

Future directions in research relating to food security: a consultation by the BBSRC on behalf of the Research Councils, July 2009

Response prepared on behalf of the ESRC Genomics Policy and Research Forum by:

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The Genomics Policy and Research Forum is a novel ESRC-funded initiative dedicated to the development of links between social scientists and scientists working in the contemporary life sciences, and the connection of research in this area to policymakers, business, the media and civil society. Led by Professor Steve Yearley, the Genomics Forum is based at the University of Edinburgh and is part of the ESRC Genomics Network (EGN), a major ESRC investment spanning five of the UK's leading universities examining the development and use of the science and technologies of genomics.

This response addresses Questions 1-5, 7-8 and 10-13 as detailed in the consultation document.

Cross-cutting points from this response:

- **A fully integrated approach to food security research and policy is essential.** Food security must be understood as one of a range of key current research and policy concerns, including climate change, environmental health, human well-being, rural economies, energy security and industrial product development. Research or policy decisions made with any one of these concerns in mind will inevitably play out across the broader system. Isolating specific issues such as food security runs the risk of pursuing research that proves counterproductive in other areas.
- **Food security is a political and social issue that cannot be resolved by science and technology alone.** Wider involvement of the social sciences and humanities in the framing of research priorities, drivers and goals is essential to achieve the visionary thinking that is needed to ensure future global food security.

Question 1. Drivers and wider considerations

1.1 In addition to the factors listed in paragraphs 8-20 of the consultation document, poverty and inequality both nationally and globally must be taken into account as both drivers and wider considerations in relation to food security. Despite increasing attention to food security as a ‘global’ problem, threats to food security do not affect everyone equally, but are distributed according to familiar patterns of inequality both within and between nations. It is particularly important that poverty and inequality as they relate to food security are not reduced to questions of ‘affordability’, as this concept fails to address the underlying issue that people living in poverty, or at risk of poverty, will always be most vulnerable to food insecurity in times of economic crisis. We are pleased to note in the consultation document that ESRC research will focus on poverty reduction, amongst other issues (p. 6). We hope that this priority can be reflected and expanded upon in the research targets, with attention to differences between the developed and developing world, and also to the particularities of local situations and food systems within individual nations.

1.2 The relationship between government and business, and the hugely powerful role of the private sector in global agriculture and the global food system in general, must also be taken into account as drivers and wider considerations in relation to food security. It is arguable whether we can or should rely on the commercial / private sector to meet longer-term, high-risk, public good-oriented goals associated with food security in the UK and developing world. A related and very important contextual issue that is missing from the consultation paper is the influence of intellectual property regimes on exploitation of genetic diversity and innovation in agricultural science.

Question 2. Overarching issues

2.1 We very much welcome the identification of the need for ‘integrated and systems-based approaches’ as an overarching issue in relation to food security research (para 26). Since 2006 the Genomics Forum has been actively pursuing such an integrated approach through an innovative and highly interdisciplinary workstream relating to plant biotechnology and the knowledge-based bioeconomy.¹ Through this work programme, we are developing a framework for systematic analysis of the effects of different research strategies and policy initiatives on biomass resources. We treat food security as one of a range of interlocking research and policy concerns related to the ‘politics of plants’, including climate change, environmental health, human well-being, rural economies, energy security, and industrial product development (see attached paper Frow et al. 2009). A crucial overarching issue in relation to food security is that research or policy decisions made with any one of these concerns in mind inevitably play out across the broader system, not least through effects on land and water use and management. A question with relevance to the current consultation thus becomes how to balance gains and minimise negative consequences across the system. Isolating specific issues such as food security runs the risk of pursuing research that proves

¹ This is a recent concept brought to attention through a European Commission Framework Programme 7 (FP7) funding initiative; see http://ec.europa.eu/research/biosociety/kbbe/kbbe_en.htm.

counterproductive in other areas – for example, maximising crop yields at the expense of CO₂ emissions reduction, biodiversity protection, or small-scale farming. An alternative approach might see a research strategy focused more broadly on the use, development and management of biomass resources. Research priorities and policy initiatives might then be determined on the basis of optimising gains across the broader system, instead of maximising gains in any single area.

2.2 As well as integration across policy areas, we would stress the importance of multidisciplinary research initiatives involving not only scientists and technologists, but also social scientists (including historians, sociologists, geographers, political analysts, philosophers, educationalists and economists). We welcome the recognition at para 26 that ‘Economic, social and political considerations need to be integrated into scientific and technological challenges from the outset’ (p. 9). Wider involvement of social science and humanities disciplines in the framing of research priorities, drivers and goals is necessary to achieve the visionary thinking required to ensure future global food security. Although we agree that ‘New science will be crucial to address the many complex issues surrounding future food security’ (para 21, p. 9), we stress that food security is a political and social issue that cannot be resolved by science and technology alone. For example, the conflicting and synergistic needs of developed and developing nations are socio-political in nature. Policy and political considerations, as distinct from the economic challenges outlined in paragraph 20 (p. 8), are particularly important: for example, the interaction between policies relating to different *scales* (local, national, international) and different *priorities* (trade, social justice, farming subsidies, environmental protection, climate change, etc) is a topic worthy of urgent and interdisciplinary research attention.

Question 3. Crop production

With reference to crop production research targets (c) and (d), both of which relate to pests and pathogens, there is a specific additional need for scientific, social scientific and policy research on the threats posed by alien pests and pathogens to crops and livestock, and the legislation needed to identify such aliens and control their movement (Brasier 2008, Ingram and Prior 2008).

Question 4. Livestock and fish production

With reference to livestock and fish production research target (l), relating to aquaculture, we note that while marine and freshwater algae are mentioned as possible sources of novel feedstuffs for aquaculture, there should also be more research into the potential of marine and freshwater algae for feeding people and/or livestock in a sustainable way. Approximately 50 percent of global photosynthetic productivity occurs in the oceans and freshwater. However, aquatic ecosystems are fragile, and given their importance as carbon sinks, much research will be required to ensure that this could be done sustainably.

Question 5. Agricultural practice

5.1 With reference to agricultural practice research target (i), regarding research on the demographics of the farming community, there is also need for much broader social, cultural, economic and policy research on rural communities and their significance to food production. The importance of maintaining rural communities as a whole – not just farmers – and the infrastructure that supports them (including public transport, schools, shops, housing, healthcare, recreation facilities and employment opportunities) should be drawn out, as should the importance of integrating social and economic policy relating to food production and rural community structure, infrastructure and welfare. Points which illustrate the need for integration in research and policy relating to rural communities include the following:

- Landscape diversity and aesthetics are vital to the tourist industry.
- Rural industries other than farming provide alternative sources of income and employment for the spouses and families of farmers.
- Rural families provide labour for farming.

Rural human diversity and vitality are central to food production. Research is needed in particular on the contribution and needs of small farmers and smallholders, who are essential to both food production and the overall health of rural communities; and the economics of food production in relation to rural industries and rural livelihoods in general.

5.2 With reference to agricultural practice research target (a), regarding research on biodiversity conservation in agricultural and associated ecosystems: greater research emphasis is needed on understanding and strengthening the reciprocal relationship between food production and biodiversity conservation. We believe that a consultation exercise involving national and international government and non-government conservation agencies would be productive for identifying priorities in this regard. As framed at present, the consultation document does not provide space for productive inputs from such bodies.

Question 7. Nutrition, food quality, processing and manufacture

With reference to research target (b), relating to the ‘obesity epidemic’ and associated health conditions, it is important to note that overweight and obesity are increasing particularly in developing countries (WHO 2000), rather than simply in ‘more developed countries’ as the consultation paper suggests (para 17, p. 8). However, it is vital that attention to overweight and obesity does not obscure continuing food shortages in the developing world, or indeed food insecurity amongst vulnerable groups within the UK. Proper concern with good nutrition must not be allowed to divert attention from the fact that access to *sufficient* food is a key plank of food security; for example, stating that ‘it is important that changes to the food supply chain do not encourage increased consumption’ (p. 16) is inconsistent with the overall goal of ensuring that everyone has enough to eat, including those who currently experience food shortage. Priority research must therefore focus

on how to balance people's needs for both *sufficient* food and *nutritious* food, in both developed and developing contexts, and amongst all population groups including vulnerable ones.

In general, it is questionable whether a narrow focus on obesity, as distinct from nutrition, is either necessary or desirable in ensuring good health for all and minimising the economic burden on health services.

Although there appears to be medical and policy consensus that obesity is a significant public health problem (WHO 2000, Foresight 2007), individual solutions for obesity, such as weight loss diets and prescription medicines, are largely ineffective, and there is extensive social science evidence to show that dieting and other weight-loss practices can have negative psychological consequences, especially for women. Although the issue is currently framed in terms of the effects of an 'obesogenic environment' (Swinburn et al. 1999), few community-based initiatives have shown significant effects on population prevalences of obesity and overweight. The link between poor diet and chronic diseases such as coronary heart disease stroke and cancer could be better understood as the result of social inequality and poverty (Wilkinson 1996, Marmot and Wilkinson 1999). Research targets may therefore be more effectively framed in terms of good nutrition and reduction of poverty and social inequality, rather than body weight or obesity.

Finally, it should be noted that changes in the food supply chain cannot be made without the co-operation of the food industry, and this industry relies on increasing consumption for a significant proportion of its profits (Nestle, 2002). In this context, it is difficult to see how the aspiration of encouraging individuals to lower their consumption of certain important and heavily subsidized elements of their diets, such as meat, can be made without politically difficult changes in legislation, such as changes to agricultural subsidies. Any attempt to improve consumers' access to clear and relevant nutritional information also needs to be framed in the knowledge that the food industry has played a significant role in the current proliferation of conflicting information in this area. This has taken place despite an existing consensus about the content of a healthy diet within nutritional science (Nestle, 2002). Consequently, research priorities must include economic, political and policy approaches; translation to policy, however, will require political will on the part of governments.

Question 8. Overall priorities for research

As noted above at 2.2, wider involvement of the social sciences and humanities in the framing of research priorities is necessary to achieve the visionary thinking required for future global food security. It would be overly ambitious to expect this consultation to set the long-term social, economic and political research agenda on this issue, beyond the priorities of the BBSRC. What is needed is a multidisciplinary workshop and consultation process specifically to frame the relevant social issues, identify the main drivers and research needs, and set the goals and priorities for future research. The Genomics Forum would be keen to participate fully in such a process. The study of social, cultural and historical aspects of food is a young but vibrant research field with its own professional bodies, notably the British Sociological Association Food Study Group and international Association for the Study of Food and Society, who should be closely

involved. Sociological and cultural research on issues relating to nutrition, food production and consumption will need to be strongly supported within an integrated approach to future food security. To take just a few examples, this would include topics as diverse as the environmental, economic, social and aesthetic value of home, community and urban agriculture; the role of gardening societies such as the Royal Horticultural Society; the use of food crop production in schools to teach home economics, nutrition and science; the influence of gardening celebrities and television chefs on public behaviour relating to food production and consumption; and lessons from food history. Food choice and eating behaviour are properly understood as social practices that are heavily context-dependent, intimately linked to many other aspects of social life such as individual identity and family nurturing, and certainly not solely determined by or dependent on scientific information (Murcott 1995, Mennell et al. 1993). The social sciences and humanities are the only fields which can adequately examine such questions.

Question 10. Training, skills and career paths

Sociological and educational research is needed into the skills deficits to which the consultation document alludes. The need may not simply be for more courses, and more students, in the applied food sciences (agriculture, food technology, etc) but also in the basic sciences such as plant science, especially the aspects of these subjects deemed to be ‘old-fashioned’ (systematics, anatomy, physiology, etc). Understanding of the historical and cultural context that has led to the current situation will be important in helping to shape appropriate responses.

Question 11. Coordination across funders

As noted above at 2.2 and at Question 8, this consultation document alone is insufficient to frame research priorities across all funders. As detailed elsewhere, wider involvement of the social sciences and humanities is required, by way of a genuinely multidisciplinary process likely to include both workshop-style events and opportunity for considered written input.

Question 12. Regulatory framework

Current property frameworks, especially those relating to intellectual property and land ownership, have significant influence on investment and innovation in research relating to food security. A better understanding of the relationship between ownership regimes, innovation and regulation will be crucial for stimulating effective innovation consistent with the goals of food security – increased investment alone will not suffice. For example, we suggest that the current intellectual property framework for protecting new crop varieties is inadequate to stimulate the innovation in crop breeding that may be required to meet global challenges.² The role of public and private sector funding in the context of food security and public goods

² The Genomics Forum convened an interdisciplinary workshop in June 2008 to explore the relationship between genetic technologies, intellectual property and plant breeding. The workshop report is available at http://www.genomicsnetwork.ac.uk/media/IP_Workshop_Report_July08_Final.pdf.

also needs careful consideration: arguably, we cannot (nor should we) rely on the commercial sector to meet longer-term, high-risk goals associated with food security in the UK and in the developing world.

Question 13. Public engagement

The Genomics Forum is an expert body in public engagement and wholeheartedly supports engagement as an essential part of developing a food security strategy. However, the consultation document occasionally implies that public engagement should function simply as a way of convincing the public of the need to adopt new scientific and technological developments. For example, regarding the need to explore more diverse sources of animal protein, the consultation document states that ‘Cultural traditions and consumer taste preferences will need to be tackled’ (p. 13). This suggests that public concern with tradition and taste should not be allowed to influence food security policy in any significant way. However, we would caution that public engagement does not necessarily lead to public acceptance of new scientific and technological developments. The ‘deficit model’ of public understanding of science has been criticised by social scientists as not only patronising but ineffective (Irwin and Wynne 1996). It is crucial that this point be taken into account in the developing of research priorities and public engagement strategies in relation to food security. Genuine two-way engagement requires the acknowledgement that members of the public, policymakers and scientists will not always agree on what constitutes scientific validity or societal value, and that they often have different ways of thinking about and judging risk. It means listening to and respecting public concerns, and being willing to respond to such concerns with changes in research programmes and policy.

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References

- Brasier, C. (2008) The biosecurity threat to the UK and global environment from international trade in plants, *Plant Pathology*, volume 57, pp. 792-808.
- Foresight (2007) *Tackling Obesities: Future Choices – Project Report*, Government Office for Science, London.
- Frow, E.K., Ingram, D., Powell, W., Steer, D., Vogel, J. and Yearley, S. (2009) The politics of plants. *Food Security*, volume 1, issue 1, pp. 17-23.
- Ingram, D. and Prior, C. (2008) *Non-Native Diseases and the Future of UK Gardens*, Royal Horticultural Society, London.

- Irwin, A. and Wynne, B. (eds) (1996) *Misunderstanding Science? The Public Reconstruction of Science and Technology*, Cambridge University Press, Cambridge.
- Marmot, M. and Wilkinson, R. (1999) *Social Determinants of Health*, Oxford University Press, Oxford and New York.
- Mennell, S., Murcott, A. and van Otterloo, A. (1993) *The Sociology of Food: Eating, Diet and Culture*, Sage, London.
- Murcott, A. (1995) Social influences on food choice and dietary change: a sociological attitude, *Proceedings of the Nutrition Society*, volume 54, pp. 729-35
- Nestle, M. (2002) *Food Politics: How the Food Industry Influences Nutrition and Health*, University of California Press, Berkeley, Los Angeles, London.
- Swinburn, B., Egger, G. and Raza, F. (1999) Dissecting obesogenic environments: the development and application of a framework for identifying and prioritising environmental interventions for obesity, *Preventive Medicine*, volume 29, pp. 563-70.
- Wilkinson, R. (1996) *Unhealthy Societies: The Afflictions of Inequality*, Routledge, London and New York.
- WHO (2000) *Obesity: Preventing and Managing the Global Epidemic*, World Health Organization, Geneva.