close consumer-producer links and in educating consumers (in the broadest sense) about where their food comes from. The initiatives we studied in the FAAN project were partly motivated by making local seasonal food accessible to people on low-incomes and to tackling health and social inequalities.
23. For example, the Manchester Environmental Resource Centre (MERCi)²⁵ – set up with National Lottery funding in 1996 - has stimulated many food projects which also address societal problems. Initiatives such as the Herbie Van and Dig Box scheme provide easier access and lower prices for fresh food for people living in ‘food deserts’, whilst other initiatives engage younger or elderly people and people with mental health issues to become involved in growing and cooking local food.²⁶ People involved in local food systems in Manchester describe a wide variety of benefits, including social integration, environmental and economic benefits. In Cumbria, the award-winning Growing Well project focuses on supporting people to recover from mental health problems by helping to grow food on an organic farm.²⁷
24. Local Food Systems involve direct communication between growers or intermediaries and customers (for example, at farmers’ markets and farm shops), but labelling also plays an important role. This can include official certification schemes (such as the Soil Association’s organic labeling scheme in the UK) or (more often) voluntary, local schemes such as Distinctly Cumbrian²⁸ (set up by the Cumbria Rural Development Agency), which promotes an entire region and its services. Consumer recognition depends upon wider efforts to promote quality meanings, often linked with public goods, including the use of sustainable farming methods. In the FAAN case studies, local food projects built upon existing brands or developed new ones, rarely dependent upon legal protection, so that they were recognised and trusted by consumers.
25. Labelling based on high environmental or animal welfare standards can inform consumer choice, allow farmers and small business to capture more of the value that they add, and stimulate competition to improve standards (a race to the top, rather than a race to the bottom). National government can have an important role to play in ensuring traceability and labelling from ‘farm to fork’. It is therefore disappointing that stated government support for labelling and consumer choice, based on high environmental and animal welfare standards, does not always appear to have been followed through by DEFRA.^{29,30}
26. Agricultural subsidies and public funding can also play a facilitating role for Local Food Systems.
27. Participants in the FAAN project mainly saw agricultural subsidies under the Common Agricultural Policy (CAP) as favouring large-scale agri-businesses rather than Local Food Systems. They expressed a strong desire to be economically self-sufficient, but also welcomed grants for support bodies and networking (including sharing best-practice); for educational work (such as

school visits to farms); training (in both growing and marketing) and for small amounts of capital (for example to buy a freezer, a van, or a pie-making machine). The most commonly identified initiative under which Local Food Systems had received funding was the Leader programme (under the 2nd CAP pillar, i.e. the Regional Development Programme, RDP).

28. Leader (*Liaison Entre Actions pour le Développement de L'Economie Rurale*) provides links between actions for the development of the rural economy. It emphasises the role of local communities in taking decisions about strategic choices for the future of a given area, and provides for the creation of local partnerships to deliver rural development programmes in their areas. Decentralised delivery through Local Action Groups encourages support for projects considered valuable at the local level. The 'pilot' phases of Leader I, Leader II and Leader+ were considered a success. In the current period 2007-2013, Leader has been mainstreamed as a mandatory component of all Rural Development Programmes. In Cumbria, the successive Leader programmes have facilitated cooperative networks, e.g. infrastructure for farmers' markets, Cumbria Organics and Made in Cumbria. They have also helped producers to cooperate in shortening the supply chain to large buyers (including supermarkets). In this way, producers can gain more from the value that they add and can promote their own quality brands.
29. Ironically, a particular problem for some of the businesses we spoke to was that grant schemes often had *minimum* grant levels that were set too high, or else required too much paperwork for the small amounts of money that these businesses were seeking.
30. One recommendation of the FAAN project is to increase the funding to Leader, maintain its bottom-up character and encourage a territorial approach linking rural producers with urban consumers (rather than promoting 'global competitiveness' of territories). Likewise, rural development and regional development funds should be linked in ways that facilitate Local Food Systems.
31. The UK Government should also support the creation of an EC inter-DG task force for Local Food Systems and a Europe-wide structure for information exchange among and about Local Food Systems, so that these growing initiatives are no longer invisible at a European level.

Which aspects of the food production and supply chain are presenting the biggest problems for the sustainability of the food industry?

32. There are major 'upstream' problems with the current supply chain which are shaping consumption patterns, such as trade and agriculture policies.³¹
33. There has been significant consolidation in the industrial food system which gives a small number of large players extensive control over key aspects of the market. This includes: a high level of control exercised by a small number of buyers in the large supermarkets (one of the sources of the squeeze on farm-gate prices); the large-scale food producers (which seek growth through increased sales of processed foods and cut product costs whilst maintaining taste by adding salt, unhealthy fats and sugars); multi-national food distributors (which exercise

- considerable control of the international commodities trade); and the seed industry (which has become highly consolidated in the wake of the introduction of patents on GM seeds).
34. The industrial food system has tended to shift production and distribution towards 'long-food chains' rather than 'short-food chains' (based on sourcing the cheapest, rather than the freshest or highest quality, ingredients); to create mass-produced, standardised products, often high in salt, sugar and unhealthy fats; and to squeeze farm-gate prices. Whilst there have undoubtedly been some benefits in terms of ensuring food supplies in relatively wealthy countries, there have also been many widely recognised downsides, including negative environmental impacts (e.g. depletion of soils and water resources, loss of biodiversity, unsustainable use of fossil fuels and agricultural inputs); the persistence of global hunger at the same time as a global epidemic of obesity; and the exacerbation of health inequalities (for example, through 'fat dumping'^{32,33,34}) and rural poverty. The Republic of Korea, where a traditional diet high in fruits and vegetables has been maintained (possibly due to earlier modernisation than many other Asian countries) illustrates that these problems are not an inevitable consequence of rising incomes.³⁵
 35. The food industry's main response to concerns about diet and health has been to promote hi-tech products such as cholesterol-lowering margarines and other functional foods (marketed at a premium to relatively wealthy consumers). Whilst some steps have also been taken to reformulate unhealthy processed foods, there has not been any fundamental change in the food supply chain.
 36. Whilst 'short-food chains' clearly cannot supply all the products consumers may wish to buy, some of which are dependent on fairer international trade (e.g. oranges, bananas, tea, coffee), they can reconnect consumers with a wide variety of local products (meat, dairy, vegetables, fruit) and at the same time tackle many of these issues of sustainability and access to healthy diets in the context of locally produced seasonal food. Closer consumer-producer links allow people to learn more about, and even become directly involved in, the process of food production and supply. Thus opportunities for education (in its broadest sense) also open up.
 37. The Government should therefore support a broadening of the EC policy initiative on food supply chains³⁶, by investigating the forces that lengthen food supply chains and devising measures to help shorten those chains, so that producers can gain more of the value that they add.

How might the changing powers of local authorities and the localism agenda hinder, or be used to encourage, more sustainable production and supply of food?

38. The localism agenda opens up considerable opportunities to support and encourage Local Food Systems. However, the squeeze on funding could also lead to cuts (especially at local authority level) that could hinder the development and expansion of such systems. The findings of the FAAN report suggest that relatively small amounts of funding are needed, but that the roles played by local support bodies (such as Manchester Food Futures³⁷ and the Cumbrian Rural

Development Agency) are crucial and that national and EU policies must be formulated in such a way that Local Food Systems are recognised and valued for the benefits they bring.

39. Devolving responsibility for public health functions to a local level could be highly beneficial, given the ability of local authorities to see and realise the benefits of Local Food Systems. However, this step needs to be accompanied by a sufficient ring-fenced budget (recognising the enormous potential cost savings that could be made if attempts to tackle obesity and reduce health inequalities are successful). It also needs food policy to be seen to be a key aspect of improving public health, and to ensure that successful experiences from across the country are built on, rather than starting again from scratch. Public consultation and engagement (at a cross-departmental local level) will be key.
40. At the same time, Local Food Systems must be made more visible at a national and EU policy level so that local initiatives are not fatally undermined by top-down policies in a wide variety of areas (e.g. food procurement, hygiene regulations, planning law, poorly directed subsidies, or red-tape for small businesses). Some examples of issues highlighted by the FAAN project are listed below.
41. **Hygiene regulations and abattoirs:** The FAAN project found that Regulation (EC) No.852/2004 on the hygiene of foodstuffs had been implemented badly in many countries (particularly in Eastern Europe) restricting local sales of products such as jams from farms. This does not appear to be such an issue in the UK, where the regulations have been implemented more flexibly. However, the closure of abattoirs due to onerous hygiene inspections is a continuing problem for Local Food Systems.³⁸ For example, closure of abattoirs in Cumbria has made hill farmers averse to new cooperative and branding schemes to market Cumbrian lamb.³⁹ Whilst participants in the project recognised the importance of food safety they felt that the regulations had been devised and implemented with the needs of large-scale agri-businesses in mind, ignoring their own needs. This has been a problem throughout the EU: however the FAAN project did identify one positive initiative in Austria, where an abattoir was purchased co-operatively about 550 farmers, two smaller butchers and one large processor and distributor of meat delicacies, in order to market specialty meat from oxen to high animal welfare standards (the ALMO initiative in Almenland).
42. **Planning law:** The example of Rennes Métropole's planning system, which was used to facilitate local food production on green belt land (cited above); and initiatives to improve access to land for growing food in cities (as in Manchester) require the benefits of Local Food Systems to be recognised by the planning system. National systems such as enterprise zones could potentially undermine similar local initiatives if they do not give due consideration to the potential use of land for growing food.
43. **Red-tape for small businesses:** The same bureaucratic requirements that all small businesses sometimes struggle with can be a problem for Local Food Systems. Thus, measures to reduce paperwork and unnecessary bureaucracy would generally be welcomed.

44. **Education and training:** Training and education for farmers and community growers as well as public education in its broadest sense was widely recognised to be of key importance by FAAN study participants.
45. **Science and innovation policies:** The idea of the Knowledge-Based Bio-Economy (KBBE) underpins R&D funding at an EU and UK level. It treats agriculture as a biomass factory supplying raw materials for diverse industrial products. Innovation is seen as a process by which ideas are 'translated' into patents and marketable products, excluding broader issues and innovation in processes (such as farmland management) from investment. In contrast, agro-ecological accounts see agricultural methods as a means to incorporate and enhance farmers' knowledge of natural resources, as a basis for them to gain from the value that they add.⁴⁰ Thus current science and innovation policies tend to undermine Local Food Systems - by diverting resources and by adding costs (e.g. the costs of segregating GM crops, which would fall on conventional and organic farmers^{41,42,43,44,45}) - rather than supporting them.

How could Government procurement practices be improved to promote better practice across the food sector?

46. The UK government ostensibly supports efforts by local authorities to procure local food and there have been some high profile successes, including, for example, initiatives facilitated by the Food for Life Partnership in schools.⁴⁶ These initiatives see procurement as only one part of a process of engaging children in growing and cooking food and building links with local farms, and thus transforming food culture.
47. However, tensions continue between the lowest price versus 'best value', and criteria remain unclear for justifying a higher price. DEFRA's Sustainable Procurement Strategy emphasises social and environmental benefits as criteria which can be included. But official guidance gives no clear direction or incentive for decisions to include sustainability criteria such as local regeneration or production methods. Official reviews have emphasised efficiency savings from 'aggregated procurement' – gaining lower prices through greater bargaining power. That emphasis favours larger suppliers, while disadvantaging local ones, unless they can aggregate diverse supplies. Consequently, local procurement officials remain cautious about favouring local food, for reasons which may conflate the constraints of UK and EU rules. Government policy emphasises nutritional criteria, while looking to supermarket chains as a major means to provide more nutritious food, even local food, rather than to small local businesses.⁴⁷
48. This approach risks knowing the "price of everything but the value of nothing" in terms of the added social, educational, health and local economic benefits that supporting Local Food Systems can bring.
49. In the FAAN local case studies, we found that local suppliers were effectively excluded from food procurement in Manchester, although the council was supportive of Local Food Systems in other ways. In contrast, support bodies in Cumbria had done much to support local businesses that wished to tender for procurement contracts. For example, local organisations (e.g. Cumbria Organics,

Distinctly Cumbrian, Cumbria Community Foundation), which support local food businesses have provided training for small businesses on how to tender for large orders, and food procurement contracts have also tended to be split into smaller parts. Cumbria Rural Enterprise Agency has helped small-scale food producers bear the burdens of compliance with hygiene regulations by providing the necessary shared infrastructure – e.g. commercially equipped kitchens, refrigeration, storage etc.⁴⁸ Small grants have also made a difference: for example, the RDP funded one small-scale manufacturer to buy a machine for making small-sized (rather than its existing large-size) meat pies, enabling it to gain contracts to supply schools and old peoples' homes.

50. Government could do more to facilitate local food sourcing in public procurement, for example by collecting experiences of local sourcing through quality and environmental criteria (which may sometimes justify a higher price) and sharing best local practice nationally. Local food procurement also needs to be expanded to include prisons, old people's homes and hospitals, as well as schools.

For further information contact:

Dr Helen Wallace
Director
GeneWatch UK
60 Lightwood Rd
Buxton
SK17 7BB
Tel: 01298-24300
Email: helen.wallace@genewatch.org
Website: www.genewatch.org

References

¹ Wallace, HM (2010) Bioscience for Life? Who decides what research is done in health and agriculture? GeneWatch UK. April 2010.
http://www.genewatch.org/uploads/f03c6d66a9b354535738483c1c3d49e4/Bioscience_for_life.pdf

² Wallace, HM (2006) Your diet tailored to your genes: preventing diseases or misleading marketing? GeneWatch UK. January 2006.
<http://www.genewatch.org/uploads/f03c6d66a9b354535738483c1c3d49e4/Nutrigenomics.pdf>

³ Participatory science and scientific participation: The role of Civil Society Organisations in decision-making about novel biotechnologies. Final Report. October 2008. PSx2 Project. EC 6th Framework Programme. Consiglio dei Diritti Genetici, Universität Bremen, GENET, GeneWatch UK, CRIIGEN, Eestimaa Looduse Fond, Université de Caen, Università di Perugia, Consejo Superior de Investigaciones Cientificas.
http://www.genewatch.org/uploads/f03c6d66a9b354535738483c1c3d49e4/PSX2_final_20report.pdf

⁴ The FAAN project was funded under the European Community's Seventh Framework Programme (2007-2013) under grant agreement No. 217280. More detailed information can be found on: www.faanweb.eu

⁵ Local Food Systems in Europe: Case studies from five countries and what they imply for policy and practice. Final Report. 2010. Facilitating Alternative Agro-Food Networks.
http://www.faanweb.eu/sites/faanweb.eu/files/FAAN_Booklet_PRINT.pdf

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- ⁷ Thompson, J., Millstone, E., Scoones, I., Ely, A., Marshall, F., Shah, E., Stagl, S. (2007) Agri-food System Dynamics: pathways to sustainability in an era of uncertainty. STEPS Working Paper 4, Brighton: STEPS Centre. http://www.steps-centre.org/PDFs/Final_steps_agriculture.pdf
- ⁸ Reaping the benefits: Science and the sustainable intensification of global agriculture. Royal Society. October 2009. <http://royalsociety.org/Reapingthebenefits/>
- ⁹ The ethics of sustainable agricultural intensification. FAO Ethics Series. Rome, 2004. ISBN 92-5-105067-8
- ¹⁰ UN(2009) Seed policies and the right to food: enhancing agrobiodiversity and encouraging innovation. Report of the Special Rapporteur on the right to food. 23rd July 2009.
- ¹¹ IAASTD (2008) International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) global summary for decision makers. http://www.agassessment.org/docs/Global_SDM_060608_English.pdf
- ¹² Global Food and Farming Futures: Final Report. January 2011. <http://www.bis.gov.uk/foresight/our-work/projects/current-projects/global-food-and-farming-futures/reports-and-publications>
- ¹³ <http://www.foodfutures.info/site/>
- ¹⁴ <http://www.fapri.iastate.edu/outlook/2008/>
- ¹⁵ Edgerton MD (2009) Increasing crop productivity to meet global needs for food and fuel. *Plant Physiology*, 149, 7-13.
- ¹⁶ Monsanto shares slip as analyst flags seed yields. Bloomberg Business Week. 28th September 2010. <http://www.businessweek.com/ap/financialnews/D9IH32FO0.htm>
- ¹⁷ Monsanto rises to China challenge. Financial Times. 6th March 2011. <http://www.ft.com/cms/s/0/daf48e08-4824-11e0-b323-00144feab49a.html#axzz1HzFUm7NH>
- ¹⁸ Zobiolo, LHS, Kremer, RJ, Oliveira, RS Jr, Constantin, J (2010) Glyphosate affects photosyntheses in first and second generation of glyphosate-resistant soybeans. *Plant Soil*, **336**, 251-265.
- ¹⁹ FAO(2008) Soaring food prices: facts, perspectives, impacts and actions required. High-level conference on world food security: the challenges of climate change and bioenergy. Rome, 3 - 5 June 2008. http://www.fao.org/fileadmin/user_upload/foodclimate/HLCdocs/HLC08-inf-1-E.pdf
- ²⁰ Biggies from agribusiness join new biofuels lobbying group. 25th July 2008. <http://www.livemint.com/2008/07/25130050/Biggies-from-agribusiness-join.html>
- ²¹ JRC (2008) Biofuels in the European context: Facts and uncertainties. JRC44464. http://ec.europa.eu/dgs/jrc/downloads/jrc_biofuels_report.pdf
- ²² Dhiman, TR, Anand, GR, Satter, LD, Pariza, MW (1999) Conjugated linoleic acid content of milk from cows fed different diets. *Journal of Dairy Science*, **82**, 2146-2156.
- ²³ Rule DC, Broughton, KS, Shellito, SM, Maiorano (2002) Comparison of muscle fatty acid profiles and cholesterol concentrations of bison, beef cattle, elk, and chicken. *Journal of Animal Science*, **80**, 1202-1211.
- ²⁴ Fairweather-Tait SJ (2003) Human nutrition and food research: opportunities and challenges in the post-genomic era. *Philosophical Transactions of the Royal Society London B*, **358**, 1709-1727.
- ²⁵ <http://www.merci.org.uk/>
- ²⁶ Levidow, L, Price, B, Psarikidou, K, Szerszynski, B, Wallace, HM (2010) Urban agriculture as community engagement in Manchester. *Urban Agriculture Magazine*, **24**, 43-45. September 2010. <http://www.ruaf.org/book/export/html/2274>
- ²⁷ <http://www.growingwell.co.uk/>
- ²⁸ <http://www.distinctlycumbrian.co.uk/>
- ²⁹ Goldsmith, Z (2011) So much for that pledge to be greener than ever. *The Daily Mail*. 30th March 2011. <http://www.dailymail.co.uk/news/article-1371329/Cloned-meat-betrayal-Unlabelled-products-sale-minister-sabotages-Europes-ban-call.html>
- ³⁰ Lucas, C (2011) The UK needs a labelling scheme for GM-free meat products. *The Guardian*. 10th February 2011. <http://www.guardian.co.uk/environment/blog/2011/feb/10/labelling-gm-meat?INTCMP=SRCH>
- ³¹ Lobstein T (2004) Suppose we all ate a healthy diet...? *Eurohealth*, **10**(1), 8-12. http://www.sustainweb.org/pdf/afn_m6_p2.pdf

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- ³² Gittelsohn J, Haberle H, Vastine AE, Dyckman W, Palafox NA (2003) Macro- and Microlevel processes affect food choice and nutritional status in the Republic of the Marshall Islands. *Journal of Nutrition*, **133**, 310S-313S.
- ³³ Aguirre P (2004) Socioanthropological aspects of obesity in poverty. *Obesity and Poverty*, **1**(1), 11-22.
- ³⁴ Drewnowski A, Specter SE (2004) Poverty and obesity: the role of energy density and energy costs. *American Journal of Clinical Nutrition*, **79**, 6-16.
- ³⁵ Kim, S, Moon, S, Popkin, BM (2001) Nutrition transition in the Republic of Korea. *Asia Pacific Journal of Clinical Nutrition*, **10**, S48-S56.
- ³⁶ CEC (2009) Communication COM(2009) 591 of 28th October 2009: A better functioning food supply chain in Europe.
http://ec.europa.eu/economy_finance/publications/publication16061_en.pdf
- ³⁷ <http://www.foodfutures.info/site/>
- ³⁸ Meat hygiene costs could force Welsh abattoir closures. *Farmers Weekly*, 14th February 2011.
- ³⁹ Hill farming systems project Cumbria Fells and Dales. Report on project findings and recommendations for future activity.
www.cumbriahillfarming.org.uk/pdfs/areabaseddevelopmentplan.pdf
- ⁴⁰ Agricultural innovation: Sustaining what agriculture? For what European bio-economy? Final Report. February 2011. CREPE Project. FP7. <http://crepeweb.net/>
- ⁴¹ Johnson DD, Lin W, Vocke G (2005) Economic and welfare impacts of commercializing an herbicide tolerant, biotech wheat. *Food Policy*, **30**, 162-184.
- ⁴² Bock A-K, Lheureux, Libeau-Dulos M, Nilsagård H & Rodriguez-Cerezo E (2002) Scenarios for co-existence of genetically modified, conventional and organic crops in European agriculture. IPTS - JRC Report EUR 20394EN <ftp://ftp.jrc.es/pub/EURdoc/eur20394en.pdf>.
- ⁴³ Belcher K, Nolan J, Phillips PWB (2005) Genetically modified crops and agricultural landscapes: spatial patterns of contamination. *Ecological Economics*, **53**(3), 387-401.
- ⁴⁴ Munro A (2008) The spatial impact of genetically modified crops
Ecological Economics, **67**(4), 658-666.
- ⁴⁵ Universitat Autònoma de Barcelona (2008) An Impossible Coexistence: Transgenic And Organic Agriculture." *ScienceDaily* 2 July 2008. <http://www.sciencedaily.com/releases/2008/06/080630102731.htm>
- ⁴⁶ <http://www.foodforlife.org.uk/>
- ⁴⁷ Levidow, L. (2009) National policy contexts with potential relevance to AAFNs. FAAN Working Paper. http://www.faanweb.eu/sites/faanweb.eu/files/FAAN_D2_Policy_Context_AAFNs.pdf
- ⁴⁸ <http://www.cumbriafoodtechnology.co.uk/>