



House of Commons
Environment, Food and Rural
Affairs Committee

Food security

Second Report of Session 2014–15

*Report, together with formal minutes relating
to the report*

*Ordered by the House of
Commons to be printed 24 June
2014*

Environment, Food and Rural Affairs Committee

The Environment, Food and Rural Affairs Committee is appointed by the House of Commons to examine the expenditure, administration, and policy of the Department for Environment, Food and Rural Affairs and its associated bodies.

Current membership

[Miss Anne McIntosh](#) (*Conservative, Thirsk and Malton*) (Chair)
[Richard Drax](#) (*Conservative, South Dorset*)
[Jim Fitzpatrick](#) (*Labour, Poplar and Limehouse*)
[Mrs Mary Glendon](#) (*Labour, North Tyneside*)
[Mrs Emma Lewell-Buck](#) (*Labour, South Shields*)
[Iain McKenzie](#) (*Labour, Inverclyde*)
[Sheryll Murray](#) (*Conservative, South East Cornwall*)
[Neil Parish](#) (*Conservative, Tiverton and Honiton*)
[Ms Margaret Ritchie](#) (*Social Democratic and Labour Party, South Down*)
[Mr Mark Spencer](#) (*Conservative, Sherwood*)
[Roger Williams](#) (*Liberal Democrat, Brecon and Radnorshire*)

The following members were also members of the committee during the inquiry:

[Thomas Docherty](#) (*Labour, Dunfermline and West Fife*)
[George Eustice](#) (*Conservative, Camborne and Redruth*)
[Barry Gardiner](#) (*Labour, Brent North*)
[Dan Rogerson](#) (*Liberal Democrat, North Cornwall*)

Powers

The Committee is one of the departmental select committees, the powers of which are set out in House of Commons Standing Orders, principally in SO No 152. These are available on the internet via www.parliament.uk.

Publication

Committee reports are published on the Committee's website at www.parliament.uk/efracom and by The Stationary Office by Order of the House.

Evidence relating to this report is published on the Committee's website at www.parliament.uk/efracom.

Committee staff

The current staff of the Committee are David Weir (Clerk), Anna Dickson (Second Clerk), Sara Priestley (Committee Specialist—Environment), Boaz Nathanson (Committee Specialist—Agriculture), Clare Genis (Senior Committee Assistant), Lisa Stead (Committee Assistant) and Hannah Pearce (Media Officer).

Contacts

All correspondence should be addressed to the Clerk of the Environment, Food and Rural Affairs Committee, House of Commons, 14 Tothill Street, London SW1H 9NB. The telephone number for general enquiries is 020 7219 5774; the Committee's email address is efracom@parliament.uk

Contents

Report	<i>Page</i>
Summary	3
1 Introduction	5
Our inquiry	5
Report structure	5
2 The UK food system	5
UK food strategy	5
What is food security and who is responsible?	6
What we produce and what we consume	7
The EU context	10
The CAP and food security	11
The global context	12
The demand for protein and the price of animal feed	14
3 The challenge of climate change	16
Responding to climate change	17
Extreme weather	17
Reducing emissions from the agricultural sector	19
4 Sustainability and sustainable intensification	21
Sustainable intensification	21
Increasing yields	22
Protecting soil quality	22
Organic food production	23
Sustainable intensification in practice	25
5 Supply chain resilience	26
Length of supply chains	26
The Grocery Code Adjudicator	29
6 Harnessing technology	31
Technology and the food security challenge.	31
The Agri-Tech Strategy and technological innovation	31
New and emerging technologies	33
Protecting and improving crops	33
Precision farming technology	33
EU regulation of technological innovation	35
7 Genetically modified food	36
What is GM?	36
Potential benefits	37
Obstacles to greater uptake	39
The EU regulatory process	40
Breaking the deadlock	41

8	Securing food for the future	42
	The research landscape	42
	Farm-level research	43
	Knowledge transfer	44
	New Farmers	46
	Conclusions and recommendations	48
	Formal Minutes	54
	Witnesses	56
	Published written evidence	57
	List of Reports from the Committee during the current Parliament	59

Summary

The UK currently enjoys a high level of food security, but this situation will not last unless the Government plans now for future changes in our weather patterns and the changing global demand for food.

This report focuses on food production, supply and the systems necessary to ensure our food security in the future. It highlights some examples of good practice and how Government and food producers could plan for projected changes better to make our food production, and supply systems more secure.

Food security has many dimensions and responsibility for it rests with at least three departments—Defra, BIS, DECC. While we are sure that cross-departmental communication takes place, we recommend that the Government identify Defra as the lead Department and appoint a Food Security Coordinator within it to ensure a coherent approach to this important issue.

The UK is currently 68% self-sufficient in foods which can be produced here. There has been a steady decline in this level over the last 20 years. While there is no optimal level of self-sufficiency, and a diversity of supply is important for spreading risks, the Government should monitor this level. Levels of self-sufficiency in fruit and vegetables have fallen the most, and farmers should seek to extend the seasonal production of fresh fruit and vegetables in coordination with the Agricultural and Horticultural Development Board.

We want to see more supermarkets shorten their supply chains. It is clear that this significantly reduces the threat of disruption and risk in the system and helps ensure consumers know exactly where their food comes from.

Many of our food imports are from other EU member states. As part of the CAP, many of our farmers receive support from the EU. This is a contentious issue. We believe the objective of ensuring secure food supplies is still relevant. Nevertheless the CAP, and indeed our own food production systems must change to meet the challenge of climate change.

This requires a significant shift in how we produce our food. Agricultural output is extremely weather dependent and we know that climate change will bring more unpredictable and volatile weather. Storms last winter led to extensive flooding of agricultural land in Somerset, for example. Farmers need better longer-term weather forecasts, and resilient production systems to be able to recover from such events. The technology to assist farmers is available, but at present, it is not translated into a marketable tool which would enable farmers to predict the likely impact of adverse weather and plan for it.

We support the concept of sustainable intensification—producing more food, on a finite amount of land, in a sustainable way. What this means for each farmer, and each product will differ, but the concept of producing more with fewer inputs is important. We note that for our staple crop, wheat, yield levels have not increased for many years.

We also need to consider what type of food we produce. Our livestock and dairy produce is heavily dependent on imported soybean for animal feed. Projected increases in the demand for protein from emerging economies in India, China and other parts of Asia, Africa and South America, threaten our supply of soybean, currently imported mainly from South America. In view of the significant strategic risk and cost the UK is exposed to in relation to its animal feed imports, the Government needs to put in place a plan for alternative animal feed for the livestock and dairy sectors.

In responding to climate change the agricultural sector must reduce its emissions. Livestock production contributes more than 40% of these. There is a need for more research into how to reduce this. We saw interesting research at Rothampsted Research Institute. More is needed urgently. The Government must also produce a detailed plan for how the agricultural sector as a whole should reduce its emissions.

One of the key ways in which we can ensure our future food security is by taking advantage of available technology. We support the Government's new £160 million AgriTech Strategy whose objective is to support collaborative research and development and ensure that technological ideas are translated into practice. However, the funding may be insufficient—the first round of bids was six-fold oversubscribed. The Government must monitor this and, if necessary, identify additional funding sources.

There are many technological developments which could help to improve productivity in a sustainable manner. We were impressed with the opportunities provided by precision farming technology, for example to be able to plough water-logged fields, or to use robots and scanning technologies to detect and remove weeds in a field. At present much of this research is not reaching the field.

We also looked at GM technology and its ability to import desirable traits—such as aphid-repellence, or drought resistance into a plant. We were told that EU regulations were hampering our ability to take advantage of this technology. We also discussed consumer concerns about GM—the implications of its production for other types of crops, and concerns about consumption. The Government must address these concerns, using available science to counter food safety fears. The Government must also continue to work within the EU to encourage a more evidence-based approach to the licensing of crops.

In addition to taking advantage of available technology, our longer term food security requires research now, into the systems which will be appropriate in the future. The Government spends £410 million annually on agri-food research. However, much of this research is fragmented, and there is insufficient funding for farm-scale research which can carry out investigations in a sustained manner, replicating livestock and farming systems and bringing research closer to the farming community.

In addition to technology it is clear that we need a vibrant farming sector. Initiatives to encourage new farms are welcome. These should take place in cooperation with industry which can help with the costs associated with entry into farming,

1 Introduction

Our inquiry

1. This Report is the first of two we intend to make on food security in the UK. It is about how we produce food, where our food comes from, how it is traded and marketed and the preparedness within our food system to address long term issues arising from climate change and projected global population growth. In our second Report, later this year, we intend to focus on consumption, affordability and access to food and food waste.

2. We reported on food security in the last Parliament. Our 2009 Report, *Securing food supplies up to 2050: the challenges faced by the UK*, was published in the aftermath of the 2008 food price spikes which had led to significant economic and political disruption in many countries and increased the significance of food security globally.

3. In the course of our inquiry we received written submissions from 50 different individuals and organisations in the UK. We held five oral evidence sessions and one private briefing (a full list of witnesses can be found at the end of this Report). In connection with this inquiry we made visits to Devon and Cornwall to Mountstephen Farm, Rothamsted Research Institute and the Cornish Cheese Factory in Liskeard. We are grateful to all those who have contributed to our inquiry in one form or another. We have also had the assistance of an external Specialist Adviser, Professor Brian Revell, Emeritus Professor of Agricultural Economics, Harper Adams University, whose assistance has been invaluable.

Report structure

4. Our Report is structured as follows: the second chapter sets out the broad framework of UK food policy looking at the interconnections between the global, regional and national structures. The focus of chapter three is the challenge of climate change to our food production systems. The remaining chapters explore the necessary responses to this challenge focusing on sustainable intensification, supply chain resilience, harnessing technology, and research and development needs for the long term.

2 The UK food system

UK food strategy

5. In 2010 Defra produced a UK Food Security Assessment which analysed the risks and challenges to UK food supplies and placed UK food security in a global context.¹ The Assessment focused on the themes of food availability, access, affordability, safety and resilience. It concluded that the UK currently enjoys a high degree of food security, based on a strong UK food production base, access to EU markets and an open, rule-based

1 Defra ([FSY 0044](#)) para 7

international trading system.² The Assessment was reviewed by the current Government in 2012 and found to be still relevant.

6. The Food Security Assessment fed into the creation of the Government's food strategy to 2030.³ Its objectives were to ensure that:

- consumers could make informed choices about the food that they eat;
- there was a strong domestic agricultural and food sector with EU and global trade links; and,
- food would be produced in an environmentally sustainable manner.

The present Government has similar objectives, including increasing food exports, removing barriers to competitiveness, pressing for reform of market-distorting EU trade and agricultural policies, and reducing food waste while providing “strategic support to ensure the long term resilience of the sector.”⁴

What is food security and who is responsible?

7. Food security has been defined by the UN Food and Agriculture Organisation as:

when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.

This implicitly includes future generations, and requires food production methods, in the UK and elsewhere, to be sustainable.⁵ Germains Seed Technology commented that “food security is a global challenge which affects all areas of agriculture and rural development.”⁶ The NFU wrote, “we have a moral obligation to do what we can both domestically and through our influence on other countries to help address the critical long term food security issue, as well as the more pressing issue of hunger in some parts of the world.”⁷

8. Responsibility within Government for key elements of policy that make up the multiple dimensions of our food security are distributed across a number of Whitehall Departments. The Foreign and Commonwealth Office (FCO) is responsible for international trade negotiations, and the Department for Business, Innovation and Skills (BIS) through UK Trade and Investment, for assisting businesses (including those in the agri-food sector) in developing export trade. BIS also has responsibility for ensuring we have a research capacity and capability to cope with future challenges. The Department for

2 Defra ([FSY 0044](#)) para 6

3 HM Government, [Food 2030: How we get there](#), January 2010

4 Defra ([FSY 0044](#))

5 Research Councils UK ([FSY 0016](#)) Annex 1, para 3

6 Germains Seed Technology ([FSY 0008](#))

7 NFU ([FSY 0029](#)) para 9

International Development (DFID) is mandated to ensure UK food, trade, aid, and development policies help developing countries to increase their food security.

9. Nevertheless Defra also has a role to play in helping to ensure our farmers are as efficient as possible, promoting the use of new technologies in conjunction with BIS through the Agri-Tech Strategy.⁸ Furthermore, both Defra and the Department of Energy and Climate Change (DECC) have responsibilities regarding reducing greenhouse gas emissions (GHG) from agriculture, and in bio-renewable energies. The question of cross-departmental policy coherence and actions as they relate to the policy and strategies for UK food security is therefore relevant.⁹

10. We were re-assured to hear that cross-departmental communication regarding specific policy areas does take place.¹⁰ However, it is not entirely clear to us which department has the primary responsibility for leading on UK food security and its delivery, nor what priority these issues are given in other departmental strategies, and therefore how this may affect their specific contributions in relation to resourcing and delivery of the Government's food security strategy. The Food and Drink Federation pointed to the Environmental Audit Committee report of 2012 which concluded that the Government did not have a strategy which unified policy areas which impact on production, supply and demand which could drive the whole system towards greater sustainability.¹¹

11. In order to clarify the resourcing, commitment and prioritisation of food security across government we request that the Government set out the financial contributions and support of each department to the goals and delivery of the Government's food security strategy. The Government should identify Defra as the lead Department for food security and appoint a Food Security Coordinator within it to ensure policy coherence across Government departments.

What we produce and what we consume

12. Professor Benton commented:

Food security is not only about what we produce; it is about the resilience of the food we bring in, not just chocolate, cocoa and soya but all the other things that we bring in. It is also about buying sufficient food, not overbuying food and throwing it away, and buying sufficient food for a healthy diet and not overeating food and wasting it in that way. There are many ways in which we can increase our ability to cope with problems of production, and they are not all about growing more in the UK.¹²

8 The Strategy was launched in 2014 and is discussed in detail in chapter six

9 The Department of Health and the Department of Work and Pensions have responsibilities in relation to affordability and access to safe food and a healthy adequate diet.

10 Q269

11 Food and Drink Federation ([FSY 0027](#)) para 13

12 Q21

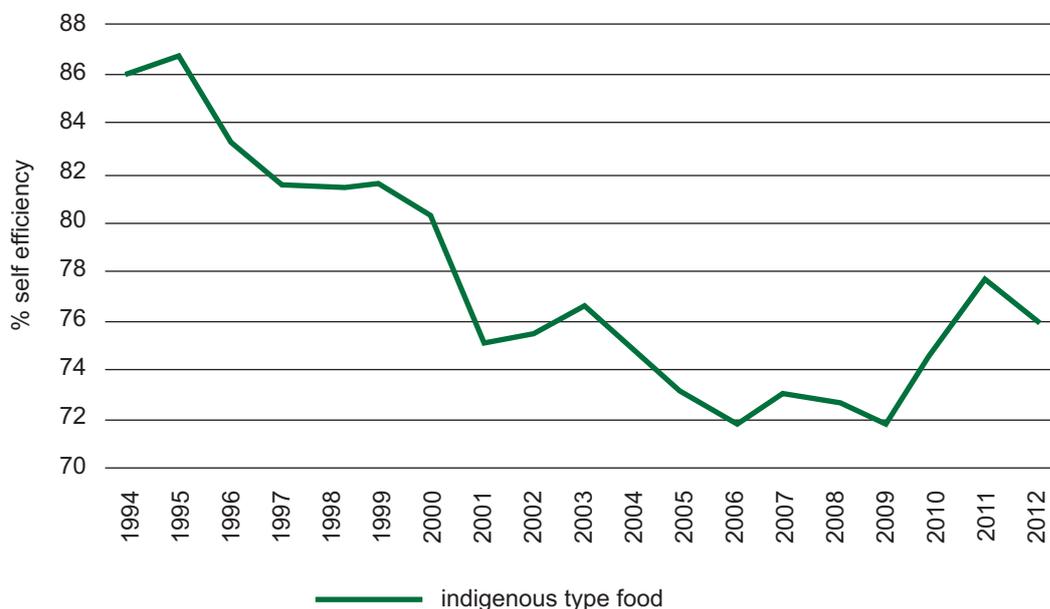
13. The UK Food Security Assessment noted that our food security depended on being able to source food from a variety of countries and that this diversity of supply enhanced security by spreading risks, widening options and keeping prices competitive.¹³

14. In January 2014 the Secretary of State, Rt Hon Owen Paterson MP, told the Oxford Farming Conference that he wanted British consumers to purchase more seasonal British produce. He said:

By buying seasonal fruit and veg we can improve the nation's health, help the environment and boost the economy. [...]As British farmers and food producers you know that we grow some of the best food in the world here - so why is 24% of the food eaten in the UK imported when it could be produced here? [...]We have a top-class fruit and veg sector which produces everything from green beans to strawberries, yet we imported £8bn of fruit and veg in 2012.¹⁴

This figure of 24% is based on the ratio of indigenous-type food produced to indigenous-type food supplied into the market, and thus a measure of the amount of food available for consumption which could be produced here. Paragraph 14, The “self sufficiency ratio” or “food production to supply ratio” for indigenous foods has declined from a peak of almost 87% in the early 1990s to 77% in 2012.¹⁵

Graph 1: Self sufficiency levels since 1994 for indigenous foods

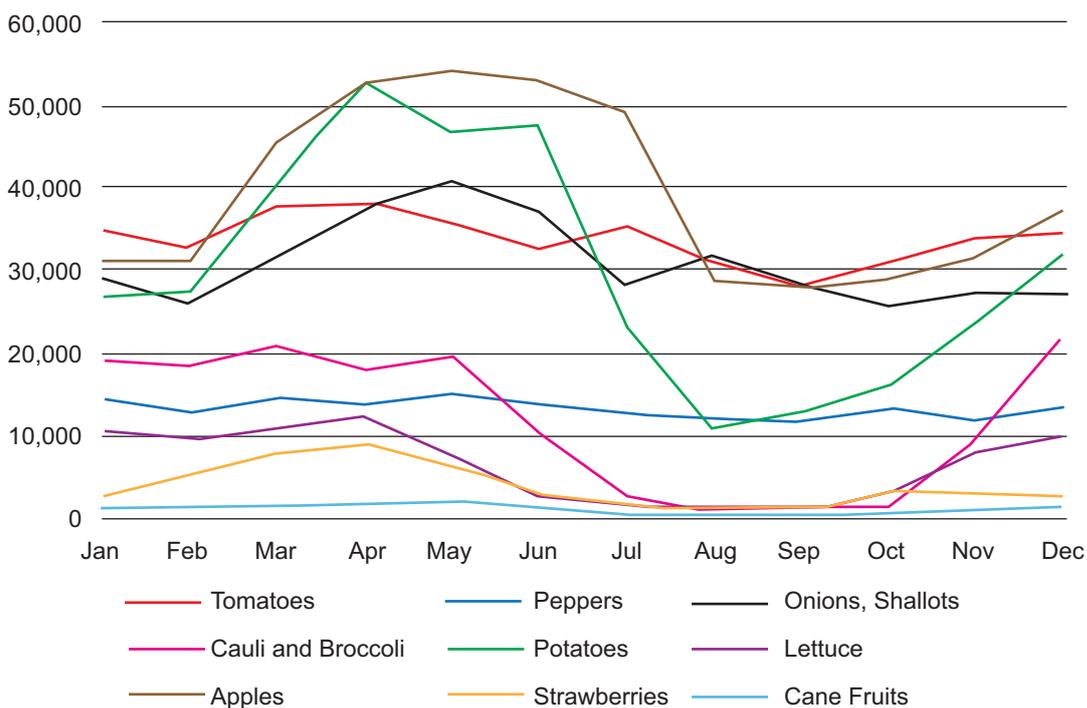


Source This chart has been created using data provided by DEFRA at <https://www.gov.uk/government/collections/overseas-trade>

13 Defra (FSY 0044) para 10
 14 [Buy British fruit and veg to help the economy](http://www.bbc.co.uk), www.bbc.co.uk
 15 Defra, [Agriculture in the UK 2012](#). Figure revised at 29 May 2014.

15. We note the low levels of self-sufficiency in the UK fresh fruit and vegetables sectors, at 12% and 58% respectively. While most of these imports, by volume, occur in the out-of-season months of November to June, as the graph below illustrates, import levels of apples, potatoes, peppers, onions and tomatoes remain still relatively high at the height of UK seasonal production. It is likely that the majority of these imports come from other EU Member State which experience similar seasons to the UK.

Graph 2: Imports of fresh fruit and vegetables: monthly averages by tonne, January 2009 to October 2013



Source HM Revenue and Customs, trade info, [UK export and import data](#)

Even if productive capacity in the UK were to be at its maximum level, it is unlikely that the UK would be fully self-sufficient in indigenous food. This would also be a risky strategy. As the CLA commented:

If the UK refocused solely on domestic production and ignored external trade, there could be an unforeseen catastrophic event, such as a major crop failure or disease epidemic in livestock, which would leave the UK needing to rapidly source food from global markets. Diversity of supply is the key to resilience.¹⁶

16. Professor Benton told us that the UK needed more diversity in what it currently produced—mainly cereals and livestock—in case of market failure.¹⁷ He discussed *Thanet*

¹⁶ CLA ([FSY 0043](#)) para 3.5

¹⁷ Q11

Earth, a large greenhouse complex in Kent, which now produced about one third of UK cucumbers and tomatoes, as an example.¹⁸

17. The Government suggested that there may be sectors where the UK could increase the production-to-supply ratio through greater competitiveness. It is also looking at areas where there may be obstacles which prevent UK producers from fully exploiting their comparative advantage, as well as barriers to UK food and drink exports in foreign markets.¹⁹ The Government is also trying to find new markets for UK food exports in those parts of the world where demand for food is increasing. The Minister told us:

We have been particularly successful at opening markets in China to British pork, and we have opened markets in Russia to British lamb, for instance. A key element of the TTIP negotiations at the moment—the Transatlantic Trade and Investment Partnership—that the EU is leading is to ensure that we can open the US market to European beef. There are lots of opportunities for us in export.²⁰

18. Food security is not simply about becoming more self-sufficient in food production. A diversity of supply is an important safeguard against diseases, severe weather or other domestic supply disruptions. There are opportunities to extend the seasonal production of non-tree crop fresh fruits and vegetable products. We would like to see a more coordinated and positive approach by retailers, the Agricultural and Horticultural Development Board and local and central Government to examine ways to encourage greater domestic production in these sectors.

19. We should also export, where possible, those products which are surplus to demand in the UK and can be produced competitively for export, as this will help boost our production. We are pleased that the Government is seeking to do this. The Government must redouble its efforts to negotiate the export of products such as pigmeat and cheese to China and demonstrate reciprocity in trade.

20. It is right that the Government keeps track of levels of self-sufficiency in indigenous products—which will vary from time to time. While the UK may be food secure at present, it would be unwise to allow a situation to arise in which we were almost entirely dependent on food imports given future challenges to food production arising from climate change and changing global demands.

The EU context

21. The EU provides the framework for our trade, including in food and agricultural products. The bulk of our food imports apart from tropical and sub-tropical fruit and vegetables, out-of-season temperate fruit and vegetables, and products such as soya and

18 Q14. Thanet Earth has clarified that it supplies 12% of the UK market for cucumbers, peppers and tomatoes.

19 Defra ([FSY 0044](#))

20 Q281

rice, come from other EU member states.²¹ It would be impossible to consider UK food security without reference to the EU context.

22. In addition the CAP is the framework under which UK farming takes place, providing payments to farmers and setting standards for environmental, food safety, phytosanitary regulation and animal welfare. We reported last year on the Implementation of the CAP in England 2014–20.²²

23. Within the Commission, different Directorates General (DGs) are responsible for different aspects of food security. As in the UK, no single EU body has the whole food security remit. Moreover, each Member States has its own approach to food security. This makes the process of policy coherence and unity of objectives difficult to achieve at the EU level and this is evident in many of the debates around the CAP.

24. Professor Crute told us the UK was at the forefront in the EU in thinking about food security.²³ Andrew Opie, of the British Retail Consortium (BRC), told us that there was a need for a cross-EU approach to food security.²⁴ The BRC said the EU was:

better placed to consider the structural issues of food security as it has competence for trade agreements, the CAP and legislation on biotechnology. However, we feel more co-ordination is needed to bring these policy areas together in a coherent fashion to address food security.²⁵

The CAP and food security

25. The Government believes that the CAP, combined with EU trade policy, “has a negative impact on global food security”.²⁶ It says that direct payments through the CAP provide a cushion to farmers which dilutes the effects of changes in the market prices of their products and inputs and encourages inefficient farmers to remain in the sector. Price support and other market interventions also keep prices higher than they would otherwise be and high agricultural tariffs keep potentially more efficient producers in other parts of the world out of the EU market.²⁷ Professor Crute agreed with this saying:

The CAP is a little bit behind the curve in terms of the importance of looking at the efficiency of agricultural production systems. It essentially still rewards, for all intents and purposes, inefficient farming. It is more of a social policy, in some senses, than an agricultural policy.²⁸

21 Q155

22 Environment Food and Rural Affairs Committee, Seventh Report of Session 2013–14, [Implementation of the CAP in England 2014–20](#), HC 745

23 Q10

24 Q155

25 British Retail Consortium ([FSY 0018](#)) para 3.8

26 Defra ([FSY 0044](#)) para 14

27 Defra ([FSY 0044](#)) para 14

28 Q10

26. Peter Kendall from the NFU said he could not agree with this analysis:

The challenge for saying that our payments keep inefficient farmers in production is quite emotive. The reason I say that is because if it is devil take the hindmost, and let people go out of business because they are not cutting-the-mustard: that is a pretty tough message. It is tough because their competitors get that support. If we say that we are going to let the market forces operate, it is fair to say that we would reduce those support payments to farmers evenly across Europe.²⁹

27. Agricultural support continues to be a subject of major contention. The CAP was designed as a measure to help ensure food security, to sustain the rural economy and ensure that farming remained a viable economic activity. The conditions which originally gave rise to the CAP have changed and the EU is in a good position in relation to food security now. However, the CAP is no longer just about the amount of food produced, but increasingly about the way we produce it. The new CAP also allows Member States a great deal of flexibility in its implementation which can be used to assist UK food security objectives.³⁰

28. The CAP has changed significantly over the years, and now has many more objectives including environmental protection and conservation. Nevertheless, its original objective of helping to ensure EU consumers have access to stable food supplies at reasonable prices remains important particularly in the context of projected increased global demand for food and potential supply disruptions. The farming sector also provides public goods which, by their very nature, have no market value. Some remuneration through direct payments is warranted, as such provision may entail specific costs in order to meet environmental or strategic objectives and targets.

29. The UK Government must ensure a joined-up approach to food security within the EU across different policy areas, and particularly in relation to the CAP, to ensure policy coherence. The Government should set out how it will use the flexibility provided by the new CAP agreement to help meet the objective of food security.

The global context

30. After the global food crisis in 2008, the Government commissioned a report on the future of food and farming which was published in 2011. *The Future of Food and Farming*, often referred to as the Foresight Report, is widely accepted as one of most significant and wide-ranging reports on food security in recent years.

31. The Foresight Report argued that:

29 Q119

30 Q24

The global food system will experience an unprecedented confluence of pressures over the next 40 years. On the demand side, global population size will increase from nearly seven billion today to eight billion by 2030, and probably to over nine billion by 2050; many people are likely to be wealthier, creating demand for a more varied, high-quality diet requiring additional resources to produce. On the production side, competition for land, water and energy will intensify, while the effects of climate change will become increasingly apparent. The need to reduce greenhouse gas emissions and adapt to a changing climate will become imperative. Over this period globalisation will continue, exposing the food system to novel economic and political pressures.³¹

32. One of the main challenges posed by the Foresight Report was how to feed a growing global population with limited or finite resources in the context of unpredictable climate change impacts. Professor Tim Benton, from the University of Leeds, told us:

If you look ahead towards the middle of the century, although it is quite difficult to effectively produce a weather forecast that is accurate enough to understand what production is going to be like, under some scenarios of change, where the variability may increase detrimentally, it might be difficult even to produce the same number of calories as we do at the moment, yet alone the projected increase in demand of 100%. If there is enough food, broadly speaking, for 7 billion to 9 billion, and we have 9 billion or 10 billion, and the richest people want to eat twice the global share, what will end up happening? Wars are likely to happen, for access to land and water, and food prices are going to detrimentally affect a whole range of different things, so together they are quite painful challenges.³²

Professor Ian Crute, from the Agriculture and Horticulture Development Board (AHDB), agreed that the challenge of feeding an increasing global population, with a rising middle class, was significant. Professor Sir John Beddington, the lead author on the Foresight Report and previously the Government's Chief Scientific Adviser, added that even if the fertility rate in developing countries slowed down with increasing prosperity as was expected, the impact of this on the demand for food would not be felt for some time.³³ One example of our dependence on global markets is in relation to the demand for protein and the price of animal feed.

31 Government Office for Science, [The Future of Food and Farming: Challenges and Choices for global sustainability](#), 2011

32 Q2

33 Q71

The demand for protein and the price of animal feed

Increased incomes in emerging economies have led in those countries to an increased demand for protein (meat and dairy in particular). Most of the livestock feed relies on soybean as an ingredient, much of which is imported, increasingly from South America. Professor Benton told us:

You can certainly see, with respect to China, the dietary transition has been huge over the last 25 years or so, and the amount of meat and dairy that is being consumed has gone up about fivefold per capita. The end result of that is they are importing, for example, huge amounts of soy from South America. We also rely on soy, primarily for putting in processed foods—about 70% of foods in the supermarket have soy in—and for most livestock food.³⁴

As a result there is risk to the UK that the cost of producing animal protein in the UK, especially pigmeat and poultrymeat, which are fed on soy products, will substantially increase. Furthermore the dominance of Brazil both in global soybean trade—accounting for over 37% of world soybean exports in 2012/13³⁵—and also as a supplier of soybeans to the UK—88% of UK soybean imports came from Brazil in 2012³⁶—underlines the strategic risk to the UK.

Professor Benton suggested we need a “Plan B” for future protein because if China, decided that it needed more food, prices for products dependent on soybeans would increase.³⁷ Professor Beddington agreed:

I do not think we are going to be in a situation of protein starvation; it is just a price mechanism that will harvest it, and we are a wealthy country compared with other parts of the world. We will not be in a situation where we will not be able to buy in the protein. The issue is round the margin. It is whether, in fact, pig production or chicken production is going to be profitable in the UK if you are importing grains or soya to feed at what is a very high price.³⁸

33. We asked the Government what account it had taken of the possibility that we may be unable to rely on sourcing animal feed from South America in future, and the implications of this for the price of animal-based protein in the UK. The Minister for Farming, Food and the Marine Environment, George Eustice MP, acknowledged that since animal feed is a globally traded commodity, prices do go up and down. He reiterated the Government’s

34 Q4

35 USDA, [World Agricultural Outlook: agricultural projections to 2022](#), February 2013

36 UN, [Comtrade database](#)

37 Q4

38 Q89

support for open markets and free trade, but said more could be done to produce animal feed here, for example by growing more leguminous crops for animal feed, and by sourcing more animal feed locally as was being trialled in the pig sector. He said new cropping rules under the Common Agricultural Policy (CAP) might also encourage diversification into using legumes as break-crops.³⁹ He also told us that the Government had put £18 million into research through the Technology Strategy Board to work out how the industry could reduce reliance on protein sourced overseas.⁴⁰

34. In contrast, environmental organisations such as the Soil Association and Friends of the Earth argue that the solution to this problem is for us, in the developed world, to eat less meat. The Soil Association told us that “we could feed roughly three billion people more on the planet if feed that goes to animals—and which is capable of humans eating it, like grains and protein—went to humans.”⁴¹ They also commented on the large amount of meat which is wasted.

35. Professor Benton commented that it was important to use land appropriately—some areas of land were suited to livestock, other areas of highly productive land were suited to grow grain, and given the high price of wheat, it was unlikely that such land would be given to livestock. He did however suggest that changing our habitual diet was a possibility in the long run and would result in changed land use.⁴²

36. The Minister assured us that the Government was not pursuing a policy to discourage people from eating red meat, beef or lamb. He said, “We think that is something that is a choice for consumers.”⁴³ He also pointed out some benefits from pasture-fed animals:

Particularly when it comes to sheep, actually having some grazing of sheep is quite important to maintaining certain landscapes and habitats for certain types of insect, which then themselves provide a feed for birds. Some of our agri-environment schemes do indeed have requirements around stocking densities and requirements for there to be some grazing to maintain some of those habitats.⁴⁴

37. There is a significant challenge to feed a growing global population in a sustainable manner. The key question for us, is how the UK responds to that challenge—that is, what role it plays in global markets given that it is both a small part of the global food economy, and its agriculture is a relatively minor contributor to global GHG emissions.

38. Consumers should be able to make informed choices about what and how much they consume, and health and resource impacts should play a part in these choices. There is an important role for protein from a variety of sources in our diet, and some of

39 Q284

40 Q285

41 Q189

42 Q24

43 Q286

44 Q288

the animals we consume—for example, cattle and sheep—also play a vital role in ensuring our hillsides and upland farms remain viable. The production of protein, whether from animals or plants, must make efficient use of land and water, and discourage waste and reduce harmful emissions.

39. We are concerned about the potential impact of projected rising trends in global demand for animal protein on the price of animal feeds and the cost of production. The Government is aware of this issue and has funded some research in this area.

40. *In view of the significant strategic risk and cost the UK is exposed to in relation to its animal feed imports, we recommend that the Government give higher priority to research to enable us to source more of our animal feed from within the EU. The Government must promote the growth of more legumes which ensure greater output per hectare. Additionally, the Government should monitor the demand for soya and other animal feeds at the global level and ensure that there is a long term “Plan B” for animal proteins within the EU.*

3 The challenge of climate change

41. The biggest long-term challenge for food security, at the global and national level, is the impact of climate change. Thus our food production systems, and the Government’s approach to food security, which suit us well as present, will need to respond to this challenge if we are to guarantee food security in the future.

42. The UK Committee on Climate Change, an independent statutory body established under the Climate Change Act of 2008, raises concerns about the possibility of a shortfall in water during dry periods, and of soil degradation resulting from intensive agriculture, both as a consequence of climate change and population pressures.⁴⁵ Professors Benton and Crute said that, although we know that temperatures will increase, we do not yet have a good understanding of what will happen to the jet stream which steers our weather patterns. However, it is most likely winters will become wetter and summers drier and hotter in the UK, and extreme weather events more frequent.⁴⁶ Professor Benton said:

Climate risks are inherently uncertain as they [*also*] depend on the future emissions pathway and the eventuating climate impacts. The impact of extreme weather on food production is increasing; but its future impact is, by its nature, very difficult to predict.⁴⁷ [...]

Hence it is about thinking through the systemic response to climate change and having a likely scenario that you are working towards, whether it is four

45 Committee on Climate Change, [Managing the land in a changing climate](#), 2013

46 Q41; [Climate change making extreme rainfall in England more likely](#), *The Guardian*, 30 April 2014

47 Tim Benton ([FSY 0054](#)) para 16

degrees, or understanding better the extremes of and variability in the weather.⁴⁸

Responding to climate change

43. The Food Ethics Council argues that climate change risks are not adequately incorporated into UK food security strategies and planning. Other witnesses also told us about the need for food systems which took account of climate change. Peter Kendall, then NFU President, told us that our agriculture could cope with small changes in temperature but not large ones. He said the agricultural sector needed to build resilience and, in particular to protect its physical infrastructure, to withstand extreme weather.⁴⁹

Extreme weather

44. While changes in our climate may be less hostile to agriculture than in other parts of the world, all agriculture is vulnerable to extreme weather events and conditions. Indeed witnesses told us it was the number one challenge for our food production.⁵⁰ The NFU writes that since the turn of the century farming in the UK has suffered significant financial losses as a result of a number of extreme events including £1.2 billion in 2012, £66 million in 2007, and £603 million in 2000–01 and, across the EU, the heat wave in 2003 cost European farming €13.1 billion.⁵¹ The 2013–14 winter floods also affected significant amounts of agricultural land. The NFU has stated that:

About 49,000 hectares of agricultural land was flooded in a one week period including about 14,000 hectares on the Somerset Levels and Moors and large areas in the Thames and Severn catchments and along the South Coast of England. In addition about 2,600 hectares flooded during the December tidal surge along the North coast of Wales and East coast of England, but it is still too early to assess the financial cost to farming.⁵²

45. The farming community would benefit from early warnings of extreme weather events. Professor Benton talked about the importance of longer term weather predictions:

We need to understand better the environment system. That includes investment in decadal-long weather forecasting so farmers can plan water resources and infrastructure, and includes thinking about soils and how soils will be impacted and the whole range of plant/environment interactions.⁵³

Professor Beddington concurred saying:

48 Qq16, 43

49 Q125

50 Qq 70, 83 [Professor Beddington]; 125 [Peter Kendall]; 130 [Peter Kendall, Tom Taylor]; 163 [Callum Murray]

51 NFU ([FSY 0029](#)) para 26

52 Environment Food and Rural Affairs Committee, First Report of Session 2014–15, *Winter Floods 2013–14*, HC 240. NFU ([XFL 0024](#)) para 8

53 Q43

I think there is real scope for linking meteorological prediction more closely to the farming community. Everybody watches Country file these days or listens to Farming Today and you get a forecast, but it is well within the capability of our meteorologists now to predict on forecasts of a few days away very accurately, but also giving you some idea three or four weeks ahead. For example, not this last winter but the previous winter, it was pretty much predicted we were going to have a very, very cold period at the tail end of January or, last summer that we were going to have a fairly mild autumn. These are the sort of things that the farming community could benefit from a lot.⁵⁴

46. Food Security Ltd, a farmers' organisation, said the Met Office had a long history of translating its science to provide services to decision making. This expertise could be used to help the agricultural industry become more resilient.⁵⁵ We note that Defra and DECC have co-funded UK CP09, a climate information service provided by the Met Office which can assist with interpreting possible future climate conditions based on different scenarios, and wonder whether a similar service for weather forecasting could be created.

47. Nevertheless, the farming community also needs to be able to put in place appropriate response measures, and the Government has a responsibility to ensure its policies encourage this. Minister of State for Agriculture, George Eustice, told us the Department's strategy for responding to climate change impacts on food security was based on the Foresight Report findings indicating that it was largely a longer-term problem, creating stresses in the food systems predominantly in the subtropical and equatorial regions of the world.⁵⁶ The Government was promoting a number of initiatives in response to climate change, including, in particular, the uptake of new technologies:

We have [...] encouraged and been at the forefront of saying that we should have an open mind to new technologies, such as genomics and also GM crops, where there is the potential that you could breed more drought-resistant varieties of crops. That could be very important for those areas that suffer the worst impacts of climate change. I would say, through a combination of the Agri-Tech Strategy that we are pursuing, combined with our view that we should open world markets and have food trade, those two key measures are the key measures that we would need to mitigate the risk of climate change.⁵⁷

48. Defra told us it was working towards a more sustainable agriculture through productivity improvements resulting from sustainable intensification, reductions in post-

54 Q70

55 Food Security Ltd ([FSY 0042](#)) para 6

56 Q267

57 Q298

harvest losses and climate-smart technology.⁵⁸ Defra produced a climate change evidence plan in March 2013,⁵⁹ but we have not yet seen an action plan resulting from this.

49. The IPCC's 5th assessment report of March 2014 makes strong connections between climate change and its potential impacts on food security without appropriate adaptation strategies.⁶⁰ However it focuses on the need for strategies for adaptation which distinguish between incremental and transformational adaptation (or paradigm shifts) to climate change, and for methodologies for decision making under circumstances of climate impact, adaptation and vulnerability.⁶¹ While many Governments are addressing issues of incremental adaptation, less is being done in relation to transformational adaptation. Issues of risk assessment and planning relating to climate change impacts on UK agricultural and food system were not widely explored in any detail in the Foresight Report.

50. Climate change will have significant implications for our agricultural production in the long run. While it may be that the UK climate becomes better suited to particular types of agriculture, farmers will need the know how to adapt their crops or livestock without productivity losses and in a sustainable manner. Farmers would be greatly assisted by having access to more reliable long range weather predictions so that they can be better prepared for extreme weather events and conditions.

51. We urge the Government to explore the cost implication for farmers of access to more long term weather forecasts as a first line of defence against extreme weather.

52. Building on the Climate Change Evidence Plan, the Government must produce an up-to-date action plan for reducing UK emissions. This should draw on the conclusions of the latest IPCC Report and on the methodologies for risk assessment outlined in it.

Reducing emissions from the agricultural sector

53. While protection against extreme weather is important and a very real threat, in the long run there is a need to reduce emissions from the agriculture sector. As part of its response to climate change the Government has committed to reduce Greenhouse Gas (GHG) emissions across England by 80% by 2050. Agriculture accounts for approximately 9% of the UK's total GHG emissions. Projections for this sector show only a 2% reduction by 2020 and little further reduction by 2030.⁶²

Reducing emissions from livestock

54. Cattle and sheep are the largest contributors to GHG emissions in the agriculture sector. Livestock as a whole contributes 49% of agricultural emissions. Professor

58 Defra ([FSY 0044](#))

59 Defra, [Climate Change evidence plan](#), 2013

60 IPCC, [5th Assessment Report](#), 14 March 2014

61 IPCC, WGII AR5 Ch 14 [Adaptation Needs and Options](#); IPCC WGII AR5 Ch 2 [Foundations for Decision Making](#)

62 Defra, [Greenhouse Gas Emission Projections for UK Agriculture to 2030](#), 2011

Beddington suggested that identifying ways to reduce this was still an under-researched area.

Livestock (enteric) emissions	31%
Unmanaged field deposition of manure	8%
Manure as fertiliser	10%
TOTAL	49%

Source Bob Watson, [The Government response to the Foresight Report on Food and Farming](#), Oxford Farming Conference, 2012.

55. The BBSRC told us about their research which found that feeding cattle high sugar grasses helped to reduce livestock emissions. Sainsbury's and Asda were reported to be trialling this.⁶³ Defra is also funding some research into agricultural GHG abatement to assess the potential for mitigation of livestock genomics and breeding, reproductive efficiency and livestock dietary manipulation.⁶⁴

56. BBSRC said there was need for additional experimental farm sites to carry out research so that “different aspects of water run-off and greenhouse gas emissions can be measured under different agriculture regimes in different parts of the country.”⁶⁵ Rothamsted Research Institute is currently the only place carrying out farm-scale research in this way in relation to lowland sheep and beef. We visited the North Wyke Farm Platform where scientists are testing the hypothesis that intensive beef and sheep production systems can be developed with less impact on the environment. We discussed the need to encourage consumers to eat less, better-quality meat.

57. We were impressed with the range of practical research we saw at Rothamsted Research Institute. There is an important role for ruminant livestock on less intensively-farmed and environmentally valuable hills and uplands in the UK where a significant reduction in livestock numbers would have negative consequences for these environments.

58. The bulk of our meat and dairy however is produced on lowlands, and if this is to continue, there is a need for greater research effort and funding directed at reducing emissions from more intensive beef, sheep and dairy farming systems. Given the limited projected progress made in reducing emissions from the agricultural sector as a whole, the Government should identify, as a priority, specific actions which will ensure the sector can meet national greenhouse gas reduction targets.

63 Qq249–51

64 Defra ([FSY 0056](#))

65 Q250

4 Sustainability and sustainable intensification

Sustainable intensification

59. In the context of a changing climate, we need to ensure our food production and systems are sustainable and resilient. The Foresight report recommended that one response be sustainable intensification—increasing the global food supply while minimising negative consequences for the environment. Professor Beddington explained: “intensification is more from less; sustainable intensification is not to harm the environment in a way that you cannot continue forever.”⁶⁶ He discussed the importance of sustainable intensification in the agricultural sector:

The idea of intensification is manifestly sensible. We do not have much land; we do have an issue of food production; we need to get more from the same amount of land. On the other hand, it would be a pretty daft thing to do to be getting more by having very large inputs of fertiliser, pesticides and so on. The intensification and the increase in product per unit area need to be balanced against how you actually do it.⁶⁷

60. Peter Melchett from the Soil Association stressed the importance of conservation. He told us:

We will not have food security if we simply produce more but destroy soils, use up fresh water, destroy wildlife, and do things to farm animals that the public will not accept. All of those things are huge challenges, and are linked together with the overarching fact that climate change is now affecting farming and will affect it more in future.⁶⁸

The NFU view was that sustainable intensification was about smart land use—using all the available technology and innovation.⁶⁹ Mr Kendall also said that different types of agricultural land would should have different measures of productivity so that sustainable intensification would mean different things in different parts of the country.

61. The Government sees sustainable intensification as a key policy solution to the challenges to our food security arising from climate change in a country where agricultural land is limited. The Minister talked about the importance of investment in research and development to help to identify ways of improving output per hectare without destroying the natural habitats on which farming depends.⁷⁰

66 Q92

67 Q92

68 Q186

69 Q120

70 Qq304–7

Increasing yields

62. A key component of sustainable intensification is increasing yields or output per hectare using fewer inputs. A number of witnesses discussed the fact that for cereal crops, such as wheat, yield levels have been stagnant for some time. We were told there had been an extended period of time where cereal and other crop yields increased exponentially, but that this had changed over the last ten years. For example the Crop Protection Association wrote:

The period from the 1940s to the 1990s saw national average yields rising from 2.7 t/ha to 7.6 t/ha. Since then farm wheat yields have stalled, varying between 7.0 and 8.0 t/ha but with no rising trend. The reasons for these yield plateaus are not well understood. [...] Since the 1990s, wheat yields have essentially been the same.⁷¹

63. Professor Beddington told us about research at Rothamsted Research Institute which was seeking to increase wheat yields from 8 tonnes per hectare to 20:

That would be a mix of breeding, agricultural practice, precision agriculture and so on, and they want to do that in 20 years. I think they started in 2012. There is a real recognition that this can be done. Elsewhere in the world, you are seeing these sorts of increases in the level of productivity.⁷²

However, Mr von Westenholz, Chair of the Crop Protection Association, told us that the EU regulations acted against technologies which could improve yields with negative consequences for other regions:

[...] it appears to me that Europe is actually nobbling its own productive capacity, therefore actually requiring other areas of the world to provide.⁷³

64. The Minister said that the agriculture levy boards spent a fair amount of their funding on research and development, and trying to get new varieties of crop that might be higher-yielding. He suggested that it may simply be that we have reached the limit of yield increases without taking advantage of new technologies.

Protecting soil quality

65. There are many ways to increase yields. One aspect of this which we discussed with witnesses in the context of sustainable intensification, was about ensuring that the integrity of our soils was not diminished through the greater application of artificial fertilisers, herbicides and pesticides, or by overstocking and overgrazing by cattle or sheep. Professor Welham from the Natural Environment Research Council (NERC) said that the research councils have recognised the importance of soil quality:

71 Crop Protection Association ([FSY 0031](#)) para 5

72 Q94

73 Q221

soils actually provide a whole lot of services to us that we would not perhaps think about. They are the medium for growth; they are a location where microorganisms and other organisms live; and, obviously, they are key to food, fodder and fuel production.⁷⁴

She said that NERC was developing a soil-security programme, which BBSRC, Defra and the Scottish Government were also involved in. This was trying to build up a series of approaches to understand how our soils function, what determines their function and how those functions change when either the climate, land use or nearby land use change.⁷⁵ We saw some research measuring the run-off from soil on the farm platform in North Wyke. Professor Hartley, from the University of York, pointed out that we now had the technology—new genomic and DNA technologies—which allowed us to understand a lot more about the biological functions of soil.⁷⁶

66. We need to increase agriculture output without increasing the amount of land used. It is clear that in some key crops this is not happening and yield levels have stagnated. We also need to ensure our agricultural production systems preserve the soil on which these crops are grown and ensure it retains key nutrients.

67. Sustainable intensification in relation to key UK cereal crops has made limited progress. The plateauing of yield levels in wheat must be addressed a matter of urgency. As part of its efforts towards sustainable intensification, we recommend the Government also direct greater funding to research on maintaining and improving soil quality.

Organic food production

68. Given the need to increase yields, we also discussed with witnesses yield comparisons between conventional and organic production and the role of organic production in contributing to food security and sustainability.

69. One of the arguments in favour of organic production is that it eschews as far as possible the use of agrichemicals and therefore has a less harmful impact on the environment. Peter Melchett from the Soil Association talked about the reliance of conventional agriculture on imports of mined mineral phosphates, nitrogen fertiliser, and animal feed,⁷⁷ and of the need to reduce our dependence on such phosphates in order to meet our Greenhouse Gas reduction targets.⁷⁸

70. We were told by the Crop Protection Association that the situation in relation to reducing environmental impact, such as through the Environmental Stewardship schemes was slightly more nuanced:

74 Q247

75 Q247

76 Q247

77 Qq185–6

78 Q191

Some of the best results in terms of biodiversity—this used farmland birds as its indicator—was through either environmental stewardship approaches or conservation grade-specific wildlife-management approaches to farming, and not organic approaches. However, if you had an organic farming approach that actually followed those same criteria, that would then have equally positive effects. It is not about organic farming or the use of pesticides or not; it is about the specific approach you take to creating a habitat alongside your farming and food production that encourages biodiversity⁷⁹

71. In relation to yields Mr Melchett said that although organic yields were lower, they used fewer inputs which meant organic products might be more efficient in terms of resource use:

In the UK, milling wheat yields in organic systems would be about 30% to 40% less than non-organic yields, but for some other staple crops—much of fruit and veg, and protein crops like peas and beans—yields would be the same, 100%. Lamb finished on grass may be even higher in organic systems. It varies a great deal. If you look at the output of milling wheat, to take your example, and you take into account the inputs—the fertiliser, the fossil fuels, the phosphate that you have had to put in per hectare to get a ton of wheat out—I think it is arguable that organic wheat will be more efficient in terms of resource use per hectare.⁸⁰

72. Nick von Westenholz, Chair of the Crop Protection Association, said that because yields of many organic products were lower than conventional crops, we needed to focus on using new technologies and methods of production:

We are talking about increasing output on the same, or even less resources—using less resource, so less land being an obvious one. I do find it hard to see, [...] how we would achieve that through entirely organic approaches. Having said that, I do think it is not just about being able to use more inputs or more pesticides or even fertilisers; it is about taking quite an integrated approach. So it is about taking new approaches in terms of cultivation, rotations, precision technology, but also using, in a targeted manner, technology through things like pesticides and fertilisers.⁸¹

73. Organic production uses fewer pesticides and inorganic fertilisers and, in so doing, makes an important contribution to environmental stewardship. We believe organic production also has a place in the market in adding to consumer choice. However, organic yields—certainly for extensive crops such as cereals and also for potatoes and some fruit—are generally lower than those for conventional agriculture.

79 Q230

80 Q200

81 Q229

Sustainable intensification in practice

74. Developments in technology are allowing us to farm land much more intensively, by using the right products in the right place, at the right times to increase output.⁸² Some examples of innovative ways of increasing yields sustainably are set out in the two boxes below.

Thanet Earth

The NFU told us about Thanet Earth—a large greenhouse complex in Kent which uses glass house production, a computer-controlled irrigation system and hydroponics to increase production.⁸³ Professor Benton was keen on the project which he said now supplied a third of the UK market for tomatoes and cucumbers giving consumers competitively priced, locally produced fruit and vegetables.⁸⁴ He said it had “the potential to diversify production in a viable way and reduce our reliance on imports. Incentivising relatively small land areas, given to modern, efficient, under-glass horticulture could produce a significant amount of UK demands.”⁸⁵

NFU pointed out that for such investments to be successful the supply chain needed to send the right signals to farmers so that they had the confidence to invest.⁸⁶

Case study of poultry sector

Andrew Large, Chief Executive of the British Poultry Council, a trade association, representing about 90% of the UK industry, for the poultry meat sector, told us the industry was around 70% self-sufficient overall, with a thriving import and export trade.⁸⁷ The sector had made significant gains in productivity over the last 25 years without having access to CAP subsidies.⁸⁸ It had done this by making significant improvements in feed-conversion ratios which meant less feed was required per bird.⁸⁹

Poultry also had a low environmental impact—poultry production was water-efficient.⁹⁰ Mr Large thought the poultry industry was in a good position to help reduce emissions and to become more sustainable.⁹¹

82 Q15

83 Q118

84 Q14 Thanet Earth has clarified that it supplies 12% of the UK market for cucumbers, peppers and tomatoes.

85 Prof Tim Benton ([FSY 0054](#)) para 14

86 Q118

87 Q114

88 Q124

89 Q115

90 It took one unit of water to produce one kilo of poultry meat. For lamb the figure was 1.6 and for beef 2.5.

However the sector was dependent on UK wheat for feed. If the price of wheat increased significantly this would lead to increased prices for poultry.

Mr Large had concerns about the viability of existing housing stock. He said there were opportunities to improve efficiencies by modernising the poultry housing stock—the average age was 25 years—with the latest innovations in heating, climate control, ventilation, feed management and water management.⁹² We visited Mountstephen Farm in Devon where we saw one of these modern poultry housing systems. The farm regularly reared 30,000 free range birds, using Freedom Foods Standards, for the market. The waste was fed into an anaerobic digester which produced electricity to run the farm and fertiliser for the fields. We were told the business was profitable and the farmer would expand his poultry business if he had the room.

In relation to different production systems Mr Large was keen to stress that consumers would make the choices which would determine how poultry was produced. He said there was demand for all the different production systems: indoor, barn-reared birds, free-range and organic.⁹³

5 Supply chain resilience

75. In most cases, unless we purchase our food directly from the farmer, the food we eat has traded hands a number of times before we purchase it, often from a supermarket, or has been processed beyond its original state into other products before final purchase. We have previously published two reports which focused on traceability and labelling in relation to horse meat contamination, so we focus in this chapter on how supply chains can best withstand possible shocks such as trade wars or severe weather.⁹⁴

Length of supply chains

76. Short supply chains involve fewer transactions in the production of any one product. They are most common in primary products including fruit, vegetables and raw meat rather than processed or pre-prepared foods. Where the components of such products are imported volatility in global supply chains means that, for some goods, at some times, access to supplies at an affordable price for all may be constrained.

77. In addition to price concerns, consumers want assurances that food supplies will not run-out. We were told that a diversified food system, with short supply chains creates

91 Q124

92 Q124

93 Q129

94 Environment Food and Rural Affairs Committee, Eighth Report of Session 2012–13, [Contamination of Beef Products](#), HC 946 and Fifth Report of Session 2013–14, [Food Contamination](#), HC141

resilience by making the supply chain less vulnerable to extreme weather events, changes in global markets or the closures or takeovers of large businesses.⁹⁵

78. We were assured that there is ongoing work between Government and industry to prevent or minimise the impact of such events in the UK:

The final element of resilience is around very short-term resilience in terms of the supply chain. Officials have previously had meetings with some of the retail chains in the UK to ensure that if, for instance, we were to have a serious fuel strike and had fuel lorries going on strike, there would be sufficient resilience to ensure that we got food to the shelves. Work is going on continually at all those levels, and it is something that we are keen to promote.⁹⁶

Andrew Opie told us that the British Retail Consortium (BRC) worked with Defra in their food chain emergency liaison group, to pass information back and forth through the supply chain, with groups like the NFU and the Food and Drink Federation.⁹⁷

79. However, while securing our ports and ensuring good trading relationships are important aspects of food security for which the Government is largely responsible, ensuring good relationships with primary food producers is the responsibility of the food industry as a whole, and that of the supermarket sector in particular.⁹⁸

80. David Croft, Managing Director of Waitrose, the only supermarket to respond to our call for evidence, told us about the model they used in the John Lewis Partnership. He said, they nurtured short supply chains which kept them in close contact with farmers in the UK and abroad. He said:

for those farmers, the longevity of a working relationship with Waitrose as a customer is something that really makes a difference in terms of access to capital. As a result, we are thinking that that is something that can help stimulate investment from farmers into the sector to build growth, with the confidence that they have a long-term trading relationship with Waitrose.⁹⁹

He said Waitrose was also thinking about “contingencies, building robust producer groups that help us to work closely with farmers and understand their needs and what might be barriers to entry for them into the marketplace”.¹⁰⁰

95 Q11; Nourish Scotland ([FSY 0009](#)) para 28

96 Q233

97 Q139

98 Large grocery retailers account for about 85% of the total market, with Asda, Morrisons, Sainsbury's and Tesco accounting for two-thirds of the total, House of Commons Library Standard Note, [Supermarkets: the Grocery Code Adjudicator](#), 1 March 2013

99 Q133

100 Q139

81. We also discussed whether supermarkets seek to sell seasonal British products where possible or simply seek the lowest price. Waitrose told us it would always take British fresh produce in season:

At the time of the British apple harvest, we will seek to dominate all of our apple offers with British apples. I think I am right in saying that we offer the greatest variety of British apples during the season. That is a commitment we make to farmers upfront. We are working through our suppliers to balance supply across different farms, throughout the course of the season, to maximise that offer on-shelf. What we will also do is work with those farmers to help manage if there are fluctuations in supply, because of adverse weather, for example. In one case, we have promoted weather damaged apples to make certain that those farmers are still able to provide a retail offer and get the best value for their crop.¹⁰¹

He discussed ways of ensuring that a bumper crop did not push prices down too low. Such initiatives were possible, he said, because Waitrose maintained long term relationships and ongoing dialogue with its farmers.

82. Andrew Opie told us that all of the major retailers promoted British plums and apples in season. Given that the UK is part of a single market, it is to be expected that there will be products from other EU member states on our supermarket shelves. Out-of-season, retailers had relationships with farmers in the rest of Europe or beyond to supply UK supermarkets, and this diversity of supply helped to ensure continuity of supply:

There will be times of the year, for example, when we have adverse weather conditions here, even for root vegetables. We might need to take some more supply from France, or close to the continent, to supplement that. The preference, in season, is growing awareness for UK produce.¹⁰²

83. Nevertheless the NFU told us that the UK food system must work better to ensure long term resilience. It should:

deliver transparency and traceability through; shorter supply chains, fair distribution of margin, better information sharing across food businesses (from farm to pack) and a joined up approach to managing volatility and risk in order to safe-guard the longer-term resilience of UK food.¹⁰³

The Government told us that its review into the integrity of supply chains, which was due to be published in the spring of this year, would address many of these issues.¹⁰⁴

101 Q135

102 Q138

103 NFU ([FSY 0029](#)) para 5

104 Q265

84. Shorter supply chains minimise the threat of disruption and therefore help food security. As we said in our Report on Food Contamination, we are concerned about the length of supply chains, particularly for processed and frozen meat products, and we welcome the efforts made by some retailers to shorten these. As a result of horsemeat contamination in 2013 the Government commissioned a review of supply chain resilience. We look forward to the final report on this matter, and to receiving any evidence that supply chains in general are becoming shorter.

The Grocery Code Adjudicator

85. One challenge of supply chain relationships is keeping the price of food at a competitive level, while also ensuring that farming remains an economically viable industry. UK food price inflation has slowed of late: it was 0.8% in March, fell to 0.7% in April and has remained at that level.¹⁰⁵ Nevertheless many people are using food banks.¹⁰⁶ As Professor Benton commented:

At the moment, with nominally 4 to 5 million people in food poverty in the UK and half a million people or so accessing food banks, food security is already an issue for us in terms of the nutritious side of the diet.¹⁰⁷

We will explore the use of food banks in our second report which will focus on the demand for food.

86. Professor Benton cautioned against unrealistic expectations. He said, “we want to have locally produced, high welfare, low environmental impact but cheap food available all year round, and we cannot have all of these.”¹⁰⁸ The CLA, which represents landowners, wrote that “producers wish to see higher food prices in order to maintain viable margins. For farmers, where input prices have often risen at a rate above inflation, static pricing or even reduced returns, make it harder for farmers to compete.”¹⁰⁹ It said retailers had a responsibility to share risks and profits fairly:

It is incumbent on the retail sector to ensure the relationship between the producer and the retailer is both fair and equitable. To make farming more sustainable, there needs to be an equitable share of risk and profit along the food supply chain, and some form of investment from the larger retailers in the producer’s business, to help secure the ability to supply. Whilst it is accepted that a cheap food policy is being pursued by the Government, there has to be a realisation that the increasing costs of producing food will lead to many exiting the industry, which is a threat to food security.¹¹⁰

105 BRC, [Food price inflation](#), June2014

106 NFWI ([FSY 0037](#)) para 12

107 Q3. This issue will be discussed in more detail in our next report.

108 Q52

109 CLA ([FSY 0043](#)) para 2.2

110 CLA ([FSY 0043](#)) para 2.4

87. When we visited the Cornish Blue Cheese Company we were told that, as a small business, it did not sell to the supermarkets because the margins were too low. It was better to sell the cheese abroad, and in farm shops or delicatessens. The owners also told us about the slow, bureaucratic process of getting approval to expand their successful business.

88. It is important that the farmers who produce the food we eat are paid adequately and fairly for their work. And, as discussed in the previous section, they also need a level of certainty about the price they will receive over time. The creation of the role of the Grocery Code Adjudicator (GCA) is thus a welcome step.

89. The purpose of the Adjudicator is to help ensure that markets operate transparently and price signals are properly transmitted through the supply chain.¹¹¹ The Government says that the GCA should also promote “a stronger and more efficient groceries market, bringing better value to consumers through increasing trust between suppliers and retailers by changing their behaviour to follow the Groceries Supply Code of Practice.” In principle the GCA should help to ensure a fairer relationship between big retailers and their suppliers and should prevent supermarkets passing on excessive risk and cost to suppliers.¹¹² We previously considered the draft legislation for the Bill which created the role. The evidence received then recommended that the office of the GCA should have the ability to proactively initiate investigations into malpractice, rather than waiting for a complaint to be made.¹¹³

90. Written evidence said that the Adjudicator’s role must be properly resourced; look at wider issues than price; and alert BIS to any emerging harmful practices.¹¹⁴ The National Federation of Women’s Institutes talked about the importance of ensuring that supermarkets paid a fair price to dairy farmers. They said the “difficulties that UK dairy farmers had following the collapse of the international cream market last year [...] demonstrates how farmers are often held at the mercy of food processors.”¹¹⁵

91. We want to ensure that the role of the Grocery Code Adjudicator works for farmers and buyers, and therefore ultimately the consumer, so that the farming industry remains both sustainable and efficient. If farm incomes are squeezed unduly, farmers are unlikely to make the necessary investments in sustainable production. The creation of the role is welcome and must be properly resourced as part of a wider effort to promote food security.

92. We recognise that assessing “fairness” in relation to producer and consumer prices is fraught with difficulty, not least those of determining whether markets are working efficiently and transparently. However, we fully support the role of the Adjudicator in assessing whether contractual and other commercial practices may be unfair within the

111 Defra ([FSY 0044](#)) para 36–37

112 CLA ([FSY 0043](#)) para 4.5

113 Oral evidence taken on [14 June 2011](#), HC (2010–12) 1199, Q4 [NFU]

114 CLA ([FSY 0043](#)) para 2.5; FDF ([FSY 0027](#)) para 15; Friends of the Earth ([FSY 0036](#)) para 13

115 NFWI ([FSY 0037](#)) para 17

supply chain, or prejudicial to farmers and the longer run viability of their businesses, and whether there is evidence of abuse of market power in the supply chain.

93. *We request an update on progress made and outcomes achieved to date from the Office of the Grocery Code Adjudicator. We suggest that it would be better if the Office had the power to initiate an investigation rather than waiting for a referral to be made.*

6 Harnessing technology

Technology and the food security challenge.

94. The need for technological innovation in securing future UK food supplies and in contributing to global food security was an almost universal theme in the evidence we received. For example, the British Retail Consortium (BRC) commented that “science and technology, as it always has, will help to improve food security.”¹¹⁶ The Food and Drink Federation stated:

Getting “smarter with science” will be fundamental to raising the limits of sustainable production, addressing new threats, driving resource efficiency throughout the food supply chain and making food safer, more nutritious and affordable for all, not least through innovations in formulation, packaging and storage as well as improvements in plant and animal genetics and the functioning of primary agriculture.¹¹⁷

The Government has recognised this in its new Agri-Tech Strategy launched earlier this year.

The Agri-Tech Strategy and technological innovation

95. One of the key Government objectives in its strategy for food security is to support innovation and knowledge transfer through the Technology Strategy Board, which is charged with supporting collaborative research and development with industry.¹¹⁸ The Government’s new Agri-Tech strategy, managed and delivered through the Technology Strategy Board, was published jointly by BIS, Defra and DFID. It is co-funded by industry and will provide £160 million of translational research from science to technological innovation and development, aiming to re-position the UK as a world leader in the sustainable intensification of agriculture.¹¹⁹

96. The Government says it is:

116 BRC ([FSY 0018](#)) para 5.1

117 FDF ([FSY 0027](#)) para 19

118 Defra ([FSY 0044](#))

119 Defra ([FSY 0044](#)) para 55; Q332

also working with the Technology Strategy Board (TSB) to drive innovation to support a more competitive, resilient and sustainable agri-food sector via the £90m Sustainable Agriculture and Food Innovation Platform; £4.5 million investment in a new Sustainable Intensification Platform to help translate knowledge into practice to help farmers; and the £70 million Agri-tech Strategy's catalyst innovation competitions with industry led by TSB (with a £10 million contribution from DFID for projects in developing countries).¹²⁰

97. The Agri-Tech Strategy has been described as a bold and innovative response to the challenges of food security.¹²¹ Paul Mullan told us that it was stimulating enormous interest and excitement in the industry.¹²² The Research Councils were pleased that it provided new types of funding, hitherto unavailable.¹²³ Callum Murray of the Technology Strategy Board reported that the first call under the catalyst innovation competition was six-fold oversubscribed.¹²⁴ The Minister told us this was inevitable: “whenever you have funds of this sort, you are going to get a lot of applications coming forward. The key thing is that you prioritise the ones that are going to add most value.”¹²⁵

98. Nevertheless demand for funding may well continue to exceed supply, with the concomitant risk that many worthy projects may not be brought to fruition. Professor Sue Hartley cautioned that we were starting from a low base of collaboration between academia and industry, and that since many of the key industry players were global, it would remain challenging to encourage the major UK agri-businesses to engage and co-fund.¹²⁶ GM Freeze, an alliance of non-profit organisations, expressed concern that agro-ecological technologies might not be included in the range of projects.¹²⁷

99. We support the Agri-Tech Strategy as a bold and innovative response to the need to ensure our agricultural production methods are modern and sustainable. The Government must ensure that it creates new partnerships between academia and those involved in developing technology. It should identify alternative funding mechanisms with the Technology Strategy Board in case adequate industry co-funding is not forthcoming, particularly where technology can deliver significant public benefit. We also recommend that the Government monitor the early competitive rounds of catalyst funding to assess whether there could be justification for expanding the funding base.

120 Defra ([FSY 0044](#)) para 56

121 Q177

122 Q177

123 Q246

124 Q17

125 Q334

126 Q240

127 GM Freeze ([FSY 0032](#)) para 14

New and emerging technologies

Protecting and improving crops

100. Germains Seed Technology told us about its improved seed priming which had brought about a 12% increase in in sugar beet yields over the past 18 years. Coupled with improved varieties and targeted crop protection techniques this had contributed to a 40% increase in yields over the past 30 years whilst reducing costs and GHG emissions.¹²⁸ The company also highlighted the role that biological substances can play in stimulating natural plant defence mechanisms when attacked by pests and diseases.¹²⁹

101. Professor Sue Hartley of the University of York presented evidence about the combination of new DNA technologies, improved bioinformatics and advanced analytical methods which were revolutionising approaches to crop improvement and crop protection and increasing the understanding of crop-soil relationships as well as the development of bio-fumigation techniques to combat crop pests by co-cultivating plants naturally inimical to specific pests.¹³⁰

Precision farming technology

102. We were particularly impressed by the opportunities presented by precision farming technology to greatly enhance our food security. Professor Simon Blackmore, from Harper Adams University, explained that precision farming was not new technology *per se*, but a holistic management technique bringing together a range of technologies. Some were still under development such as robotics in seeding, weeding, harvesting, and the use of controlled traffic farming to reduce soil compaction. Other techniques involved satellite field mapping and GPS controlled farm machinery to deliver selective application of herbicides, pesticides, fungicides and fertilisers, and for recording crop yield variation within fields.

103. Some farmers were already using these techniques and we were told there were opportunities to extend the take-up.¹³¹ The National Farmers' Union commented that:

With better information and application, further [productivity] gains can be achieved through a blend of precision farming, access to data to help with agronomic decisions and the use of crops bred for their performance in terms of yield and resource efficiency e.g. improving irrigation efficiency and installing rainwater harvesting; fertiliser application¹³²

Research Councils UK and the Biotechnology and Biological Research Council endorsed the value of precision farming techniques with particular emphasis on future research into

128 Germains Seed Technology ([FSY 0008](#))

129 Germains Seed Technology ([FSY 0008](#))

130 University of York ([FSY 0024](#)) para 1.2

131 Qq314–5

132 NFU ([FSY 0029](#)) para 11

sensor technologies.¹³³ The box below has some examples of the potential of precision farming technologies to increase the efficiency and effectiveness of agriculture, reduce costs of production, facilitate compliance with environmental legislation and reduce or eliminate the need for herbicides.

Machine vision, micro droplets and laser weeding.

GM technologies allow blanket spraying to remove all weeds without damage to the crop plant. However the longer term effect can be the emergence of herbicide-tolerance and resistance and non-target weed species are also be affected. Machine vision systems (cameras and computer software) can identify up to 26 different weed species automatically, and measure leaf area, biomass and growing point of the weed. This information is used to apply tiny micro-droplets of herbicide directly to the leaf of the weed thus reducing the volume of herbicide applied by 99%. This system is operated by light weight robotic vehicles which can work 24/7.

Controlled traffic farming

Controlled traffic farming methods—in which the machinery/robot is guided by GPS and restricted to relatively few “tramline” paths across a field—can reduce soil compaction, quadruple rainfall in-filtration into the soil, and reduce the area of crop damaged under conventional machine cultivation. This can result in yield increases of up to 18% and fuel savings of 50% compared with conventional cultivation techniques.

Selective harvesting

Up to 60% of a salad crop, such as lettuce, is thrown away after harvest because it does not meet retailer quality criteria. By developing smart scanning systems to assess the quality of the crop before harvest, selective harvesting can pick only those crops of marketable quality, and allow the (smaller) plants to be harvested later in the year.

104. Dr Burrows, from the BBSRC, said precision technology was “low-hanging fruit. [...] because we can use agricultural machinery in real time, going across fields, to map yields, nutrient content and so on, and be very sparing in the amount of pesticides or fertilisers we are putting on.”¹³⁴ Professor Ian Crute informed the Committee that:

We have not yet seen, in any sense, the benefits that are going to accrue to engineering in general terms: sensor technology, remote sensing, precision approaches in terms of disease and pest forecasting, as well as all of the mechanisation that comes in livestock-production systems, sensors that will be able to detect animal performance, health and welfare. We are at the beginning of seeing many of these technologies having a major impact on

133 Q242

134 Q242

management: soil management as well as the management of systems in general.¹³⁵

Professor Blackmore argued that it was proving difficult to commercialise some of the technology here because the relevant UK companies were risk-averse. In contrast, many of these technologies were being adopted in China.

105. We were impressed by some of the possibilities provided by precision technology to make farming easier and more efficient. There are, for example, already sensor technologies which have the potential for development in a range of engineering and other precision farming applications where quick-wins could be achieved for UK farming.

106. As the Government's new Agri-Tech Strategy addresses technological developments that are close to being brought to commercial reality, research funding bodies should place additional emphasis on pre-commercial and multidisciplinary applied research into precision farming technologies.

EU regulation of technological innovation

107. We discussed the EU regulatory framework for the approval of new science and technology. We were told that it took an overly cautious approach to new technologies basing its assessment on potential hazards and the precautionary principle rather than on actually assessed risk and scientific evidence.¹³⁶

108. At Rothamsted we were told that the EU process had three components. The first was the legal structure, which Professor Huw Jones said was outdated; the second was the European Food Safety Authority (EFSA) risk assessment process, and the third was the management of risk process which took place within the European Commission, led by DG Sanco. Professor Jones said that this was where delays often occurred after a product had been approved by the EFSA.

109. The Crop Protection Association called for a more inclusive model for scientific evidence in risk management which would rely on full use of scientific evidence and expertise in risk evaluation.¹³⁷ AIC Ltd observed that “at a more fundamental level the impact of the hazard to risk issue, meant that industry was not able to retain existing technology”.¹³⁸ The CLA underlined this point citing that there was now restricted use of

135 Q49

136 The precautionary principle states that if an action or policy has a suspected risk of causing harm to the public or to the environment, in the absence of scientific consensus that the action or policy is harmful, the burden of proof that it is not harmful falls on those taking an action.

137 CLA ([FSY 0043](#)) para 23

138 AIC Ltd ([FSY 0033](#))

Asulam for bracken control on upland hill sheep grazing land and Warfarin for invasive grey squirrel control.¹³⁹

110. The upshot of the EU's approach to many modern farming methods and technologies has led to a significant decline in the research and development share of global crop protection investment for the European market over the past decade, and may reduce both the international competitiveness of EU agriculture, and the ability of EU farmers to respond to the opportunities of increasing global food demand.¹⁴⁰ Nick Van Westenholtz commented that, in relation to the plateauing of UK cereal yields over the last fifteen years, "the European regulatory and policy environments do not appear to encourage any way of breaking out of that stalling."¹⁴¹

111. UK agriculture must embrace new technologies which are consistent with the principles of evidence and balanced risk-based assessment whilst meeting criteria of both economic and environmental sustainability, if it is to meet the challenges to food security in the future.

112. Given the evident concern about the way in which the EU regulatory framework operates and its potential implications for the future productivity and competitiveness of our agricultural sector, the Government should tell us what conclusions it has drawn regarding its scope for unilateral action on the EU regulatory regime for crop protection and GM crop approval as part of its wider review of the Balance of Competences between the UK and EU.

7 Genetically modified food

113. As noted in the previous chapter, the challenge of increasing production in a sustainable manner can be assisted by scientific advances and new technologies. One of these is Genetic Modification (GM) which is the focus of this chapter.

What is GM?

114. Genetically modified foods have had specific changes introduced into their DNA using the methods of genetic engineering. Usually, and distinct from conventional breeding, one specific desirable trait is added to or replaced in their genetic makeup. This allows for greater control and precision over a food's genetic structure than previously afforded by methods such as selective breeding and mutation breeding.

115. To date most genetic modifications of foods have primarily focused on cash crops in high demand by farmers such as soybean, maize, oilseed rape and cotton seed. These have been engineered for resistance to pathogens and herbicides and better nutrient profiles.

139 Q228

140 CLA ([FSY 0043](#)) para 20–21

141 Q221

Research has therefore tended to focus on increasing productivity through reducing the cost of production rather than modification to enhance the intrinsic yield of crops.

116. We discussed specific examples of GM research with scientists at Rothamsted Institute. One research project has sought to produce omega-3 fish oils in GM *Camelina* plants in order to provide a sustainable supply of omega-3 fish oils which are beneficial for our health.¹⁴² We were also shown images of wheat plants which had been modified to repel aphids, thus reducing the need for pesticides. Neither of these plants was commercially available at present.

117. Within the EU the Minister told us only one GM crop had been licensed for use in 1998, and another was in the pipeline, but because of political disagreement, “they [GM crops] were not used at all, at the moment.”¹⁴³ However, GM crops are widely grown in USA and Latin America. Professor Beddington said:

Brazil is the obvious country to look at, because they produce a very substantial amount of soya protein, primarily for animal consumption. Most of that is now GM; there is a tiny amount of non-GM soya being produced, to the extent that it is very hard to even find it, because the GM technology for soya is enormously economically attractive. The fact that non-GM product has some price premium is of indifference to the farmers that are actually producing it.¹⁴⁴

The International Service for the Acquisition of Agri-biotech Applications’ (ISAAA) statistics show that global adoption of GM crops reached 170 million hectares in 2012, an increase in 10 million hectares from the previous year.¹⁴⁵ We were told that the UK imports substantial amounts of GM soya now, which is used in the meat trade,¹⁴⁶ and that it was virtually impossible to obtain non-GM soya, which was also more expensive.¹⁴⁷ The British Poultry Council told us that all the major retailers, bar Waitrose, used genetically modified feed in poultry.¹⁴⁸

Potential benefits

118. The Agricultural Biotechnology Council (ABC) argues that GM crops can increase yields without the use of harmful chemicals:

Agricultural biotechnologies, including GM, are one of many ways we can improve yields. GM crops enable farmers to produce more food on the same amount of land, offering the potential for increased yields of between 6% and

142 Rothamsted research, [Making omega-3 fish oils in GM *Camelina* plants](#).

143 Q362

144 Q80

145 ABC ([FSY 0025](#)) para 4

146 Q80

147 Q127

148 Q126

30%, whilst also allowing farmers to grow their crops more sustainably. Biotech crops can help farmers to reduce greenhouse gas emissions due to less tillage, whilst also reducing the use of pesticides and protecting biodiversity.¹⁴⁹

It reported that Romania was producing herbicide-tolerant GM soya before joining the EU. This accounted for nearly 70% of all soybeans planted in the country (about 137,000 ha). On accession to the EU in 2007, Romania had to stop growing GM soya and yields have fallen by 30%.¹⁵⁰ The CLA pointed out that further research from the ISAAA concluded that GM crops saved the equivalent of 473 million kilograms of pesticides in 2011 and reduced GHG emissions by 23 billion kilograms of carbon dioxide-equivalent.¹⁵¹ In this way, GM products have similar objectives to those of organic producers in reducing the need for pesticides and nitrogen-based fertilisers.

119. Germaines Seed Technology commented that GM technology can offer many benefits to productivity models and enhanced food quality including:

- Disease resistant crops which reduce the need for recourse to broadcast crop protection product use and reduce the pesticide impact on the environment;
- Nutritional traits may reduce the need for an extensive production model, delivering more nutrition with less food stock and land use; and
- Stress resistance to drought or reduced irrigation strategies, or adverse climatic conditions.¹⁵²

120. Dr Little told us that in the US farmers grew organic crops side by side with GM crops with no evidence of cross contamination. In the UK, a body called SCIMAC was set up in 1998 to explore co-existence arrangements between GM and non-GM crops.¹⁵³ However, we would be interested to learn if there was any research comparing yields and inputs between GM and organic production, and whether the Government has assessed the potential impact of growing GM crops on the market for organic products.¹⁵⁴

121. ABC told us that “UK farmers were united in their desire to grow GM crops because of the potential to increase yields and disease resistance.”¹⁵⁵ The NFU confirmed it supported new technologies such as GM and that the consequences of not embracing GM were significant for the UK:

149 ABC ([FSY 0025](#)) para 3

150 ABC ([FSY 0025](#)) para 7

151 CLA ([FSY 0043](#)) para 4.5

152 Germaines Seed Technology ([FSY 0008](#))

153 Qq170–171

154 See paragraph 72

155 ABC ([FSY 0025](#)) para 13

NFU policy is that we are in favour of new technology. We believe that GM will be one of the solutions, not the only solution. Our concern is that there are so many new plant-breeding techniques that we may find we are rejecting some other, new developments of traits. [...]In 1989, 33% of the big seed plant companies' R and D spend occurred in Europe. Today, they spend €7 billion, and only 7% of it is spent in Europe. The rest is being spent round the world, where there is an interest and a hunger in having that technology. We are rapidly turning people away from making the investments here. The UK used to export agriculture solutions to the world. We are now shifting that to other people.¹⁵⁶

122. Despite comments by the Soil Association that we could not know whether GM products were leading to diet related ill-health in the USA because there had been no research on this,¹⁵⁷ the European Academies Science Advisory Council (EASAC) notes that, after over fifteen years of cultivation, there is no compelling evidence of any greater risk to humans, animals or the environment from GM crops than that associated with conventional crops.

Obstacles to greater uptake

123. Despite this, it is clear that there are obstacles to the greater use of GM foods in the UK and the EU. There is a fair amount of public ambiguity about GM arising from both misunderstanding about the science and a lack of awareness of the extent of GM crops already used in the production of our food. Tom Taylor of the Agriculture and Horticulture Development Board told us:

Supermarkets and retailers have concerns about what the public perception of this is. I think that that partly goes back to the fact that this has not been simply explained to people. I am not having a pop at the retailers for that, because I can understand where they are. Collectively, we do have to demystify this, to make sure that people are not frightened about GM and we can use it sensibly.¹⁵⁸

There are also individuals and groups which are openly hostile to GM, for example GM Freeze,¹⁵⁹ and GeneWatch UK.¹⁶⁰ Opponents have objected to GM foods on several grounds, including public health, environmental impacts, ethical concerns about placing animal genes in plants (transgenics), and economic concerns raised by the fact that GM technology has largely been developed, and is owned, by large multinational corporations.

156 Q127

157 Q208

158 Q128

159 GM Freeze ([FSY 0032](#))

160 GeneWatch UK ([FSY 0005](#))

124. The Soil Association argued that GM crops lock farmers into buying costly seeds and herbicides which generate tolerance in those strains of weeds which initially exhibited some resistance. It said GM was “the product of a narrow, top-down approach driven not by the needs of farmers, consumers or the environment, but of seed and chemical companies.”¹⁶¹ Peter Melchett told us that there was an “inherent instability and an inherent risk in GM technology”¹⁶² which did not apply to other types of technology which might achieve the same ends.

125. Friends of the Earth said that GM crops modified to be resistant to insect pests and tolerant to herbicides, have resulted in a dramatic increase in the use of chemicals to deal with weeds that develop resistance to the chemicals over time. However it supported some new advanced plant breeding techniques:

[which] allow traditional plant breeding to be speeded-up, including marker-assisted genetic selection. [...]As long as issues of risk, rights and farmer control were satisfied, we would support research into some types of GM crops that could not be achieved through conventional breeding approaches, such as nitrogen-fixing wheat or rice that uses a more efficient type of photosynthesis.¹⁶³

126. The Secretary of State has said he is supportive of GM technology and its potential benefits for the UK and for developing countries. Mr Eustice acknowledged that there was public concern about the use of GM technologies for crop production as well as about the consumption of GM foods.¹⁶⁴

The EU regulatory process

127. We have already criticised the EU regulatory framework which has prevented greater use of GM technology. The ABC pointed out that the EU had one of the world’s strictest approval procedures for GM products:

Once the European Food Safety Authority (EFSA) has made its extensive scientific risk assessment, progress is hampered by a politicised secondary decision-making phase administered by the European Commission and involving the Member States. This was acknowledged in the recent decision by the European Court of Justice when it ruled that the European Commission must stick to the legally prescribed processes and cannot misuse bureaucratic processes to delay the authorisation of a regulated product, requiring the Commission to put forward the GM maize 1507 dossier for a vote in the Council. This followed a substantial delay in the process for a product which had been found to be fully safe, with seven positive EFSA

161 Soil Association ([FSY 0015](#)) para 22

162 Q205

163 Friends of the Earth ([FSY 0036](#)) para 36

164 Qq298,321

safety opinions published on the product since its submission for approval 12 years ago.¹⁶⁵

ABC said that UK research institutes were exporting their expertise on GM crops to other countries because of the “disproportionate EU regulatory environment”.¹⁶⁶ The Minister confirmed that there were delays at the EU level. He said:

until very recently, there was only one GM crop that was licensed for use in the European Union. We have always suffered in the European Union, frankly, from a lot of political disagreement about whether or not we should allow the planting of GM crops in the European Union. Different countries have taken very different views, and that is why it has been very difficult to get any progress.¹⁶⁷

Breaking the deadlock

128. AB Sugar suggested that the Government could help change the public perception of GM foods by “seeking to move the public debate away from viewing GM as a ‘blanket technology’, and instead focus on the benefits it can bring society in specific applications.”¹⁶⁸

129. The Minister told us there might be a way forward in the EU. He said:

Countries like Germany, who themselves are very reluctant politically to allow GM crops, have signalled that they may live with the fact that, at a European level, these crops could be licensed, provided there could be some sort of national derogation that allowed them to prevent them being grown in their own country. It may be that, in order to get some progress in this issue, it would be possible to have agreement for these crops at a European level, but with member states having the ability to have a derogation from that. That might be one possible way forward, and I think that is a more likely way forward than us unilaterally licensing them and growing them.¹⁶⁹

130. As part of the effort to move forward on GM, the EU passed new legislation for animal feed in July 2011, referred to as the ‘technical solution’. This is designed to allow GM material currently unauthorised in the European Union, to make up to 0.1% of imports, provided it has been submitted to EFSA for review and been approved by one other food safety authority in another non-EU country. The legislation was introduced to address the problem of asynchronous authorisations, whereby new GM traits are fully approved in certain countries and not in others.¹⁷⁰ More recently a vote in the Agricultural

165 Ev19 ABC ([FSY 0025](#)) para 15

166 AIC Ltd ([FSY 0033](#))

167 Q322

168 AB Sugar, ([FSY 0006](#))

169 Q222

170 Eating Better: for a fair, green, healthy future ([FSY 0045](#)) para 9

Council will allow two strains of maize resistant to a particular weedkiller to be grown in member states if they wish. This Council decision has to be approved by the European Parliament. The Secretary of State is reported to have said that “this is a real step forward in unblocking the dysfunctional EU process for approving GM crops which is letting down farmers and stopping scientific development.”¹⁷¹

131. The technology involved in the production of genetically modified crops generates public concern. In particular there are concerns that there may be unknown implications of this technology. In relation to the consumption of GM foods many people in other countries, and a large percentage of our poultry and livestock, consume GM products with no known or documented ill-effects. This should offer some reassurance to the wary. In terms of concerns about the production of GM crops, the EU process for approval of such crops is, as noted, extremely rigorous, and appropriate regulations can be put in place to guard against cross-contamination.

132. The Government should do more to inform the public about the potential beneficial impacts of growing GM crops in the UK. It should encourage an evidence-led public debate about GM crops and also counter food safety fears about the consumption of GM. In order to give consumers the opportunity to make informed choices, GM foods should be labelled as such, in the same way as organic produce. The Government must continue to work within the EU to argue for a system which is more flexible for those member states that wish to take advantage of GM technology, while still ensuring that all EU consumers are protected, in the same way it does with non-GM technologies. Progress towards this objective must be research and science-led. The Government must also ensure that any GM products grown legitimately in any member state may be freely traded across the EU.

8 Securing food for the future

The research landscape

133. The Government spends £410 million annually on agri-food research. The Global Food Security programme, a partnership of the main funders of research in relation to the provision and use of food, helps to co-ordinate research in this area through themes set out in the Global Food Security Strategy.¹⁷² The Government is also building international multi-disciplinary research links to address food security through a number of EU initiatives. These include the Joint Programming Initiative on Agriculture, Food Security and Climate Change, the European Research Area Networks and Horizon 2020 programme. This latter programme is biggest EU Research and Innovation programme with nearly €80 billion of funding available over 7 years (2014 to 2020).¹⁷³ Funding is available for individual research projects as well as collaborative projects with researchers from at least three different member states.¹⁷⁴ The UK also collaborates at the international

171 [“EU ruling paves the way for GM farming in England,”](#) *The Telegraph*, 13 June 2014.

level through a Sustainable Agricultural Innovation Network with China, and the Global Research Alliance.¹⁷⁵ These are in addition to Agri-Tech Strategy discussed in chapter six.

134. Research Councils UK told us that the Global Food Security programme itself accounted for some £350 million of the total Government research spend, and supported a large portfolio of work which underpins food security, including programmes relating *inter alia* to plant, animal and microbial biology, biodiversity, ecosystem services, climate modelling, socio-economics and engineering, although not all of these may directly address food security.¹⁷⁶

135. We were also told that the research councils had collectively recognised the need for a more holistic approach to the science of soils and the services they provide. Whilst investment in soils research is a welcome new initiative, the programmes have relatively small budgets, and, as noted in chapter four, the soil survey information, which enables the monitoring and longer-term changes to soil properties and function is rather fragmented and out-of-date.¹⁷⁷ The Food and Drink Federation commented on the fragmentation of the research landscape and the proliferation of different reports which it viewed as symptomatic of this at the policy level.¹⁷⁸

136. We recommend that the Government, through its Global Food Security Programme, undertake a themed mapping of the current scientific research programmes, projects and reports that are directed specifically towards enhancing our food security either publicly funded or co-funded, and of those which might exert a potentially important indirect impact on food security. This would provide a first line of co-ordinated communication of research to potential users, and indicate more transparently where current priorities lie.

Farm-level research

137. The shortage of whole or sub-farm scale research environments remains a constraint on certain types of agricultural systems research in which livestock and other farming systems could be replicated.¹⁷⁹ The importance of systems and holistic approaches for longer term adaptation to underpin food security was stressed. The RSPB cautioned:

Currently there is an issue that research is siloed and as such fails to take account of the multifunctional nature of agriculture. Research should focus

172 Defra ([FSY 0044](#))

173 European Commission, [What is Horizon 2020](#)

174 European Commission, [Research and Innovation: How to participate](#)

175 Defra ([FSY 0044](#)) para 57

176 Research Councils UK ([FSY 0016](#)) para 9

177 Q247

178 Food and Drink Federation ([FSY 0027](#)) paras 10-11

179 Rothamsted Research (FSY 0057)

on sustainable production methods which address both farm, farming system and landscape levels.¹⁸⁰

The BBSRC told us that it had only one experimental farm-scale research platform, in North Wyke, Devon, and that more were needed to measure the effects of different agricultural regimes in different parts of the country on variables such as GHG emissions, soil and water properties, but that this would impact massively on its budget.¹⁸¹

138. In a different context Professor Hartley pointed to the demise of many of the older university departments of agriculture with consequent loss of university farms. There are however, a number of specialist land-based universities and colleges of agriculture with farm facilities which work at the more applied research and technology transfer ends of the spectrum.¹⁸² Waitrose explained that it too was working with a number of partner universities and the Soil Association through the Centre for Excellence in UK Farming,¹⁸³ to apply research and new science in the field.¹⁸⁴

139. UK research councils should encourage the research-intensive universities and institutes which they fund to explore opportunities to extend the scope for farm-level research through greater co-operation with specialist land-based sector universities and colleges, thereby bringing the scientific research closer to application and the farming community, and ensuring best use of scarce and expensive resources. The Government should recognise the contribution made by our universities and research institutes and ensure the long term security of their funding.

Knowledge transfer

140. The NFU said that British farming needed the following from science to respond to the challenge of food security:

- a strong science base engaged in highly-relevant and impactful research
- a clear pipeline to commercialisation
- widespread knowledge-exchange activity
- effective skills and training provision.¹⁸⁵

141. The Agri-Tech Strategy addresses issues of commercialisation of research into practice. However that is mainly about technology transfer for product development and

180 RSPB ([FSY 0020](#)) para 4.1; Q12 [Professor Benton]

181 Q250

182 Q255

183 Now called, Farming Futures

184 Q139

185 NFU ([FSY 0029](#)) para 18

manufacturing which is only part of the process. There are areas of knowledge transfer which the agricultural and food sectors will require in order to prepare for future challenges to food security.

142. The solution to this is not simply to throw more money at projects which demonstrate particular advances. Rather it is to ensure that advances in research are translated and packaged into actions that can be taken onto the farm. In addition researchers must engage with farmers, to gain knowledge of the farm, the aspirations and motivation of the farmer and therefore the most appropriate way in which changes can be made.¹⁸⁶

143. At present this does not happen systematically. For example, some of the more critical comments regarding basic research into agriculture highlighted the lack of focus and funding on agro-ecosystems¹⁸⁷ and organic farming. However, the Natural Environment Research Council (NERC) has a strong focus on agro-ecosystems and aims to develop viable management systems that optimise the ecosystem functions integral to food production.¹⁸⁸ This highlights that there is a disjuncture and information flow gap between researchers and those who might usefully benefit from it. Indeed, much of the evidence on this topic has underlined the need for improved communication from Government and the research community.¹⁸⁹

144. The process of effective knowledge transfer is complex and subtle. The Agriculture and Horticulture Development Board told the Committee it spent 45% of its money on research and knowledge transfer to the farm. Tom Taylor, their Chief Executive said the budget was designed that way because “without that knowledge transfer back on to the farm, the research in how you do this is completely wasted.”¹⁹⁰ The NFU President Peter Kendall acknowledged the challenge for both the AHDB and NFU was to champion getting the messages across.¹⁹¹

145. Whilst it is evident that those organisations funded by farmers should take a proactive and positive role engaging transferring knowledge to their members, we also received evidence suggesting that there was a role for the public sector. Professor Ian Crute told us that most technical advice into farming was done on a commercial basis.¹⁹² Professor Tim Benton went further, explaining:

I certainly share the view that there is a bit of a valley of death between upstream information and farmers necessarily getting hold of it. It is not helped by the fact that they have to pay. There is lots of scope for new ways of delivering advice, so not reinventing an extension service, but I do not think that we really have the nuances of where exactly the cutting edge of advice is

186 AIC Ltd ([FSY 0033](#))

187 Friends of the Earth ([FSY 0036](#)) para 36

188 Research Councils UK ([FSY 0016](#)), para 16

189 CLA ([FSY 0043](#)) para 147; Q95 [Professor Beddington]; Q233 [Nick von Westenholz]

190 Q118

191 Q123

192 Q29

and how it should be delivered, partly because we have not thought enough about it over the last decade or so¹⁹³.

146. However, Professor Sir John Beddington highlighted that a Food Research Partnership Study had concluded that there was a need for a publicly funded organisation with responsibility for advising farmers.¹⁹⁴ Dr Little said “there will certainly be a role for Government funding in enabling knowledge transfer, for example between the fundamental research that is done and things that will allow farmers to move ahead.”¹⁹⁵

147. *There are gaps in the co-ordination and flow of knowledge from research institutes to the farmers who would use and benefit from it. We recommend that the Government develop an integrated knowledge transfer strategy and action plan, which can be delivered and co-ordinated within the present funding frameworks, to ensure engagement between researchers and the relevant end users.*

New Farmers

148. We were told that to ensure a vibrant, forward-looking, agricultural sector for the future, we needed new farmers to enter the profession. The average age of a farmer is currently about 60 years. However Henry Robinson of the CLA told us that age was not the issue but that farmers needed to be good at farming:

Farmers have to work hard and be technologically good, which is what will happen if the market makes them do that. It is a market-based system.¹⁹⁶

149. Peter Kendall told us young farmers were locating in remoter areas and bringing new techniques and smart technology.¹⁹⁷ He said new farmers were better at embracing technologies and new thinking which was vital to keep the industry competitive.¹⁹⁸ The AHDB agreed that it was vital to get new farmers, not just as managers but also performing necessary technical roles.

150. Mr Eustice told us about some work being carried out as a result of the *Future of Farming Review*, to encourage new entrants into farming. The Review highlighted the figure that only 8% of family farms were farmed by first-generation farmers.¹⁹⁹ He said we needed to have “alternative business models to make it easier for new entrants to come in, earn a stake in the industry and fulfil their aspirations in the industry.”²⁰⁰ Peter Kendall agreed:

193 Q30

194 Q98

195 Q170

196 Q236

197 Q116

198 Q120

199 Defra, [Future of Farming Review](#), 2013, para 2.7

200 Q268

They are absolutely vital. The most exciting farmers you will ever meet are first-generation farmers. I am not sure you can legislate for it. The most important thing we can do is big up the industry, talk it up and make it an attractive career choice for young people to go into university and study. They will not all be primary operators; they may come in as managers, advisers or specialists in different sectors. It is absolutely, vitally important that we bring fresh thinking.²⁰¹

151. But in its evidence, the Government made no reference to the Pillar 2 Rural Development Programme of the CAP Reform 2014–2020, designed to support young farmers; nor did it say whether the RDPs will themselves make any specific provision or allocate resources for new entrants to farming. Mr Tom Taylor told us about a new AgriSkills Strategy which worked with industry, land-based training organisations and agricultural colleges, Harper Adams and the other universities with agricultural specialist faculties or departments—to get people into the food and farming industry.²⁰²

152. Our food security depends on a vibrant, innovative and professional UK farming sector. This in turn requires a regular inflow of new entrants to the sector. Farming in the UK does not have this and efforts must be made to encourage new entrants who are willing and able to take advantage of new technologies in order to ensure the sector is modern and competitive. We are pleased that the Government is examining ways to do this in conjunction with the industry which can also help with the costs associated with entry into farming.

153. We recommend that the Government update us on its efforts and on the likely actions that will emerge from the Future of Farming Review. It should also clarify whether any Rural Development Programme funding will be made available to support the implementation of the recommendations arising from the Future of Farming Review.

201 Q120

202 Q120

Conclusions and recommendations

The UK food system

1. *In order to clarify the resourcing, commitment and prioritisation of food security across government we request that the Government set out the financial contributions and support of each department to the goals and delivery of the Government's food security strategy. The Government should identify Defra as the lead Department for food security and appoint a Food Security Coordinator within it to ensure policy coherence across Government departments. (Paragraph 11)*
2. *Food security is not simply about becoming more self-sufficient in food production. A diversity of supply is an important safeguard against diseases, severe weather or other domestic supply disruptions. There are opportunities to extend the seasonal production of non-tree crop fresh fruits and vegetable products. We would like to see a more coordinated and positive approach by retailers, the Agricultural and Horticultural Development Board and local and central Government to examine ways to encourage greater domestic production in these sectors. (Paragraph 18)*
3. *We should also export, where possible, those products which are surplus to demand in the UK and can be produced competitively for export, as this will help boost our production. We are pleased that the Government is seeking to do this. The Government must redouble its efforts to negotiate the export of products such as pigmeat and cheese to China and demonstrate reciprocity in trade. (Paragraph 19)*
4. *It is right that the Government keeps track of levels of self-sufficiency in indigenous products—which will vary from time to time. While the UK may be food secure at present, it would be unwise to allow a situation to arise in which we were almost entirely dependent on food imports given future challenges to food production arising from climate change and changing global demands. (Paragraph 20)*
5. *The CAP has changed significantly over the years, and now has many more objectives including environmental protection and conservation. Nevertheless, its original objective of helping to ensure EU consumers have access to stable food supplies at reasonable prices remains important particularly in the context of projected increased global demand for food and potential supply disruptions. The farming sector also provides public goods which, by their very nature, have no market value. Some remuneration through direct payments is warranted, as such provision may entail specific costs in order to meet environmental or strategic objectives and targets. (Paragraph 28)*
6. *The UK Government must ensure a joined-up approach to food security within the EU across different policy areas, and particularly in relation to the CAP, to ensure policy coherence. The Government should set out how it will use the flexibility provided by the new CAP agreement to help meet the objective of food security. (Paragraph 29)*

7. There is a significant challenge to feed a growing global population in a sustainable manner. The key question for us, is how the UK responds to that challenge—that is, what role it plays in global markets given that it is both a small part of the global food economy, and its agriculture is a relatively minor contributor to global GHG emissions. (Paragraph 37)
8. Consumers should be able to make informed choices about what and how much they consume, and health and resource impacts should play a part in these choices. There is an important role for protein from a variety of sources in our diet, and some of the animals we consume—for example, cattle and sheep—also play a vital role in ensuring our hillsides and upland farms remain viable. The production of protein, whether from animals or plants, must make efficient use of land and water, and discourage waste and reduce harmful emissions. (Paragraph 38)
9. We are concerned about the potential impact of projected rising trends in global demand for animal protein on the price of animal feeds and the cost of production. The Government is aware of this issue and has funded some research in this area. (Paragraph 39)
10. *In view of the significant strategic risk and cost the UK is exposed to in relation to its animal feed imports, we recommend that the Government give higher priority to research to enable us to source more of our animal feed from within the EU. The Government must promote the growth of more legumes which ensure greater output per hectare. Additionally, the Government should monitor the demand for soya and other animal feeds at the global level and ensure that there is a long term “Plan B” for animal proteins within the EU.* (Paragraph 40)

The challenge of climate change

11. Climate change will have significant implications for our agricultural production in the long run. While it may be that the UK climate becomes better suited to particular types of agriculture, farmers will need the know how to adapt their crops or livestock without productivity losses and in a sustainable manner. Farmers would be greatly assisted by having access to more reliable long range weather predictions so that they can be better prepared for extreme weather events and conditions. (Paragraph 50)
12. *We urge the Government to explore the cost implication for farmers of access to more long term weather forecasts as a first line of defence against extreme weather.* (Paragraph 51)
13. *Building on the Climate Change Evidence Plan, the Government must produce an up-to-date action plan for reducing UK emissions. This should draw on the conclusions of the latest IPCC Report and on the methodologies for risk assessment outlined in it.* (Paragraph 52)
14. We were impressed with the range of practical research we saw at Rothamsted Research Institute. There is an important role for ruminant livestock on less

intensively-farmed and environmentally valuable hills and uplands in the UK where a significant reduction in livestock numbers would have negative consequences for these environments. (Paragraph 57)

15. *The bulk of our meat and dairy however is produced on lowlands, and if this is to continue, there is a need for greater research effort and funding directed at reducing emissions from more intensive beef, sheep and dairy farming systems. Given the limited projected progress made in reducing emissions from the agricultural sector as a whole, the Government should identify, as a priority, specific actions which will ensure the sector can meet national greenhouse gas reduction targets.* (Paragraph 58)

Sustainability and sustainable intensification

16. We need to increase agriculture output without increasing the amount of land used. It is clear that in some key crops this is not happening and yield levels have stagnated. We also need to ensure our agricultural production systems preserve the soil on which these crops are grown and ensure it retains key nutrients. (Paragraph 66)
17. *Sustainable intensification in relation to key UK cereal crops has made limited progress. The plateauing of yield levels in wheat must be addressed a matter of urgency. As part of its efforts towards sustainable intensification, we recommend the Government also direct greater funding to research on maintaining and improving soil quality.* (Paragraph 67)
18. Organic production uses fewer pesticides and inorganic fertilisers and, in so doing, makes an important contribution to environmental stewardship. We believe organic production also has a place in the market in adding to consumer choice. However, organic yields—certainly for extensive crops such as cereals and also for potatoes and some fruit—are generally lower than those for conventional agriculture. (Paragraph 73)

Supply chain resilience

19. Shorter supply chains minimise the threat of disruption and therefore help food security. As we said in our Report on Food Contamination, we are concerned about the length of supply chains, particularly for processed and frozen meat products, and we welcome the efforts made by some retailers to shorten these. As a result of horsemeat contamination in 2013 the Government commissioned a review of supply chain resilience. We look forward to the final report on this matter, and to receiving any evidence that supply chains in general are becoming shorter. (Paragraph 84)
20. We want to ensure that the role of the Grocery Code Adjudicator works for farmers and buyers, and therefore ultimately the consumer, so that the farming industry remains both sustainable and efficient. If farm incomes are squeezed unduly, farmers are unlikely to make the necessary investments in sustainable production. The

creation of the role is welcome and must be properly resourced as part of a wider effort to promote food security. (Paragraph 91)

21. We recognise that assessing “fairness” in relation to producer and consumer prices is fraught with difficulty, not least those of determining whether markets are working efficiently and transparently. However, we fully support the role of the Adjudicator in assessing whether contractual and other commercial practices may be unfair within the supply chain, or prejudicial to farmers and the longer run viability of their businesses, and whether there is evidence of abuse of market power in the supply chain. (Paragraph 92)
22. *We request an update on progress made and outcomes achieved to date from the Office of the Grocery Code Adjudicator. We suggest that it would be better if the Office had the power to initiate an investigation* (Paragraph 93)

Harnessing technology

23. *We support the Agri-Tech Strategy as a bold and innovative response to the need to ensure our agricultural production methods are modern and sustainable. The Government must ensure that it creates new partnerships between academia and those involved in developing technology. It should identify alternative funding mechanisms with the Technology Strategy Board in case adequate industry co-funding is not forthcoming, particularly where technology can deliver significant public benefit. We also recommend that the Government monitor the early competitive rounds of catalyst funding to assess whether there could be justification for expanding the funding base.* (Paragraph 99)
24. We were impressed by some of the possibilities provided by precision technology to make farming easier and more efficient. There are, for example, already sensor technologies which have the potential for development in a range of engineering and other precision farming applications where quick-wins could be achieved for UK farming. (Paragraph 105)
25. *As the Government’s new Agri-Tech Strategy addresses technological developments that are close to being brought to commercial reality, research funding bodies should place additional emphasis on pre-commercial and multidisciplinary applied research into precision farming technologies.* (Paragraph 106)
26. UK agriculture must embrace new technologies which are consistent with the principles of evidence and balanced risk-based assessment whilst meeting criteria of both economic and environmental sustainability, if it is to meet the challenges to food security in the future. (Paragraph 111)
27. *Given the evident concern about the way in which the EU regulatory framework operates and its potential implications for the future productivity and competitiveness of our agricultural sector, the Government should tell us what conclusions it has drawn regarding its scope for unilateral action on the EU regulatory regime for crop protection*

and GM crop approval as part of its wider review of the Balance of Competences between the UK and EU. (Paragraph 112)

Genetically modified food

28. The technology involved in the production of genetically modified crops generates public concern. In particular there are concerns that there may be unknown implications of this technology. In relation to the consumption of GM foods many people in other countries, and a large percentage of our poultry and livestock, consume GM products with no known or documented ill-effects. This should offer some reassurance to the wary. In terms of concerns about the production of GM crops, the EU process for approval of such crops is, as noted, extremely rigorous, and appropriate regulations can be put in place to guard against cross-contamination. (Paragraph 131)
29. *The Government should do more to inform the public about the potential beneficial impacts of growing GM crops in the UK. It should encourage an evidence-led public debate about GM crops and also counter food safety fears about the consumption of GM. In order to give consumers the opportunity to make informed choices, GM foods should be labelled as such, in the same way as organic produce. The Government must continue to work within the EU to argue for a system which is more flexible for those member states that wish to take advantage of GM technology, while still ensuring that all EU consumers are protected, in the same way it does with non-GM technologies. Progress towards this objective must be research and science-led. The Government must also ensure that any GM products grown legitimately in any member state may be freely traded across the EU. (Paragraph 132)*

Securing food for the future

30. *We recommend that the Government, through its Global Food Security Programme, undertake a themed mapping of the current scientific research programmes, projects and reports that are directed specifically towards enhancing our food security either publicly funded or co-funded, and of those which might exert a potentially important indirect impact on food security. This would provide a first line of co-ordinated communication of research to potential users, and indicate more transparently where current priorities lie. (Paragraph 136)*
31. *UK research councils should encourage the research-intensive universities and institutes which they fund to explore opportunities to extend the scope for farm-level research through greater co-operation with specialist land-based sector universities and colleges, thereby bringing the scientific research closer to application and the farming community, and ensuring best use of scarce and expensive resources. The Government should recognise the contribution made by our universities and research institutes and ensure the long term security of their funding. (Paragraph 139)*
32. *There are gaps in the co-ordination and flow of knowledge from research institutes to the farmers who would use and benefit from it. We recommend that the Government*

develop an integrated knowledge transfer strategy and action plan, which can be delivered and co-ordinated within the present funding frameworks, to ensure engagement between researchers and the relevant end users. (Paragraph 147)

33. Our food security depends on a vibrant, innovative and professional UK farming sector. This in turn requires a regular inflow of new entrants to the sector. Farming in the UK does not have this and efforts must be made to encourage new entrants who are willing and able to take advantage of new technologies in order to ensure the sector is modern and competitive. We are pleased that the Government is examining ways to do this in conjunction with the industry which can also help with the costs associated with entry into farming. (Paragraph 152)
34. *We recommend that the Government update us on its efforts and on the likely actions that will emerge from the Future of Farming Review. It should also clarify whether any Rural Development Programme funding will be made available to support the implementation of the recommendations arising from the Future of Farming Review. (Paragraph 153)*

Formal Minutes

Tuesday 24 June 2014

Members present:

Miss Anne McIntosh, in the Chair

Jim Fitzpatrick

Mrs Mary Glindon

Mrs Emma Lewell-Buck

Iain McKenzie

Sheryll Murray

Neil Parish

Ms Margaret Ritchie

Mr Mark Spencer

Roger Williams

Draft Report (*Food Security*), proposed by the Chair, brought up and read.

Ordered, That the draft Report be read a second time, paragraph by paragraph.

Paragraphs 1 to 10 read and agreed to.

Paragraph 11, read, amended, and agreed to.

Paragraphs 12 to 17 read and agreed to.

Paragraph 18, read, amended, and agreed to.

Paragraph 19 split, read, amended and agreed to.

New paragraph 20 read and agreed to.

Paragraphs 21 to 82, now 22 to 83, read and agreed to.

Paragraph 83, now 84, read, amended and agreed to.

Paragraphs 84 to 89, now 85 to 90, read and agreed to.

Paragraph 90, now 91, read amended and agreed to.

Paragraphs 91 to 97, now 92 to 98, read and agreed to.

Paragraphs 98, now 99, read, amended and agreed to.

Paragraphs 99 to 128, now 100 to 129, read and agreed to.

Paragraphs 129, now 130, read amended and agreed to.

Paragraph 130, now 131, read and agreed to.

Paragraph 131, now 132, read, amended and agreed to.

Paragraphs 132 to 138, now 133 to 139, read and agreed to.

Paragraph 139, now 140, read, amended and agreed to.

Paragraphs 140 to 152, now 141 to 153, read and agreed to.

Summary read, amended, and agreed to.

Resolved, That the Report be the Second Report of the Committee to the House.

Ordered, That the Chair make the Report to the House.

Ordered, That embargoed copies of the Report be made available, in accordance with the provisions of Standing Order No. 134.

[Adjourned till Wednesday 25 June 2014 at 2.30 pm.]

Witnesses

The following witnesses gave evidence. Transcripts can be viewed on the Committee's inquiry page at www.parliament.uk/efracom.

Tuesday 15 January 2014

Question number

Professor Tim Benton, Professor of Population Ecology, University of Leeds, and Professor Ian Crute, Chief Scientist, Agriculture and Horticulture Development Board, and Director of Rothamsted Research

[Q1-58](#)

Wednesday 29 January 2014

Professor Sir John Beddington CMG, Special Adviser to the Oxford Martin School, University of Oxford, and former Chief Scientific Adviser to the UK Government

[Q59-112](#)

Wednesday 12 February 2014

Peter Kendall, President, NFU, Tom Taylor, CEO, Agriculture and Horticulture Development Board, and Andrew Large, Chief Executive, British Poultry Council

[Q113-131](#)

Andrew Opie, Director of Food Policy, British Retail Consortium, and David Croft, Director of Quality and Technical, Waitrose

[Q132-184](#)

Wednesday 5 March 2014

Peter Melchett, Policy Director, Soil Association, and Vicki Hird, Senior Campaigner, Friends of the Earth

[Q185-210](#)

Henry Robinson, President, CLA, and Nick von Westenholz, Chief Executive, Crop Protection Association

[Q211-238](#)

Professor Melanie Welham, Executive Director of Science, BBSRC, Dr Paul Burrows, Executive Director of Corporate Policy and Strategy, BBSRC, and Professor Sue Hartley, Director, York Environmental Sustainability Institute, University of York

[Q239-256](#)

Wednesday 26 March 2014

George Eustice, Parliamentary Under-Secretary of State, (Farming, Food and Marine Environment), and Lindsay Harris, Deputy Director, Food and Materials Security, and Food Standards, Department for Environment, Food and Rural Affairs

[Q257-338](#)

Published written evidence

The following written evidence was received and can be viewed on the Committee's [inquiry web page](#). FSY numbers are generated by the evidence processing system and so may not be complete.

- 1 AB Sugar ([FSY0006](#))
- 2 Agricultural Biotechnology Council ([FSY0025](#))
- 3 AIC Ltd ([FSY0033](#))
- 4 Atkinson, Susan ([FSY0012](#))
- 5 Benton, Professor Tim ([FSY0054](#))
- 6 Biotechnology and Biological Sciences Research Council ([FSY0055](#))
- 7 Blackmore, Prof Simon ([FSY0051](#))
- 8 British Poultry Council ([FSY0041](#))
- 9 British Retail Consortium ([FSY0018](#))
- 10 CLA ([FSY0043](#))
- 11 Crop Protection Association UK Ltd ([FSY0031](#))
- 12 Dairy Crest Plc ([FSY0013](#))
- 13 Dairy UK ([FSY0046](#))
- 14 Defra ([FSY0056](#))
- 15 Department For Environment, Food And Rural Affairs ([FSY0044](#))
- 16 Eating Better: For A Fair, Green, Healthy Future ([FSY0045](#))
- 17 Food And Drink Federation ([FSY0027](#))
- 18 Food Ethics Council ([FSY0023](#))
- 19 Food Security Ltd ([FSY0042](#))
- 20 Food Standards Agency ([FSY0014](#))
- 21 Friends Of The Earth England Wales And Northern Ireland ([FSY0036](#))
- 22 Genewatch UK ([FSY0005](#))
- 23 Germaines Seed Technology ([FSY0008](#))
- 24 GM Freeze ([FSY0032](#))
- 25 GM-Free Cymru ([FSY0026](#))
- 26 Greenall, Catherine ([FSY0034](#))
- 27 Griffith and Jones, Peter and TSW ([FSY0021](#))
- 28 Imta ([FSY0050](#))
- 29 John Innes Centre ([FSY0052](#))
- 30 Macpherson, Euan ([FSY0002](#))
- 31 National Farmers Union (NFU) ([FSY0029](#))
- 32 NFWI ([FSY0037](#))
- 33 Noah ([FSY0035](#))
- 34 Nourish Scotland ([FSY0009](#))
- 35 Oxfam ([FSY0047](#))
- 36 Panton, Ian ([FSY0053](#))
- 37 Research Councils UK ([FSY0016](#))
- 38 Rothamsted Research ([FSY 0057](#))
- 39 RSPB ([FSY0038](#))

- 40 RSPCA ([FSY0019](#))
- 41 Scientific Alliance ([FSY0028](#))
- 42 Shorrocks, Dr Victor ([FSY0004](#))
- 43 Slinger, William Henry ([FSY0020](#))
- 44 Soil Association ([FSY0015](#))
- 45 UK Food Group ([FSY0039](#))
- 46 University Of York ([FSY0024](#))
- 47 Waitrose ([FSY0040](#))
- 48 Wildlife And Countryside Link ([FSY0030](#))
- 49 Williams, Alexandra ([FSY0022](#))
- 50 WWF-UK ([FSY0010](#))

List of Reports from the Committee during the current Parliament

All publications from the Committee are available on the Committee's website at www.parliament.uk/efracom.

The reference number of the Government's response to each Report is printed in brackets after the HC printing number.

Session 2014–15

First Report	Winter Floods	HC 240
--------------	---------------	--------

Session 2013–14

First Report	Draft Dangerous Dogs (Amendment) Bill	HC 95 (HC 637)
Second Report	Vaccination against bovine TB	HC 258 (HC 705)
Third Report	Managing Flood Risk	HC 330 (HC 706)
Fourth Report	Wild Animals in Circuses	HC 553 (HC 746)
Fifth Report	Food Contamination	HC 141 (HC 707)
Sixth Report	Rural Communities	HC 602 (HC 764)
Seventh Report	CAP implementation 2014–2020	HC 745 (HC 1088)
Eighth Report	Appointment of Chairman of Natural England	HC 890
Ninth Report	Departmental Annual Report 2012–13	HC 741 (HC 1283)
Tenth Report	Tree health and plant biosecurity	HC 469 (HC (Session 2014–15) 242)
Eleventh Report	Primates as pets	HC 984

Session 2012–13

First Report	Greening the Common Agricultural Policy	HC 170 (HC 654)
Second Report	The Water White Paper	HC 374 (HC 602)
Third Report	Pre-appointment hearing: Chair of the Water Services Regulation Authority (Ofwat)	HC 471–I & –II
Fourth Report	Natural Environment White Paper	HC 492 (HC 653)
Fifth Report	Desinewed Meat	HC 120 (Cm 8462)
Sixth Report	Draft Water Bill	HC 674 (Cm 8643)
Seventh Report	Dog Control and Welfare	HC 575 (HC 1092)
Eighth Report	Contamination of Beef Products	HC 946 (HC 1085)

Session 2010–12

First Report	Future Flood and Water Management Legislation	HC 522 (HC 922)
Second Report	The Marine Policy Statement	HC 635
Third Report	Farming in the Uplands	HC 556 (HC 953)
Fourth Report	The draft National Policy statement (NPS) on Waste Water	HC 736
Fifth Report	The Common Agricultural Policy after 2013	HC 671 (HC 1356)
Sixth Report	Implementation of the Common Fisheries Policy:	HC 858 (HC 1485)

	Domestic Fisheries Management	
Seventh Report	Pre-appointment hearing: Chair of Gangmasters Licensing Authority	HC 1400-I & -II
Eighth Report	EU proposals for the dairy sector and the future of the dairy industry	HC 952 (HC 1548)
Ninth Report	The Welfare of Laying Hens Directive—Implications for the egg industry	HC 830 (HC 1664)
Tenth Report	The outcome of the independent Farming Regulation Task Force	HC 1266 (HC 1669)
Eleventh Report	The draft National Policy Statement for Hazardous Waste	HC 1465 (HC (Session 2012-13) 540)
Twelfth Report	EU proposals for reform of the Common Fisheries Policy	HC 1563-I & -II (HC (Session 2012-13) 108)
First Special Report	The National Forest: Government response to the Committee's Fourth Report of Session 2009-10	HC 400
Second Special Report	Dairy Farmers of Britain: Government response to the Committee's Fifth Report of Session 2009-10	HC 401