Opportunities and Challenges in Agri-Food Research

"Sustaining Agri-Food Systems: The Need for Interdisciplinary Research"

Professor Philip Lowe

Programme Director of the UK Research Councils'
Rural Economy and Land Use Programme

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The Demand for Interdisciplinary Science

A recent OECD report on 'Agriculture and the Environment' set out the challenge:

"*In the next half-century agriculture, worldwide, will be required to double its output if it is to meet the expected increased global demand for food and reduce hunger. The challenge is whether agriculture can efficiently produce the food to meet this growing world demand over time* ***without degrading natural resources – and do so in ways that are socially acceptable.***"

(OECD, 2004)



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The Demand for Interdisciplinary Science

Technological solutions on their own will not suffice.

Sustainable development must incorporate social, economic and environmental components.

Unsustainable development is fostered by the fragmented thinking and constrained logic of monodisciplinary perspectives.

It is important to fully comprehend the contemporary social forces shaping agri-food systems.

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Technology-driven Food Production

Linear supply chains.

R and D targeted at boosting primary production.

Biological improvements, to enhance the productivity of the plants and animals themselves.

A sharp separation between the technical (food production) and the social (food consumption).




Connections in the Agri-food system

Resistance to globalised food chains from various quarters including farmers, environmentalists, rural interests and consumers.

Opposition to the technology-driven model of food production.

Assertion of a consumer/public interest not only in what food is produced but also how it is produced, stretching right back along the food chain.

The result is what we term food chain connectivity.



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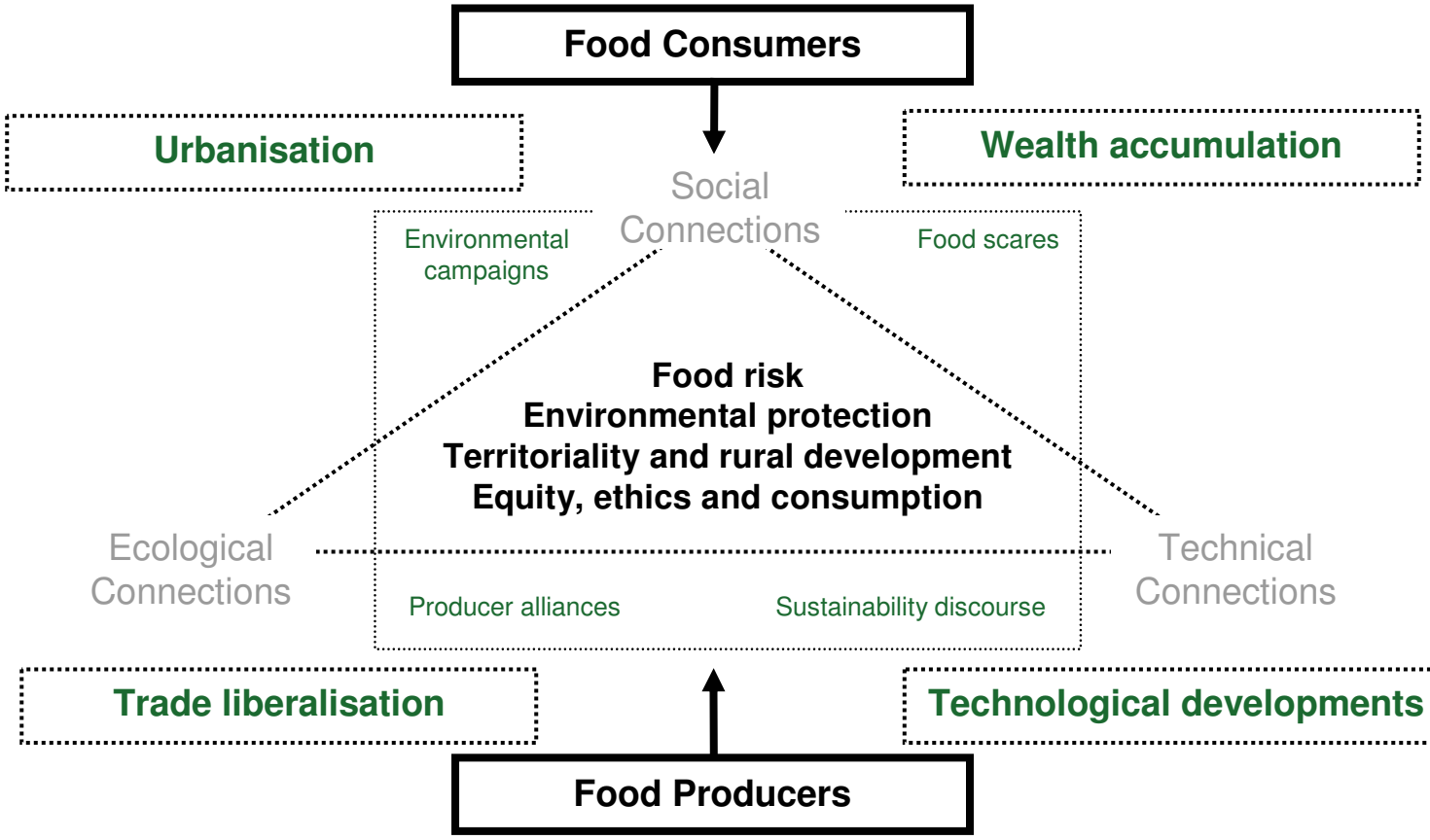
Connections in the Agri-food system






Connectivity: Emergent Issues

Food Risk

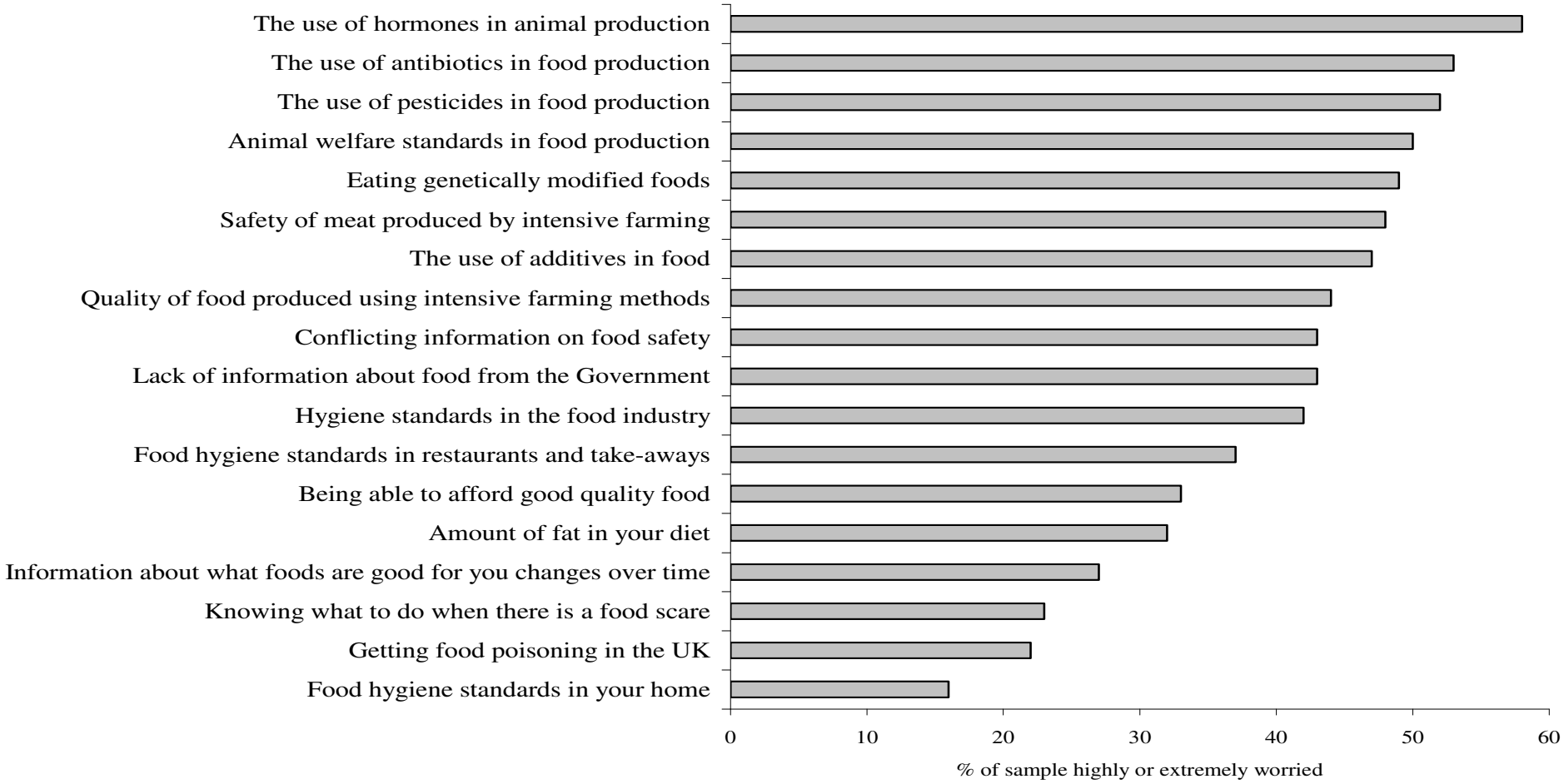
Major food safety events:

Year	Event	Country
1987/88	Beef hormone scare	Italy/European Union
1988	Poultry salmonella outbreak/scandal	United Kingdom
1989	Growth regulator *(alar)* scare for apples	United States
1993	E.Coli outbreak in fast-food hamburgers	United States
1996	Brain-wasting disease linked to BSE	United Kingdom
1996/97	Microbiological contamination—berries	United States, Canada
1995-97	Avian flu spreads to humans	Hong Kong, Taiwan
1999	Dioxin in animal feed	Belgium
2000	Large-scale food poisoning–dairy	Japan
2001	Contaminated olive oil	Spain

(World Bank, 2005)




Food safety concerns expressed by a UK sample:






Connectivity: Emergent Issues

Environmental protection

Concerns over the intensification of agriculture and its consequences broadened by links between environmental movements and consumer groups.

Territoriality and Rural Development

Move from centralised sectoral support to more locally based systems of rural development by animating endogenous resources.

Equity, ethics and consumption

Alignment of concerns over the social, ethical and environmental dimensions of the agri-food system.




Interdisciplinarity and social science

Pressing food chain problems require new forms of analysis and expertise, particularly from the social sciences

There has been increasing investment in interdisciplinary research:

"…*the solution to many of today's complex problems in areas such as globalisation, environment, health, defence and security must, by definition, be addressed using a interdisciplinary approach*."

(EU Research Advisory Board, 2004)

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Project	Discipline	Discipline	Discipline	Discipline
Modelling the interaction between climate change, agricultural pollution and land use	Economics	Hydrology	Environmental Modelling	Bioinformatics
Fostering links between quality food production and biodiversity protection	Human Geography	Ecology	Animal Science	
Comparing the social, economic and environmental impacts of consuming fruit & vegetables produced locally and overseas	Sociology	Economics	Ecology	Environmental Informatics
Identifying regulatory obstacles to biological alternatives to chemical pesticide	Politics / Political Science	Entomology	Microbiology	
Assessing the implications of a nutrition driven food policy for agricultural land use	Economics	Psychology	Animal Science	Crop Science
Farmer learning and innovation for sustainable agro-ecosystems	Human Geography	Development Studies	Crop Science	
Managing food chain risks	Psychology	Management and Business Studies	Food Science	




Beyond ‘end-of-pipe’ social science

The role of the social sciences as one of facilitating public acceptance of new technology has been discredited.

The social sciences have become recognised as part of the creative process with several major functions in interdisciplinary projects:

Social scientists as…	To…
Proxy for Society	**Consider values, preferences and motivations**
Epistemologists	**Reflect on the appropriate definition of problems**
Systems Analysts	**Understand the organisation and governance of human systems**
Comparative Analysts	**Understand social and cultural differences**




Solving Complex Problems

Risk management tools

Dealing with risk through technical models does not necessarily provide a useful guide to public responses and perceptions.

The breakdown of control systems leaves a legacy of diminished public confidence.

Public appreciation of ‘true risk’ cannot be taken for granted.

Research into devising participatory food safety approaches.

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Solving Complex Problems

Local versus overseas production

Trade liberalisation could reduce negative externalities or it may increase land pressures and lead to the loss of environmental benefits.

There are calls for food localisation to strengthen local economies and reduce food miles.

Research on comparing the social, economic and environmental impacts of consuming food produced locally (UK) and overseas (Kenya and Greece)

Full ‘life cycle’ assessment.

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Solving Complex Problems

Rural catchment systems

Understanding how social, economic and political factors determine the workings of socio-natural systems is crucial to tackling diffuse pollution.

Producers, stakeholders and researchers have different conceptualisations of human impact and interaction with the environment.

Mutual understanding is necessary to assist cooperative management of rural catchments.

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Solving Complex Problems

Barriers to alternative pest control

There are regulatory and market pressures on producers to reduce the use of chemical pesticides whilst maintaining food quality.

Biopesticides are one solution, though their take-up is poor.

Sources of market resistance and regulatory obstacles need to be understood.



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Conclusions

Research on agri-food systems requires collaboration between the social and natural sciences.

The limitations and consequences of the technology-driven model of food production demonstrate the importance of social factors.

Social science offers a variety of vital functions that can assist in understanding the complexity of agri-food systems and the social forces that shape them.