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Ensuring the UK's Food Security in a Changing World

A Defra Discussion Paper

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1. Introduction

- 1.1. Food matters to all of us. Governments everywhere have a responsibility to ensure that everyone has enough to eat. Food needs to be available, but it also needs to be affordable and accessible through a resilient and reliable supply system.
- 1.2. The current global food security situation is a cause for deep concern. High energy prices, poor harvests, rising demand from a growing population, use of biofuels and export bans have all pushed up prices, and coupled with problems of availability, have sparked riots and instability in a number of countries around the world. The effects of these price increases are pushing millions of people in developing countries further into poverty and hunger.
- 1.3. By any objective measure, and despite the recent price increases, the UK currently enjoys a high level of food security. This is reflected by the relatively small proportion of household expenditure on food and the diverse and abundant foods available in our shops, supermarkets and farmers markets.
- 1.4. We produce much of our own food, and because the UK is a developed economy, we are able to get the other food we need for a nutritious diet by buying from abroad. However, these recent increases in food prices have sparked a debate about self-sufficiency, food security and the resilience of our food supply network. This paper aims to contribute to the debate by:
 - describing the trends that have led to the current global situation;
 - setting out the challenges that will affect the food supply chain in future; and
 - discussing whether the UK food supply chain is sufficiently resilient to withstand short-term shocks and sufficiently strong to face long-term challenges.
- 1.5. This is a discussion paper, so it does not have all the answers. Its purpose therefore is to encourage debate on this important issue. To take part in the debate, e-mail foodmatters.security@defra.gsi.gov.uk. The views we receive on this discussion document and from a series of expert workshops and stakeholder events that we

plan to hold will inform **a more detailed statement of our food security policy, that we intend to publish later in the year.**

2. What is Food Security?

- 2.1. There are many ways to define food security but in this paper we take it to mean consumers having access at all times to sufficient, safe and nutritious food for an active and healthy life at affordable prices¹. To enable this, our food supply must be reliable and resilient to shocks and crises. Food must also be produced in a way that is environmentally sustainable or we will set up problems for the longer term. Therefore ensuring food security sits alongside other priorities such as tackling climate change and securing a healthy natural environment.
- 2.2. A national food security policy must therefore address availability, access and affordability.
- **Availability** is about how much food there is and how reliable is the supply;
 - **Access** covers the transportation and food distribution system which gets food to where it is needed; and
 - **Affordability** is about food being available at prices that people can afford to pay, and in particular, whether low income consumers can afford enough nutritious food.
- 2.3. Globally, food security is about whether enough food is being produced to meet demand, and whether there are efficient and effective trading and distribution systems to get food to where it is needed.
- 2.4. The global food crisis has generated an intense national and international debate about food security. At the Rome Food Summit in June 2008, Jacques Diouf, Director General of UN Food and Agricultural Organisation said *“the problem of food insecurity is a political one...it is a question of priorities in the face of the most fundamental of human needs.”*²

¹ For a more detailed discussion of the term ‘food security’ and the various definitions that are available see Defra, *Food Security and the UK – an evidence and analysis paper* (December 2006) pp 6- 8.

² Rome World Food Summit, 3-5 June 2008

- 2.5. Here in the UK, Peter Kendall, President of NFU has said *“food security cannot be uniquely tackled at the national level, but that should not preclude British farming from playing a crucial part in addressing this global issue”*³.
- 2.6. Henry Aubrey-Fletcher of the Country Land and Business Association has argued that research and development plays a key role: *“it is vital the British Government responds to the food security crisis, for example by increasing its investment in agricultural research and development”*.
- 2.7. Sir Don Curry, chair of the Sustainable Farming and Food Strategy Delivery Group, welcomes discussion on this issue: *“ Debate around what we are calling ‘food security’ is gathering momentum. There is a real concern, which I support, that we need to return to a strong production base in Britain in the light of global trends which strongly indicate that pressure on land use is going to be critical”*.
- 2.8. Professor Tim Lang, Sustainable Development Commission Commissioner for Land Use and Natural Resources said *“We are facing a mounting crisis in securing global food supplies, with climate change, rocketing oil prices and growing demand all placing a strain on traditional supply chains. On top of this, there is an urgent need to address growing national and international concerns about the societal, environmental and health impacts of food and farming, as reported by the SDC earlier this year.”*
- 2.9. Joachim von Braun, Director General of the International Food Policy Research Institute says *“A world confronted with more scarcity of food needs to trade more – not less – to spread opportunities fairly”*⁴.
- 2.10. John Beddington, Government Chief Scientific Adviser, has commented *“What we need is a new and greener revolution, like the one we saw in the developing world in the 1960s, but which tackles both food security and climate change”*.

³ www.nfuonline.com

⁴ IFPRI Food Policy Report 2008: *The World Food Situation: New Driving Forces and Required Actions*, www.ifpri.org

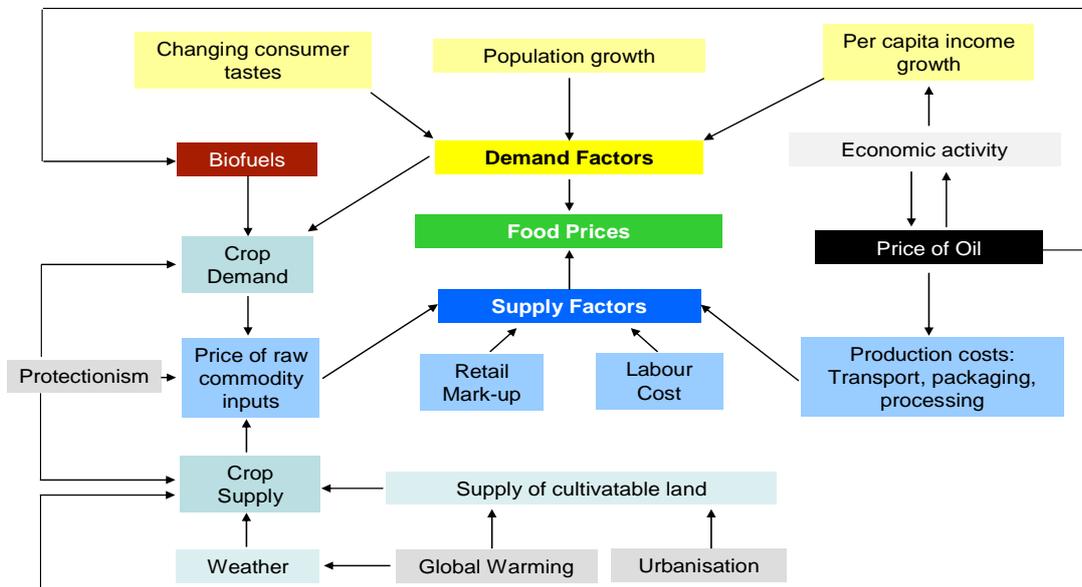
3. Global context

- 3.1. Global food security is important for the UK because, ultimately, global stability depends on there being enough food in the world to feed everyone and for it to be distributed in a way that is fair to all.
- 3.2. The steep rise in agricultural and other commodity prices (in particular oil) are a cause for serious concern. They threaten to push millions more back into poverty, rolling back progress made towards achieving the Millennium Development Goals. World prices of rice, maize and wheat have all reached record highs. In March 2008, the price of rice was at a 19-year high and wheat prices at a 28-year high, although adjusted for inflation they are at similar levels to the prices in the mid 1990s.
- 3.3. The current price rises have been caused by a combination of both short-term shocks and long-term structural changes (Figure 1). The Government recently published a detailed analysis of the causes of the recent price rises which include⁵:
- Rising incomes in India and China, in particular, which are increasing demand and shifting consumer preferences towards more meat and dairy, which in turn has increased demand for grain;
 - Bad weather, reducing harvests in a number of producing and exporting countries (e.g. Australia) which is made worse by low international stocks;
 - Some countries introducing export restrictions in response to high domestic food prices (e.g. Argentina, Kazakhstan, Ukraine);
 - Specific structural factors which tend to make the agriculture sector vulnerable to price volatility. For example, for some foods such as rice, the world market is thin and the proportion of production traded is less than 10%. In such markets, even a relatively small supply shock in a producing country can have a big impact on price;
 - High oil prices (standing above \$140 a barrel at the time of writing) which have put upward pressure on food prices by increasing production costs, through high fuel, fertiliser, transport, packaging and processing costs; and

⁵ HMT *Global Commodities: a long-term vision for stable, secure and sustainable global markets*: www.hm-treasury.gov.uk

- Growing demand for biofuels has meant that some land previously used to grow crops for food is now used to grow crops for fuel. In the US, around 27% of the 2008/09 maize harvest is expected to be used for ethanol production.

Figure 1: What influences food prices



Higher food prices are having a greater impact on developing countries

- 3.4. The increase in food prices is having a substantial effect on food security in developing countries, in particular in countries that are net importers of food, where food accounts for a significant proportion of people's expenditure. The urban poor in developing countries spend a higher share (up to 60%) of their income on food (compared to 15% spent by the poorest 10% of the population in the UK). Food shortages and high food prices have resulted in rioting and civil unrest in a number of countries (Cameroon, Niger, Mozambique, Cote d'Ivoire, Burkina Faso, Senegal, Haiti and Egypt).
- 3.5. Looking to the future, the OECD and FAO predict that prices will come down over the next few years, although probably not to the lows seen in the past. They estimate that as a result of supply and demand factors, average commodity prices – in nominal terms – for the period 2008 to 2017 will be around 30% higher for sugar, 40 to 60% higher for wheat and maize, and over 80% higher for vegetable oils,

compared with the period 1998-2007. In the longer term, prices will resume their decline in real terms, albeit at a slower rate⁶.

3.6. The Government has recently published a paper on trends in global commodities⁷. This outlines a framework for action internationally, involving:

- Maintaining economic stability;
- Promoting openness;
- Encouraging cooperation;
- Supporting innovation and investment;
- Ensuring fairness; and
- Mitigating the effects of climate change, especially increased resource efficiency.

In the short-term the UK is pressing on the international community to increase efforts to tackle global hunger

3.7. The Prime Minister's letter to the Japanese Prime Minister and chair of the G8 in April 2008 called for a co-ordinated response from the international community and recommended that the leading international donor bodies work together to lead the development of an international strategy. Shortly after, the UN Secretary General established a Task Force on the crisis to bring together a variety of UN agencies and World Bank. The Task Force has produced a Comprehensive Framework for Action which includes a range of measures including supporting social safety net schemes in developing countries, boosting smallholder farmer food production, improving international markets, and tackling governance.

3.8. At the Rome Food Summit in June 2008 the UK called on all donors, international organisations, developing country governments, the private sector and civil society to double our efforts to tackle global hunger and poverty under a Global Partnership for Agriculture and Food. The aim of this partnership would be to:

- double agricultural production in Africa;

⁶ The OECD-FAO Agricultural Outlook 2008-2017: www.agri-outlook.org

⁷ HMT *Global Commodities: a long-term vision for stable, secure and sustainable global markets*: www.hm-treasury.gov.uk

- double agricultural growth rates in Asia; and
- double investment in international agricultural research.

3.9. G8 leaders committed at the Summit in Japan to launch a new Global Partnership on Agriculture and Food to coordinate UN, World Bank, private sector and donor support with country agriculture plans. As part of this partnership, a global network of experts on food and agriculture will provide scientific analysis, and highlight needs and future risks. The Agriculture ministers from the G8 countries will also meet to help develop proposals on global food security.

3.10. **To help developing countries, the UK Government has announced a £585 million assistance package.** This includes, amongst other things, a further £30 million in response to the appeal from the World Food Programme and £54 million for social protection in Ethiopia, Mozambique and Bangladesh and £6.5 million for food aid and agricultural inputs for Afghanistan. The Government has also committed £400 million for agricultural research over the next five years.

Rising global demand for food means that global agricultural production needs to increase

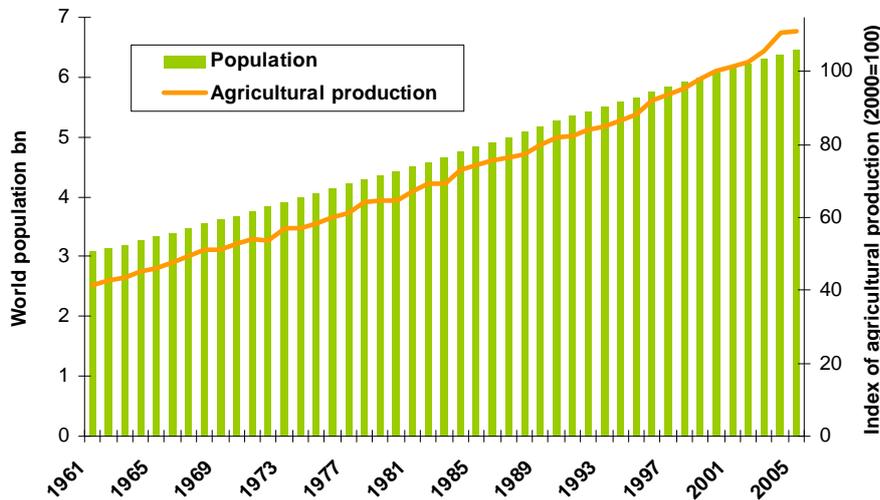
3.11. Despite a doubling of global population in the last 40 years, agricultural production has expanded faster still (Figure 2). This expansion has been possible through greater use of irrigation, fertilisers, pesticides and machinery, much of which is dependent on energy from fossil fuels, as well as by opening new areas of cultivation and developing crop varieties and livestock breeds with higher yields.

3.12. Up to now global hunger has not been due to an overall shortage of food; instead it has been a result of bad distribution of food, poverty, instability and poor governance. 850 million people in the world are under-nourished but 2 billion are overweight.

3.13. The global population is growing at the rate of about 6 million each month, and is projected to reach around 9 billion by mid-century. Most of this growth will be in the developing world. The FAO estimates that global food production needs to rise by 50% by 2030, and to double by 2050, to meet the demand of a rising world population and the eating habits of the growing middle classes in emerging

economies⁸. Specifically, as larger numbers of people eat more meat and dairy products, further pressure will be put on the production of grain and other commodities. Producing 1 kg of beef requires 7-10 kg of grain⁹.

Figure 2: World population and agricultural production (2000 = 100), 1961- 2005



Source: FAO

3.14. To meet future demand for food, production needs to increase, but in an environmentally sustainable way to avoid storing up even bigger problems for the future. Emphasis on increasing yields has in some cases had negative and often unpredicted consequences on environmental sustainability¹⁰:

- 50 years ago the taking of water from rivers was one-third of what it is today. Currently 70% of freshwater withdrawn globally (2700 km³) is used for irrigation. In some cases, this has polluted the fresh water source with salt water;
- Inappropriate use of fertiliser has led to large dead zones in a number of coastal areas and inappropriate use of pesticides has led to groundwater pollution and loss of biodiversity. But in developing countries, increasing productivity will require more fertiliser. Fertiliser use in Africa is the world's lowest at about 8 kg per hectare compared to 100kg in India and 311 kg in the UK; and

⁸ www.fao.org/

⁹ Food Matters; Towards a Strategy for the 21st Century, Strategy Unit, 2008: www.cabinetoffice.gov.uk

¹⁰ International Assessment of Agricultural Knowledge, Science and Technology for Development: www.agassessment.org

- Poorly managed expansion of agriculture can increase deforestation, environmental degradation and climate change.

Technology can help us respond to the challenge of increasing agricultural production in a sustainable way

3.15. Agricultural science will play a vital role in raising productivity particularly in developing countries, for example through better animal disease control, improved irrigation and water management practices, and better fertilisers. **The UK is contributing over £400 million to support international agricultural research over the next five years.** Of this, we intend to allocate £150 million for the Consultative Group on International Agricultural Research¹¹, to increase agricultural productivity in smallholder farming and to make agriculture more resilient to the pests and diseases which affect the livelihoods of poor farmers.

3.16. It is possible that GM crops may be able to make an important contribution to improving crop yields and resilience. We need to see how the technology develops but we must not compromise safety nor harm the environment.

Climate change presents a serious threat to global food production

3.17. Unless effective international action is taken to reduce global greenhouse gas emissions, current projections estimate that global temperatures could rise by between 1.7 and 4 degrees C by the end of this century¹². Even with decisive global action the world is already locked into unavoidable climate change - even if all greenhouse gas emissions stopped tomorrow, there would still be around 0.6°C further warming over the next few decades because of the inertia of the climate system. Agriculture is a significant contributor to greenhouse gas emissions: 14% of the global total, and 7% of the UK's total greenhouse gas emissions. This is primarily as a result of livestock production and the use of mineral fertiliser in crop production.

¹¹ The Consultative Group on International Agricultural Research (CGIAR), is a strategic partnership, working in collaboration with many hundreds of government and civil society organizations as well as private businesses around the world. The CGIAR generates cutting-edge science to foster sustainable agricultural growth that benefits the poor through stronger food security, better human nutrition and health, higher incomes and improved management of natural resources

¹² IPCC Fourth Assessment Report (2007): www.ipcc.ch

- 3.18. Developing countries are likely to suffer most from the effects of climate change¹³. Rain-fed agriculture, which covers 96% of all cultivated land in sub-Saharan Africa, will be particularly hard hit. By the 2020s, yield from rain-fed agriculture in some African countries could be reduced by as much as 50%. By the 2080s, land unsuitable for rain-fed agriculture in sub-Saharan Africa due to climate, soil or terrain constraints may increase by 30 to 60 million hectares¹⁴. Crop yields in tropical regions are likely to decline even for small increases in temperature¹⁵. Overall, higher temperatures could reduce global cereal production by perhaps 5%, with production shifting from developing to developed countries.
- 3.19. The agricultural sector can reduce direct emissions of greenhouse gases by using fertiliser more efficiently, by providing animals with diets that specifically match their nutrient requirements, and by improving manure management (and using anaerobic digestion) to reduce methane emissions. It can also displace fossil fuel use by providing biomass as an alternative to fossil fuels, producing sustainable timber as a replacement for energy-intensive building materials, and using anaerobic digestion to produce biogas for energy. Stores of carbon in woodlands and soils can also be protected.
- 3.20. Agriculture will also need to adapt to changes in climate. It will need to strengthen its resilience to changes in temperature and rainfall, resulting changes to water availability, flood risk, incidence of storms, and increased likelihood of pests and diseases.
- 3.21. Developing countries are less able to absorb shocks and deal with disruption to the food system. This vulnerability is not only associated with environmental pressure, but also with society's capacity to cope with these pressures. Therefore an essential step to reduce a society's vulnerability to the effects of climate change is to build its 'adaptive capacity', through, for example, research, communicating and raising awareness of climate change, its likely impacts and possible responses, maintaining

¹³ P. J. Gregory et al, *Climate Change and Food Security*. Philosophical Transactions of the Royal Society (2005) B, 360, p. 2143. www.gecafs.org

¹⁴ www.fao.org

¹⁵ Stern Review on the Economics of Climate Change (October 2006), pp. 56-7, 67-8, 71.:www.hm-treasury.gov.uk

or restoring natural ecosystems, and establishing supportive social structures and appropriate governance¹⁶.

3.22. Greater understanding of how to help societies manage risks to its food system is necessary, as well as research into improving yields and resilience¹⁷.

The UK is showing leadership to tackle climate change at international, EU and national levels

3.23. At the December 2007 UN Framework Convention on Climate Change (UNFCCC) conference, agreement was reached on a plan for achieving a comprehensive post-2012 global climate deal. A two year period of negotiations under the Bali Action Plan have begun, with the aim of reaching agreement at the Copenhagen conference in December 2009.

3.24. The EU has committed to a 20% reduction in greenhouse gas emissions by 2020, rising to 30% if there is an international agreement. In the UK, the **Climate Change Bill** is currently going through Parliament. It is the first of its kind in the world, setting long-term targets to reduce the UK's emissions.

3.25. Climate change was a key theme at the 2008 G8 summit in Japan. At the summit, leaders committed that their efforts should be guided by the goal of reducing global emissions by at least 50% by 2050. In order to catalyse immediate action on the ground, they launched and pledged funding for the \$6bn Climate Investment Funds (CIF), that will provide support for low carbon growth and climate resilience in developing countries between now and 2012. The UK intends to make available £800 million from Environmental Transformation Fund – International Window to support this.

¹⁶ Yohe, G.W., R.D. Lasco, Q.K. Ahmad, N.W. Arnell, S.J. Cohen, C. Hope, A.C. Janetos and R.T. Perez, 2007: Perspectives on climate change and sustainability. *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 811-841.

¹⁷ *Global Environmental Change and Food Systems* is an international, interdisciplinary research programme, which aims to “determine strategies to cope with the impacts of global environmental change on food systems and to assess the environmental and socio-economic consequences of adaptive responses aimed at improving food security”. For more information, see: www.gecafs.org

3.26. The UK is showing leadership within the EU and beyond by promoting the role of agriculture in both climate change mitigation and adaptation. The UK is working with key EU Members States to build consensus on the priorities for action, and is working bilaterally with countries such as China to help them reduce greenhouse gas emissions from agriculture. The UK is also working with China to help them understand the impacts of climate change on agriculture and develop appropriate responses. One UK/China bilateral project has recently developed the first adaptation policy framework for agriculture in any of the Chinese regions¹⁸. In addition, the UK co-chairs an Agriculture Subcommittee of the Methane to Markets Partnership which aims to increase the production of renewable energy from anaerobic digestion in the farming sector internationally.

Biofuels have ignited a debate on the purpose of agricultural land

3.27. Some evidence suggests that growing demand for biofuels has contributed to rising food prices for some commodities, although the actual extent of this contribution is currently unclear. UK, EU and international Governments must ensure that biofuel production takes place in a responsible and sustainable way, addressing both direct and indirect impacts, including on food prices.

The UK Government is reviewing its targets for biofuels, in line with findings from the Gallagher review

3.28. Professor Ed Gallagher was asked by the Government to examine the newly emerging evidence of indirect effects of biofuels¹⁹. The review confirms serious concerns about the potential adverse impacts of current UK and EU biofuels policy on land use, greenhouse gas emissions and food security. The Government has accepted the main findings of the report, including on the need to take a more precautionary approach to UK and EU targets. We will consult on slowing down the rate of increase in the Renewable Transport Fuel Obligation so that the level of biofuels will increase to 5% by 2013/14 rather than 2010/11 and this will be subject to a review in 2011/12. In the EU we are pressing for measures to help ensure the 10% by 2020 target can be met sustainably, but also for the target to be subject to rigorous review by 2013/14.

¹⁸ www.china-climate-adapt.org

¹⁹ Review of the Indirect Effects of Biofuels (Gallagher Review): www.dft.gov.uk

Food is traded in a global marketplace, a market in which subsidies in the EU and USA have a distorting effect and a negative impact on producers in developing countries

3.29. The World Bank has shown that greater liberalisation of trade would result in increased farm output in most of the world, including by 5-6% a year in Africa²⁰. At a time of high food price inflation, the EU continues to apply high import tariffs to many agricultural commodities. While the average tariff for non-agricultural goods is 4%, for agricultural goods it is around 20%, with tariffs of 70% or more not uncommon for CAP commodities such as sugar, and beef.

3.30. The tariff and subsidy regime under CAP keeps prices for consumers artificially high in the EU and was estimated to cost around €34 billion in 2007. EU and US tariffs and subsidies hinder the development of the agricultural sector in poorer economies. They offer unfair incentives to farmers in developed countries to produce food, they deny poorer countries access to markets through protecting tariff barriers, and they undermine local production in poorer countries through dumping surpluses on to global markets through export subsidies.

The UK Government is seeking to achieve a deal to balance this distortion through the multilateral trade negotiations

3.31. Agreeing a multilateral deal via the WTO's Doha Development Agenda trade negotiations would help to achieve a level playing field and in the longer run lift millions of people out of poverty. That is why we are keen to achieve a deal under the WTO's Doha Development Agenda. We also want a sustainable, simplified and fully decoupled CAP that focuses on delivering public and environmental benefits, as set out in our 2005 Vision for CAP reform.²¹

²⁰ World Bank: www.worldbank.org

²¹ www.hm-treasury.gov.uk

4. The UK context

- 4.1. People in the UK are becoming more interested in food – its quality, where it comes from and how it was produced. We are eating out more frequently and seeking a wider variety of food from around the world. This in turn has increased our appetite for global cuisine and for a wider variety of food to eat at home.
- 4.2. Though just four firms account for an estimated two-thirds of all food retail sales, UK consumers' growing interest in food has helped support the growth of farmers' and speciality food markets. There are now an estimated 550 farmers markets in the UK, compared to just one in 1997, and an estimated 4,000 farm shops. Turnover from direct selling by farmers, along with pick-your-own and box schemes, is estimated to be around £2 billion a year²².
- 4.3. Consumers are motivated to buy 'local' produce for a range of reasons, including a desire to support local producers and the local economy, and its association with higher quality, and in some instances, perceptions of lower environmental impact.
- 4.4. This trend has developed further over the last year with more people turning to growing their own food. In the last 12 months, sales of vegetable seeds exceeded those of flowers, and the media reported record waiting lists for allotments.

The Importance of UK Agriculture

- 4.5. Agriculture has created the rural landscape that we all know and cherish. In many areas it sustains habitats that are crucial to wildlife in the UK. UK farming employs over half a million people, and in 2007 it contributed £5.3 billion to the economy. A flexible, skilled and market-orientated domestic agriculture sector is showing it can thrive and compete in an international market. This in turn makes an important contribution to global food supply and to the diversity and resilience of domestic food supply.
- 4.6. In 2007 the UK harvested 19 million tonnes of cereal from 2 million hectares of land: 13.1 million tonnes of this was wheat and 5 million tonnes was barley. The total number of cattle and calves at June 2007 was 10 million with a total production value of £1.7 billion. At the same time the total number of sheep and lambs was 33.9

²² Food Matters; Towards a Strategy for the 21st Century, Strategy Unit, 2008: www.cabinetoffice.gov.uk

million with a total production value of £628 million. In 2007 the volume of milk sold to dairies was 13.4 billion litres, worth a total value of £2.8 billion. In 2007 the UK produced 714 million dozen eggs for human consumption, worth a total value of £410 million.²³

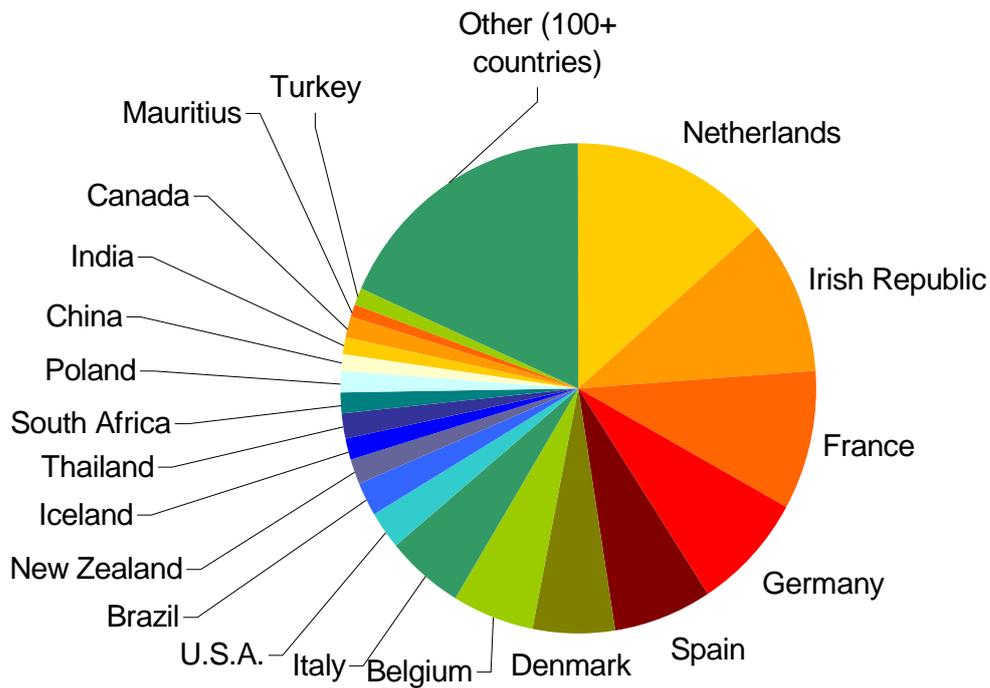
- 4.7. UK agriculture also sells to the rest of the world. In 2006 the value of food, feed and drink exports was £10.5 billion. Exports of milk and cream have risen sharply and in 2006 reached 621 thousand tonnes. In 2006 the UK exported 2.1 million tonnes of unmilled wheat. For many years the UK has exported much more lamb and mutton to the EU 26 countries than it has imported: in 2006 the figure for exports was 86.3 thousand tonnes.
- 4.8. Quality matters and sells, and we have outstanding examples in the UK. There is increasing public demand for good quality, locally-sourced food. Sales of ethical foods – organic, fair-trade, free range and Freedom Foods – rose from £1 billion to £5.4 billion between 1999 and 2005. Total sales of food and drink topped £162 billion a year.
- 4.9. We also need to recognise the role of farmers in managing our countryside and protecting stores of carbon in soils and woodland, and farming's potential to help reduce society's carbon footprint including by providing crops for energy or biogas from manure.

The UK has long been a net importer of food. Maintaining a diversity of food supply is crucial to food security

- 4.10. Currently no single country accounts for more than 13% of UK food and drink food imports. In 2006, 68% of food imports into the UK were from other Members States of the EU i.e. from low risk, stable trading partners. Maintaining a range of supply sources means that any risk to our total food supply is spread, lowering the impacts of any unforeseen disruptions involving any particular trading partner or from within our domestic agriculture sector.

²³ Agriculture in the United Kingdom 2007: www.defra.gov.uk

Figure 3: UK food import shares by country and value, 2006



Source: Defra

4.11. Improved trading relationships based on more open international markets are essential in maintaining national and international food security. Our exports are other countries' imports and they are critical to the competitiveness of our farming and food sectors.

The UK is more self-sufficient now than it was before and after the Second World War

4.12. Currently the UK is 60% self-sufficient in all foods and over 74% self-sufficient in foods that can be produced in this country. This is relatively high by historical standards (table 1).

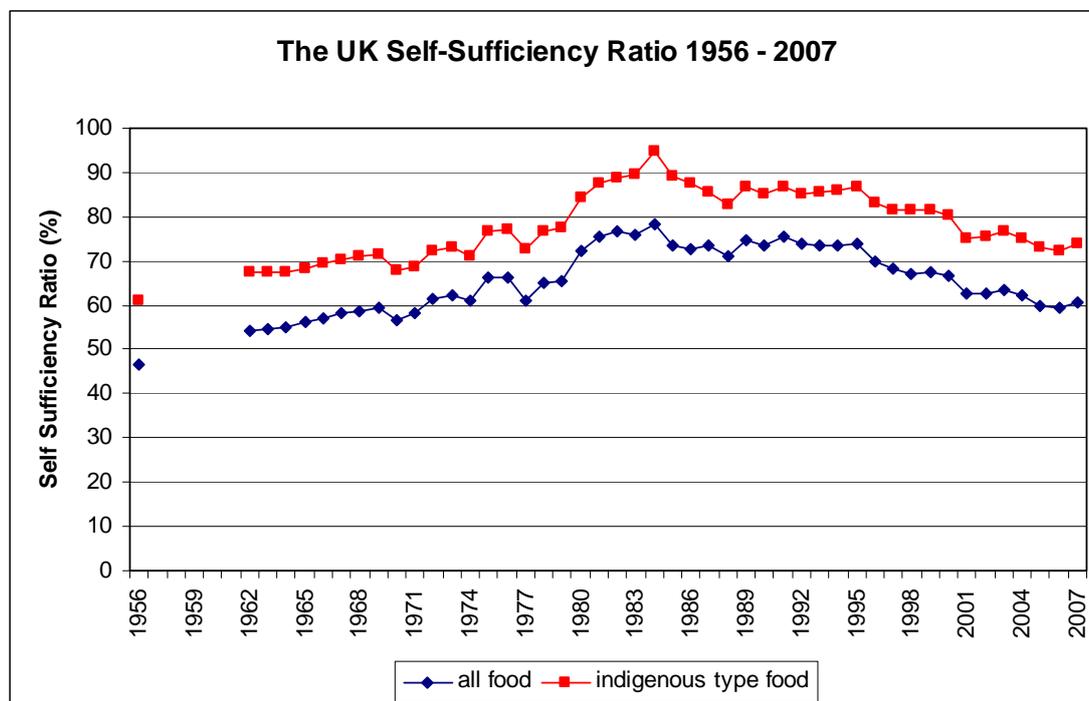
Table 1: Indicative British self-sufficiency ratios over different periods

pre – 1750	around 100% (in temperate produce)
1750 – 1830s	around 90-100% except for poor harvests
1870s	around 60%
1914	around 40%
1930s	30 - 40%
1950s	40 - 50%
1980s	60 – 70%
2000s	60%

For all food unless stated. Sources - see footnote²⁴

4.13. UK self-sufficiency peaked in the 1980s and has since declined (figure 4), but is higher now than during the interwar period. The very high self-sufficiency of the 1980s and 1990s was brought about by the CAP and its emphasis on boosting food production through direct subsidies to producers irrespective of demand from the market and was artificially maintained by trade barriers.

Figure 4: UK self-sufficiency 1956-2007



Source: Defra, *Agriculture in the United Kingdom, 2007*

²⁴ Figures derived from B.R. Mitchell, *British Historical Statistics* (1988); Davis, *Industrial revolution*; Evans, *Forging of the modern state*, p. 144; *How Britain was fed during the War* (1946); Defra statistics.

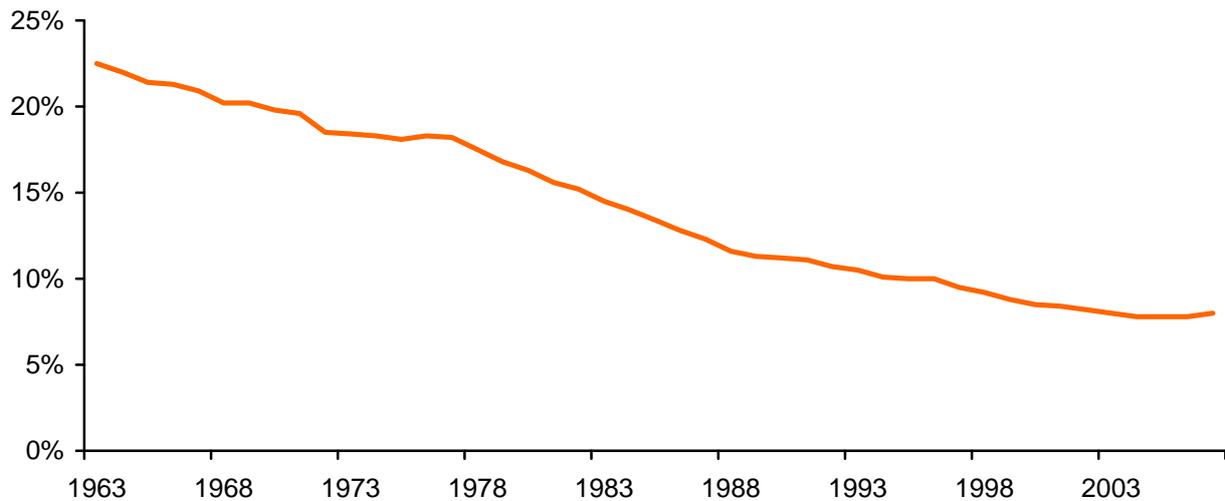
- 4.14. Crude calculations suggest that UK agricultural land could provide more than enough food from arable production in terms of our daily calorific requirements, in theory making the UK self-sufficient.
- 4.15. In the UK self-sufficiency ranges from around 10% for fresh fruit to around 100% for cereals. As a measure of domestic food security, self-sufficiency does not cover the processing and distribution of food, it does not allow for the imported energy on which domestic agriculture is directly and indirectly reliant, and it does not take account of the resilience of the supply chain.²⁵
- 4.16. Even if it were possible, self-sufficiency would not insulate us against disruptions to our domestic supply chain and retail distribution system. It would open up the UK to risks of adverse weather events, crop failure and animal disease outbreaks. We would continue to depend on imported fertilisers, machinery and certain foods for a balanced diet. Similarly, our food chain relies on various forms of energy, much of which is imported, so ensuring our energy security is as much of a priority.

The impacts of rising global food prices are being felt in the UK, and the poorest are hit hardest

- 4.17. The impacts of price rises in global food commodities have been felt in the UK. Overall inflation in June 2008 was 3.8% but food price inflation stood at 9.7%.
- 4.18. Yet over the past 40 years or so, and until the recent price rises, we have witnessed a long-term decline in real food prices (figure 5), reflected in the decline in the proportion of household expenditure spent on food. In 2007 the average household spent 9.2% of its weekly expenditure on food. In the 1960s this figure was around 20%. If food prices stay on the current upward trend, we would expect the proportion of expenditure spent on food for 2008 overall to be around 10% - the level seen at the end of the 1990s.

²⁵ Measured as the share of consumption plus exports from domestic production and is weighted by value of commodities and adjusted to raw farm-gate values.

Figure 5: % consumer expenditure spent on food



Source: ONS Family Expenditure Survey

4.19. However, recent price rises have hit family budgets and low income households spend a greater percentage of their household income on food. In the UK, the poorest 10% of the population spend 15% of their household income on food compared to 7% spent by the richest 10%. People on low incomes have been affected more significantly than others by recent food price rises. The same people have also been affected the most by recent rises in energy, fuel and housing costs.

4.20. A strong and stable economy is the most effective long-term means of tackling poverty, and therefore the affordability of food. The Government has a number measures to support low income groups. For example, approximately £100m is spent on *Healthy Start* which provides support to around half a million pregnant women, and children under four in low income and disadvantaged families across the UK.

UK food production needs to respond to growing global demand for food

4.21. We need to feed a growing world population in a way that does not degrade the natural resources on which farming and food production ultimately depend.

4.22. UK production is of course crucial to our food supply, but it is not on its own sufficient for UK food security. We should encourage a sufficient volume of domestic production for the food supply chain as a whole, and that means continuing to

encourage a market-driven, efficient and environmentally sustainable farming sector producing what consumers want.

4.23. Domestic farming will need the capacity to respond to changes, including to climate and market changes. These changes will mean using different crops and varieties, and building capacity to deal with evolving risks and threats including volatile prices, adverse weather, and pests and disease, while at the same time providing assurance over production methods and a proper, risk-based use of agro-chemicals.

The Government is committed to supporting UK food and farming

4.24. Defra has as one of its departmental strategic objectives "a thriving farming and food sector with an improving net environmental impact", and promoting a strong domestic farming sector alongside stakeholder partners is central to Defra's work.

4.25. Farming's economic and environmental performance are inextricably linked, and we need to make progress across both fronts in order to meet the global challenges ahead - including feeding a growing world population in a way that does not degrade the natural resources on which farming and food production ultimately depends. This is one of the central principles of the Government's Sustainable Farming and Food Strategy.

4.26. **Defra's spends half its research budget on supporting the farming and food sectors.** £27.5 million is aimed at resource management in the farming and food industries, including energy and water use and additional activity on climate change mitigation and adaptation.

4.27. **The Rural Development Programme for England will invest £3.9 billion in England's farming industry and rural areas** over 2007-2013; this funding will help secure environmental goods that the market does not currently reward including:

- £3.3 billion to support farmers delivering environmental land management, forestry schemes, uplands and energy crops;
- £300 million to help improve farming's competitiveness and sustainability; and
- £300 million to support the wider rural economy and communities.

The Government is also supporting research on the best ways to respond to growing competition for land

4.28. Defra, working together with the Department for Communities and Local Government, are joint sponsors of an independent **Foresight Land Use Futures** project which was launched in April 2008. The project will explore how society's use of land could evolve over the next 50 years and how Government needs to respond.

The Government is supporting the farming industry in its fight against diseases and pests

4.29. The Government is working with food producers and processors to help prevent animal and plant diseases disrupting food supplies. Defra is spending £405 million on preventing and controlling animal diseases. Steps taken by the Government and industry together in recent years to prevent outbreaks and spread of disease have helped to ensure that plant and animal diseases in the UK do not have a major or prolonged impact on food production and supply. The arrival of diseases like bluetongue show some of the challenges we face.

4.30. Defra is working with the farming industry to develop new arrangements for cost and responsibility sharing. This will provide an opportunity for Government and the farming industry to reach better decisions on the prevention, control and eradication of plant and animal diseases that command the widest possible support.

The Government is working with the farming industry to ensure there are enough workers with the right skills

4.31. Agriculture faces a challenge to recruit and retain sufficient numbers of workers. It has been argued by the industry that the viability of some agricultural businesses may be at risk from shortages in the supply of low skilled labour on which they depend, particularly at periods of peak activity (such as the harvest), and that such shortages stem in part from the increasing trend for migrant workers to take up less arduous and better paid work in other sectors or to return to their home country.

4.32. The **Skills for Farming** project aims to facilitate and enable the development of an industry which has all the appropriate skills to be fully competitive in the market place, to be able to mitigate and adapt to climate change, and to improve

environmental performance. The project, initiated by Defra, is being implemented by the farming industry.

4.33. Defra also provides support to the industry-led initiative called **Fresh Start** which aims to encourage new entrants into farming.

Risks to UK food security are more likely to come from sudden disruptions to supply chains than lack of food

4.34. Threats to our food security are more likely to come from sudden disruption to supply chains (local, national and international). The food supply chain is dependent on fuel, transport, and other elements of the critical national infrastructure. The food sector in the UK has demonstrated its ability and flexibility to deal effectively with emergencies, for example during the flooding in Gloucester and the South-West in 2007, supermarkets remained open and were able to provide food to those affected.

4.35. British grocery retailers are geared to source their produce from a number of suppliers. This enables them to keep shelves stocked and offer competitive prices. With this flexibility to switch suppliers, retailers can also ensure continuous supply in the event of a disruption to part of the food supply or distribution chain, either in the UK or abroad.

The Government is working with retailers and food suppliers to build the resilience of food supply chains

4.36. Our food resilience policy focuses on ensuring that critical elements of our food supply chain work. This includes maintaining communication, transport and energy networks.

4.37. Our overall food supply chain can also be considered robust because of the number of different supply chains and manufacturing and retail businesses. Having domestic and international food supply chains increases the options available to the retailers when a particular link in the chain is disrupted. Lean, low-inventory, just-in-time logistics systems adopted by the UK retail sector bring benefits in terms of efficiency, but are potentially vulnerable to direct or indirect disruption through, for instance:

- Extreme weather (e.g. flooding);

- IT systems failures;
- Interruptions to fuel and other energy supplies; and
- Failures in transport in transport infrastructure: roads, and port and airport services.

4.38. **The Government works with industry and the public sector to promote business continuity planning so as to improve resilience.** Defra leads the relationship with the food sector, although the Food Standards Agency leads on contamination. In addition, **Defra has set up and chairs the Food Chain Emergency Liaison Group**, a forum at which other government departments, industry, and the relevant trade associations can share information and jointly consider developing government policy.

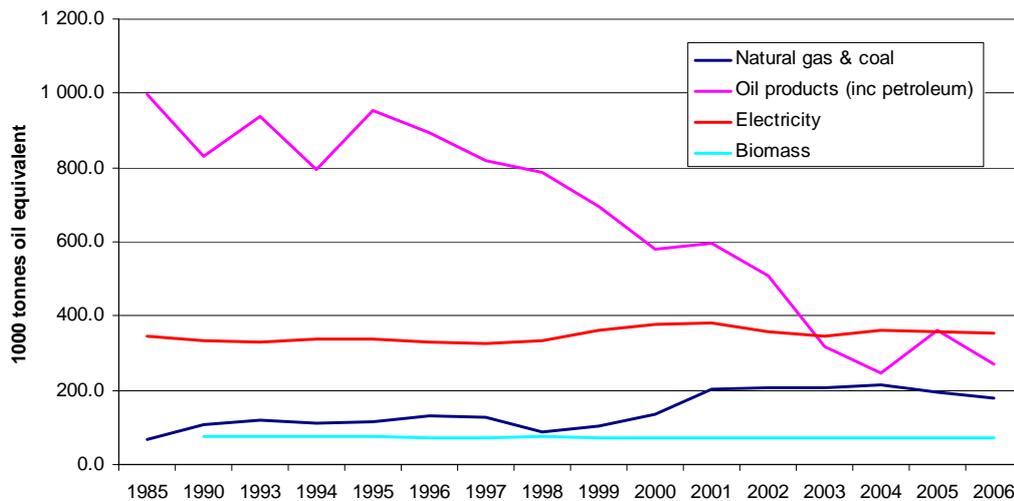
The food chain is highly dependent on energy

4.39. The modern food chain is highly dependent on energy, mostly from fossil fuels, from the production of fertiliser all the way through to food preparation. Our food system has the potential to be significantly vulnerable to interruptions in energy supplies used for agriculture, food processing and refrigeration, food transport, and in food retailing.

4.40. The UK, like other countries is set to become more dependent on a small number of energy suppliers located in less stable parts of the world. By 2020 the UK will be importing the majority of its gas and more than half its oil.

4.41. There has been a significant decline in the use of oil by UK agriculture which has been partly offset by a switch to gas, and which has led to the overall decline in direct energy use in farming (figure 6).

Figure 6: Energy use by UK agriculture



Source: Defra, *Agriculture in the United Kingdom, 2007*

4.42. UK agriculture is becoming more efficient in its use of energy. Total energy use by UK agriculture has fallen by over 30% since 1985 while output has remained fairly constant. This shows the progress UK agriculture is making in moving towards lower carbon production.

4.43. Recent research commissioned by the Sustainable Development Commission on the impact of rising energy costs concluded that there would be only a relatively small impact on UK competitiveness as producers everywhere face higher energy costs and will eventually be able to pass on increased costs. However, there would be short-term impacts with a squeezing of profit margins for producers, leading to a fall in production, the disappearance of some producers and restructuring the sector. These impacts will be more severe if oil prices rise further. Other factors influencing agricultural markets mean that increased energy prices will be felt more or less severely in different sectors. Pigs and poultry producers already facing increased feed costs will be in a worse position to cope with a further squeeze of their margins than, for example, cereals producers.

4.44. Direct energy consumption by the food manufacturing sector was 3.7 million tonnes of oil equivalent in 2006 and has followed a broadly similar rate of decline to agriculture over the last 20 years or so. In contrast to declining trends in energy use by agriculture and food manufacturing, trends in energy use for transport have been flat in the UK (as improvements in efficiency of vehicles have been offset by increases in volume of food transported).

The Government is supporting the UK agriculture sector to play its part in meeting the UK's objectives for renewable energy

4.45. The Government's Energy White Paper, *Meeting the Energy Challenge*²⁶, specifically considers how our energy security can be maintained and enhanced in an uncertain world.

4.46. As part of this we are working to help farming to play its full part in supporting our objectives for renewable energy. This includes promoting the use of anaerobic digestion (AD). This technology captures the methane emitted from manure, slurry and other organic material such as food waste, to produce biogas which can be used as a source of heat, electricity and fuel. AD offers a number of benefits: as well as providing a source of energy and helping to manage organic waste, the AD process also produces “digestate”, a nutrient-rich material which can be used as a fertiliser. We want to see much greater uptake of this technology, not just by farmers, but also within the food and drink industry, by retailers and by local authorities. We are providing financial support for anaerobic digestion (and other technologies) through the **Bioenergy Capital Grants Scheme**²⁷ which supports the installation of biomass-fuelled heat and combined heat and power projects in the industrial, commercial and community sectors in England and we have **doubled the incentive to generate energy through AD** by changes to the Renewables Obligation. We have also recently announced a **new £10 million programme** to support the construction of new anaerobic digestion demonstration plants. In addition, the Rural Development Programme for England provides support to develop energy projects or small scale on farm renewable energy technologies (including anaerobic digestion).

The Government is also helping the food supply chain to prepare for future challenges

4.47. Defra is already taking action to help ensure UK farmers and food producers are aware of how they are likely to be affected by climate change and what they need to do to manage the risks, both economic and environmental. A cross-Government Adapting to Climate Change Programme has been set up, to bring together work already underway, and to co-ordinate and drive forward the development of

²⁶ www.berr.gov.uk. The differences and similarities between energy security and food security are set out in Defra, *Food Security and the UK: an evidence and analysis paper*, pp. 73-4

²⁷ www.defra.gov.uk

Government's work on adaptation in the future. **We will shortly launch an Adapting to Climate Change website**, which will provide further information about this Programme and which will also help users find out more about how the climate is changing, and what they can do to adapt.

4.48. Defra has also launched a new project, as part of its Farming for the Future programme, to specifically address climate change adaptation by agriculture. The overarching aim of the project is to make the agriculture sector environmentally and economically sustainable in a changing climate; and to make agricultural ecosystems resilient to climate change by protecting, restoring and enhancing ecosystem services (e.g. biodiversity, water purification, flood management). This will help both to maintain the current multiple benefits we obtain from agricultural land and to manage the broader impacts of climate change on the UK as a whole. The project is supported by a continuing programme of research on agriculture and climate change.

4.49. As part of the project, Defra is working with the Rural Climate Change Forum to raise awareness of climate change and to help ensure that farmers and land managers have the information and advice they need to adapt to the effects of a changing climate (and reduce their greenhouse gas emissions). Defra is also funding a communication project called **Farming Futures**, led by Forum for the Future in partnership with the National Farmers' Union, the Country Land and Business Association, the Agricultural Industries Confederation and the Applied Research Forum. This project aims to stimulate adaptation (and mitigation) action on farms by translating scientific evidence into practical advice for farmers and land managers, and their advisers and influencers.

4.50. The greatest threat to the longer-term sustainability of fish stocks, remains excessive fishing. Under the Common Fisheries Policy in the EU, a range of initiatives are being undertaken to reduce this, in particular, by focusing on more selective fishing activities and constraining vessel effort. The intention is that by 2015, all EU fisheries are managed on the basis of Maximum Sustainable Yield i.e. they are fished at a level which balances the scale of exploitation with the need to retain strong stocks.

5. Conclusion

- 5.1. The UK currently enjoys a high level of national food security, which reflects the diverse and abundant supply of foodstuffs available in our supermarkets. We produce much of our food ourselves, and because the UK is a developed economy, we are able to access the food we need on the global market.
- 5.2. The recent increases in global food prices have, however, focused the attention of Governments around the world on short-term supply and long-term challenges to our food system. Rising global demand, climate change, high oil prices and new pressures on land such as biofuels have undermined global food security. These pressures are compounded by trade distorting subsidies and protectionist policies imposed in the US, EU and other countries
- 5.3. To address the global food price increases, the UK has committed to a substantial aid package to help the most vulnerable countries and called on the G8 to take co-ordinated action. The G8 has agreed to invest over \$10 billion to meet not just immediate humanitarian needs – including increases in food aid – but to improve food security and increase agricultural productivity over the longer term. This needs to be done in an environmentally sustainable way to maintain the natural resource base for the future. It makes sense to encourage food production in Africa, as a lack of production globally will force up prices which will affect consumers in the UK too.
- 5.4. The UK believes that effectively functioning markets are fundamental to ensuring global food security. The Government is committed to continuing to liberalise markets through the Doha Development Round of trade negotiations and reform of the EU's Common Agricultural Policy.
- 5.5. We believe that global food security means everyone having enough to eat, and we have committed to substantial investment in research and development to enable developing countries to improve their food production. Climate change presents one of the greatest threats to increasing agricultural productivity and the Government is leading the EU and the world in tackling climate change. In addition, we are investing in research and development and capacity building to increase resilience in countries that will be most affected by climate change.

- 5.6. One of the most important contributions the UK can make to global, and our own, food security is having a thriving and productive agriculture sector in the UK, operating in a global market and responding to what consumers want. The Government is committed to supporting the agricultural sector including through investment in research and development, support on skills and ensuring the UK benefits from EU support under Rural Development Programmes.
- 5.7. We are also working with retailers and food suppliers to strengthen the resilience of our food chain, and reduce its energy dependence, so it is less vulnerable to shocks which could put our food security at risk.
- 5.8. The UK is taking significant action internationally and at home to ensure UK food security. This may not be enough however, as the impact of future challenges cannot be fully known, and new challenges may emerge. We have proposed, therefore, a set of headline and supporting food security indicators which will allow us to assess and monitor our food security over time across five areas:
- (i) global availability;
 - (ii) diversity of supply;
 - (iii) food chain resilience;
 - (iv) affordability; and
 - (v) safety and confidence.
- 5.9. More detail is set out in table 2.

Table 2: Proposed headline and supporting food security indicators

Theme	Rationale	Issues	Proposed headline indicators	Potential supporting indicators
1. Global availability	Global food supply ultimately underpins UK availability and prices.	Can the world sustainably feed itself as the population, incomes and demand increase and climate change affects supply? Trading system is crucial.	Trends in global output per capita.	Real commodity prices. Stock to consumption ratios. International trade as % of global production. Agricultural research spending. Sustainability-related indicator.
2. UK trade and diversity	Trade spreads risks, keeps prices competitive and increases diversity of supply.	How diverse and secure are our imports? Importance of EU single market. Potential of UK agriculture to maximise production of calories in extreme circumstances.	Concentration / diversity of supply.	Share of UK imports from EU. EU-wide productive capacity. UK productive potential in extremis.
3. Food chain resilience	Food supply depends upon a sophisticated and complex chain and infrastructure.	Energy intensive food chain. Does just-in-time operation reduce resilience? Diversity of domestic supply chains. Is there sufficient continuity planning? Port and transport infrastructure.	Energy dependency of the food chain.	Energy reliability. Diversity of oil and gas imports. IGD retailer stock levels. Cereal stock ratios. Retailer concentration ratios. Business continuity planning. Port capacity.
4. Affordability	Household food security. Everyone should be able to afford a healthy diet.	Can low income households afford nutritious food?	Share of spending on food by low income households.	Food inflation for low income groups. Fruit & veg purchases by low income households. Fruit & veg inflation.
5. Safety and confidence	Public confidence in UK food system rests primarily on food safety. Food safety stressed in Strategy Unit Food Matters report.	Do consumers have confidence in the food industry and authorities? Is food safety improving? Growing role for assurance and traceability.	Public confidence in food safety measures.	Trends in cases of pathogens. Food covered by assurance schemes. Consumer confidence in food availability.

We invite your views on:

- 1. Whether we have correctly identified the challenges facing global and UK food security.**
- 2. The action the UK Government is taking globally and domestically to address these challenges and ensure food security.**
- 3. What further role the agricultural or retail and food service sectors can play in ensuring UK food security.**
- 4. Whether the food security indicators cover the right areas and measure the right things.**
- 5. What steps we should take together if the indicators suggest there is a problem.**

5.10. To take part in the debate, e-mail foodmatters.security@defra.gsi.gov.uk. The views we receive on this discussion document and from a series of expert workshops and stakeholder events that we plan to hold will inform **a more detailed statement of our food security policy, that we intend to publish later in the year.**