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UK Food Security Assessment: Our approach

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Executive Summary

This paper describes the Government's activities to ensure the UK remains food secure. We are publishing it to coincide with the one-year anniversary of the Strategy Unit's report, *Food Matters*,¹ and of Defra's discussion paper, *Ensuring the UK's Food Security in a Changing World*.² The paper draws on the detailed *UK Food Security Assessment* (published alongside this paper), and sets out the challenges and risks facing UK food security, our current assessment of the state of our food supplies, and how we plan to continue to deliver sufficient, safe and nutritious food for all our citizens.

In global terms, we are relatively fortunate. By any objective measure, we enjoy a high degree of food security in the UK today. We have high standards of food quality and safety and, although we are keen to understand the effects of recent price rises on the poorest, most of us have access to affordable and nutritious food. In particular:

- Evaluation of the current evidence suggests that the headline trend in the global availability of food per person is favourable, and has actually improved since the mid-1990s. The availability of food per person has increased in recent decades and shows no sign of falling.
- Our openness to trade makes the UK very resilient in terms of disruptions from one or a few sources of supply. In particular, food retailers are able to switch sources of supply rapidly in case of disruption, as has been seen during animal disease episodes. The current picture presented by the Assessment for UK availability and access is favourable, and we project that it will remain so over the next five to ten years.

However, we cannot be complacent. At home, we are working to better understand the effects on access to a nutritious diet of the food price increases of the last 18 months. Globally, the availability of food has moved in a favourable direction, but there are very significant distributional problems, so that many households around the world are food insecure; 1 billion people remain poorly nourished yet 1.6 billion are overweight and the number is rising fast³. And, given the potential impacts of climate change, and the challenges facing developing countries in continuing to increase production, our assessment of the

¹ http://www.cabinetoffice.gov.uk/strategy/work_areas/food_policy.aspx

² <http://www.defra.gov.uk/foodrin/pdf/Ensuring-UK-Food-Security-in-a-changing-world-170708.pdf>

³ The World Health Organisation projects that by 2015, approximately 2.3 billion adults will be overweight, and more than 700 million will be obese. See <http://www.who.int/mediacentre/factsheets/fs311/en/index.html>

global availability of food per person suggests a more cautious view over the next five to ten years.

Chapter One sets out the global economic, climatic, and social events accompanying the rise of food in the political consciousness over the past two years. It was against this background that Defra published its discussion paper, and individuals and organisations were invited to comment on the assumptions made, and actions undertaken, by the Government. The paper also invited comment on draft themes and supporting headline indicators for UK food security. We set out what we have done since publishing the discussion paper, including stakeholder consultation. We also set what we are doing on food security in the broader context of Defra's overall work to define a vision for a sustainable and secure food system, on which we will be publishing the results of our work later this year.

In Chapter Two we examine the Government's definition of UK food security in relation to the six themes in the UK Food Security Assessment, and provide an introduction to the analysis that the Assessment provides in each area.

The main challenges and risks to our food security and how we manage them are the subject of Chapter Three. We illustrate the wide range of risks to our food supply and show how the Assessment covers the important issues raised by them. We explain how the Assessment takes a 'balanced scorecard' approach to the cross-cutting issues affecting UK food security, and we set the work we are doing in the context of other types of analysis being conducted by the Government's Foresight programme and others.

In Chapter Four, we examine how food secure we are currently against the Assessment's six themes, while Chapters Five and Six outline the Government's policies to ensure the ongoing resilience of our food supplies, and our plans to assess and monitor the risks moving forward, respectively.

We conclude the paper with a summary of the activities outlined, and provide some emerging thinking on issues to be addressed in the cross-Government strategy for Sustainable and Secure Food being developed later this year.

1. Introduction

Our relationship to food helps to define us. It is our essential fuel, and it brings people together. In many parts of the world people have either too little or too much food and, where it is in abundance, it is often of the wrong composition for healthy, active lives. Ensuring access to food for life is one of the defining roles of governments.

For all that food means to individuals, communities, and nations, the global events of the past two years have led to a heightened awareness of the centrality of food to modern life. Drought, riots over access to food, commodity price spikes, food export bans, and supermarket food price inflation have made headlines here and abroad. Thankfully, the worst seems to be over for now, with commodity prices well below their early 2008 peaks, UK food price inflation falling back from its peak last summer, and the UK food supply sector, from farm gate to checkout, showing its resilience and ability to respond to new pressures. Nevertheless, challenges remain. With the global population estimated to increase from 6bn to 9bn by 2050, the Food and Agriculture Organization (FAO) estimates that global food production will have to increase by 70% compared to 2005-7 levels.⁴

Against the backdrop of these events, the Government has tested its assumptions and activities for ensuring we remain food secure in the UK. In July 2008 Defra published a discussion paper, *Ensuring UK Food Security in a Changing World*⁵, which set out the Government's thinking, and invited comments on whether we had got it right, and, if not, what more we and others should be doing. The paper built on previous analysis carried out by Defra and published in December 2006 as *Food Security and the UK: An Evidence and Analysis Paper*⁶. Finally, it proposed a set of indicators (now developed into the UK Food Security Assessment) to provide evidence in a structured way about our food security now and in the medium term.

So what have we done?

⁴ The estimated increase of 70% is quoted by OECD-FAO in their *Agricultural Outlook 2009-2018* (published on 17th June 2009) http://www.agri-outlook.org/pages/0,2987,en_36774715_36775671_1_1_1_1_1,00.html See p. 11, fifth bullet point. We are aware that other headline projections have been attributed to FAO and cited in international fora, and we are further investigating this, together with DfID.

⁵ <http://www.defra.gov.uk/foodrin/pdf/Ensuring-UK-Food-Security-in-a-changing-world-170708.pdf>

⁶ <https://statistics.defra.gov.uk/esg/reports/foodsecurity/default.asp>

- We have brought our work on the sustainability and security of food more closely together, in collaboration with the Department of Health and the Food Standards Agency, and individuals and organisations interested in food policy. We have launched an online discussion on what a sustainable food system should look like in 2030, to seek views from a wide range of stakeholders. We have also been developing a framework of indicators to assess progress in moving towards such a food system. These draft indicators for sustainable food are also being published today and will sit alongside the UK Food Security Assessment to provide a way of assessing the sustainability and security of our food, and where there might be synergies or trade-offs. The need to look at sustainability and security together is also reflected in our definition of UK food security as *ensuring the availability of, and access to, affordable, safe and nutritious food sufficient for an active lifestyle, for all, at all times*. To enable this, our food must be reliable and resilient to shocks and crises and be produced and brought to market as sustainably as possible, and ensuring food security must sit alongside other priorities such as tackling climate change and securing a healthy natural environment.
- We have held three workshops in Reading and Manchester. As well as learning from these events, we received over 100 written responses to the discussion paper, and received valuable input from meetings with stakeholder groups.
- We have refined our approach, by, for example, adding a sixth thematic area (Global Resource Sustainability) to our UK food security indicators in the UK Food Security Assessment, to capture concerns that we need to pay sufficient attention to longer term environmental challenges that could impact food production.
- Building upon the indicators, we have looked in greater detail at particular aspects of UK food security, at household level, and globally. We are, for example, examining what impact recent food price rises have had on the ability of low-income and vulnerable UK households to eat well.
- We have commissioned research to examine how we can meet anticipated 2030 global food needs in the most environmentally sustainable way. This will help to inform the Government Chief Scientific Adviser's Foresight Food and Farming Futures project which Defra is co-sponsoring with the Department for International Development (DFID), and which is looking at how to feed nine billion healthily and sustainably by 2050. And we are continuing to work with DFID, building on the new International Development White Paper, to contribute to efforts to tackle hunger and food insecurity in a sustainable way, including through the

Global Partnership for Agriculture and Food Security (GPAFS), and engagement with Food and Agriculture Organization (FAO).

- Finally, we have been examining the relationships between UK food security and other key Government policy areas to ensure we understand where tensions between objectives arise, and are in a position to understand any trade-offs between conflicting goals.

Our work with others to test arrangements for ensuring our food supply chains remain resilient also continues, most recently in the context of contingency planning for the H1N1 flu virus.

Finally, the Government's Council of Food Policy Advisers is following our work on UK food security, and has already provided valuable advice on the coverage and interpretation of the indicators in the assessment.

2. What is Food Security?

First and foremost, for most people, food security means their ability to feed themselves and their families with nutritious and affordable food. But food security has many dimensions. The heavy energy use of the food industry is a concern. Common to the many ways of defining food security are, however, some recurring themes: availability, access, affordability, nutrition, quality, safety, and resilience.

We set out the Government's definition of UK food security in Chapter One above and, in global terms, we are relatively fortunate. By any objective measure, we enjoy a high degree of food security in the UK today. As a modern trading economy, the UK enjoys a rich diversity of nutritious food from home and abroad, so we have a vested interest in the sustainability of our food wherever it comes from. We have high standards of food quality and safety and, although we are keen to understand the effects of recent price rises on the poorest, most of us have access to affordable and nutritious food.

This has not always been the case in the UK and Europe. In many of our parents' and grandparents' lives, food imports were severely disrupted during World War II. Maintaining food supply then involved securing the flow of imports, as well as boosting home production and other food chain interventions. Post-war efforts for greater self-sufficiency in food across Europe were a response to wartime and post-war shortages. Current levels of UK self-sufficiency in food are pretty normal by historic standards and relatively high compared to the first half of

the twentieth century, and we are now more self-sufficient than we were in the 1930s or 1950s.⁷

But self sufficiency is not the same as food security. Many of those responding to our discussion paper have agreed that we should not base our food security policy on the pursuit of self-sufficiency⁸, and the debate has shifted to a broader discussion of the complex factors that affect food security. In order to provide a sophisticated assessment of our food security, the Government believes we need to improve our understanding of the following areas:

- (i) Global availability <http://www.defra.gov.uk/foodrin/pdf/food-assess-analysis-0908.pdf#page=12>

Global supply ultimately underpins the availability and affordability of the diverse range of food we enjoy. Increased production and productivity will be required to meet the needs of a growing global population, supported by a well-functioning international trading system which spreads the risks of supply shortages in individual countries, incentivises production where comparative advantage exists, allows supply to respond to movements in international prices, facilitates the spread of new technologies, and brings development benefits through agricultural and rural growth to the developing world. The combination of poverty and weak domestic production and distribution, often undermined by distorted international agricultural markets, means that much of the developing world suffers from chronic food shortages. This chronic condition is often exacerbated by a combination of conflict and other socio-economic and political factors.

The UK Food Security Assessment provides timely evidence on the factors affecting the global availability of food. Indicators under this theme cover trends in overall global availability per capita, the growth in yield in developed and developing countries, real commodity price trends, stock-to-consumption ratios, levels of international agricultural trade, concentration in world markets, and spending on research and development.

- (ii) Global resource sustainability <http://www.defra.gov.uk/foodrin/pdf/food-assess-analysis-0908.pdf#page=33>

Defra's July 2008 discussion paper on food security states that *food must be produced in a way that is environmentally sustainable or we will set up problems for the longer term. We need to feed a growing world population in a way that*

⁷ *Food Security and the UK: An Evidence and Analysis Paper*, Food Chain Analysis Group, Defra, 2006, pp. 33-50.

⁸ The self-sufficiency ratio measures the value of home food production (including exports) as a share of total domestic food production.

does not degrade the natural resources on which farming and food production ultimately depend. If global production expands at the clear expense of the natural environment, this would not be considered sustainable. The International Assessment of Agricultural Science and Technology for Development (IAASTD)⁹ responds to the realisation that despite significant scientific and technological enhancements to our ability to increase agricultural productivity, we have been less attentive to some of the unintended social and environmental consequences of those achievements. Such degradation in developing countries, combined with governance failures, exacerbate poverty and insecurity, and undermine productivity.

The impacts of climate change on our food system require us to plan and collect data needed to prepare for change. The Government is monitoring closely the climate risks to harvests and the potential for more volatility in supplies and prices. We will also examine any implications for animal disease and food safety. Other areas of climate change impacts on our food will include further pressure on fish products from increasing ocean acidification; supply strains on water-reliant crops such as fruit from the Mediterranean; and, the impacts of increasing episodes of coastal flooding and erosion. The use of energy intensive fertilisers and methane emissions at home and abroad exacerbates greenhouse gas emissions, as does displacement of forest area by agricultural expansion. Mitigating the effects of climate change requires us to ensure our production, distribution, storage, and retail activity in food supply chains all rely less on fossil fuels; and the Government will continue to work with UK businesses to ensure that both supply change continuity planning and infrastructure resilience take full account of patterns of extreme weather events.

Climate change effects will be monitored under most, if not all, of the Assessment's six theme areas. <http://www.defra.gov.uk/foodrin/pdf/food-assess-analysis-0908.pdf#page=37> Specific indicators in this theme include changes in global land use, the fertiliser intensity of global food production, water productivity of crops, total water withdrawn for agriculture, and global fish stocks. These indicators provide a snapshot of changing land use patterns with any associated indications of strain on ecologically important areas, the extent to which the decoupling of fertiliser and stored water use from agricultural production is occurring, and how sustainably global fisheries are meeting growing demands for fish protein. We are also exploring other possible indicators appropriate for this theme.

- (iii) UK availability and access <http://www.defra.gov.uk/foodrin/pdf/food-assess-analysis-0908.pdf#page=48>

⁹ IAASTD, <http://www.agassessment.org/>

As Defra's papers of 2006 and 2008 argue, trade spreads risks, encourages productivity growth and other economies, keeps prices competitive and increases diversity of supply. As climate change makes agricultural output in any region more volatile and affects it in different and unpredictable ways, the ability to switch sources of supply quickly is critical. However, whilst trade enhances food security, it is not without risks, such as disruptions to ports and shipping.

It is impossible to foresee all future developments in agricultural markets around the world, and their impact on agricultural prices in the UK. Against this backdrop, it makes sense for us to ensure that our agricultural sector (domestically, and across the EU more broadly) is flexible and efficient, and has the capacity to adapt to changing circumstances, and in particular to respond to changing international prices. Therefore, we have indicators for UK productive potential and for EU-wide production capability. We are also interested in trends in UK agricultural land and yields over time, and the maintenance of the skills necessary for sustainable and competitive UK agriculture in future. While the availability of land is clearly important to the UK's productive potential, it is interesting to note that, while total UK agricultural land has fallen by around 2% over the past 20 years, cereal yields have risen by about 15% over the same period. Questions of competing priorities for finite land resources in the UK are being examined by the Government's Foresight Land Use Futures Project, and we will factor its outcomes into our thinking.

- (iv) UK food chain resilience <http://www.defra.gov.uk/foodrin/pdf/food-assess-analysis-0908.pdf#page=70>

UK food supply depends upon a sophisticated and complex chain and infrastructure, and is particularly dependent upon energy in its various forms. This complex chain has many strengths. Defra's July 2008 paper notes that the resilience of the overall food supply chain is underpinned by *the number of different supply chains and manufacturing and retail businesses*. It states that food resilience is about *ensuring that critical elements of our food supply chain work. This includes maintaining communication, transport and energy networks*.

However, it also warns that the 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*. Recent years have seen a wide range of potential threats and disruptions to the food chain, and whilst in general the food chain has proved remarkably robust, business continuity planning is becoming more important.

This theme will therefore provide information on energy reliability, the diversity of our oil and gas imports, retailer and cereal stock levels, the diversity of our food industry, business continuity planning, the viability of large manufacturers, and the capacity of our strategic road network. The distinctions between energy

security and food security are explored in Box 5 of the assessment <http://www.defra.gov.uk/foodrin/pdf/food-assess-analysis-0908.pdf#page=81>

- (v) Food security at household level
<http://www.defra.gov.uk/foodrin/pdf/food-assess-analysis-0908.pdf#page=97>

Every Briton should have access to an affordable, healthy diet; achieving this is at the core of Government policy. For the Government, this also means ensuring food is available in any civil emergency.

Defra already keeps a close watch on movements in real food prices and food's share of spending in low income households, but the UK Food Security Assessment brings this data together with other evidence on the affordability of fruit and vegetables, and household access to food stores.

- (vi) Safety of, and confidence in, our food security
<http://www.defra.gov.uk/foodrin/pdf/food-assess-analysis-0908.pdf#page=109>

Food safety, and consumer confidence in the safety of our food, are also indispensable pre-conditions for ensuring UK food security. The Strategy Unit's (SU) report, *Food Matters*, set the challenge of continuous improvement in the safety of food as one of its four main goals which the Government accepted. As such it is an important part of the framework of what Defra is doing on food policy broadly, and the Secretary of State is working closely with Cabinet colleagues to progress this and the other goals from the Strategy Unit report across Government.

As such, working closely with the Food Standards Agency, the data brought together for this theme in the UK Food Security Assessment includes trends in cases of pathogens, food covered by assurance schemes, reported food safety incidents, and consumer confidence in food availability as measured by the Food Standards Agency's *Consumer Attitudes Survey*.

3. What are the main challenges and risks to our food security and how can we manage them?

We do not live in a risk-free world. Risk and uncertainty surrounds us. The same goes for our food system. Because our food system is complex, it is possible to conceive of an array of better or lesser known environmental, technical, political and economic risks, threats and challenges to our domestic and global food system. We discussed these with participants at our Autumn workshops, and the matrix below was adapted from Defra's 2006 publication, *Food Security and the UK: An Evidence and Analysis Paper*, and work by the OECD. Some of the elements in the table below have materialised in recent years, others are likely to threaten in the future, and they are set out as they relate to various aspects of the food system as classified by the Assessment's six themes.

	Types of threats and challenges (illustrative)			
Scorecard themes	Political	Technical	Demographic & economic	Environmental
Global availability	Wars Export restrictions Bilateral land deals Bio-fuel policies	Yield growth Investment and skills	World population growth Incomes growth	Floods, droughts Plants / animal disease Changing climate
Global resource sustainability	Wars; Institutional and policy failures	Farming practices	World population growth; Farming intensification	Water scarcities Desertification, Soil erosion Climate change; Ecosystems breakdown
UK availability and access	Trade embargoes, Breakdown in international trade; Breakdown in EU trade; EU Regulations	Decline in non-renewable energy; Port closures	Importance of fruit and veg consumption and imports; Sharp decline in UK competitiveness	Animal disease Coastal flooding of ports; Water scarcities; Bio-diversity risks
UK food chain resilience	Strikes / protests Regulation	Radioactive fallouts; IT corruption Contingency planning; Just-in-time	Oil shocks; Absenteeism due to pandemic flu; Food chain concentration; Financial crises	Extreme weather events
Household affordability and access	Planning restrictions	Lack of transport	Poverty; Food inflation; Currency devaluations; Unemployment	Extreme weather events
Safety and confidence	Malicious activity regulatory failures	Contamination;	Increasing demand for complex processed products; Longer supply chains	Pests and diseases

By mapping these illustrative threats and challenges across the six themes, we can ensure our indicators are addressing a wide range of potential risks and issues. A quick scan of the summary of the UK Food Security Assessment reflects the global inter-dependencies of our food supply chains. Two of the six themes cover global issues of availability and resource sustainability, while a third, UK availability and access, reflects in large measure our role as a trading nation and the need to ensure diversity of supply and the resilience of our ports. There are also linkages between indicators: for instance, an international oil shock will affect energy prices, and, depending upon energy intensity in the food sector (Theme 3), could affect the real price, and affordability of food (Theme 5). The UK food chain resilience theme shows the importance of effective business continuity planning and the role of stocks, and how sometimes logistical efficiency might actually weaken resilience to unexpected events. The sixth theme reminds us that, whilst food safety and consumer confidence have improved, we cannot take them for granted.

Of course, simply producing more food without heeding the environmental impacts and legacy of that production is a recipe for passing on problems to future generations. We already see the effects of previous unsustainable agricultural practice in the globe's polluted water courses, drained aquifers, loss of wildlife, and spoiled landscapes. We see it too in the seas around us denuded of fish. The need for agriculture and food supply chains to play their role in mitigating, and adapting to, climate change is also clear, particularly given the food chain's contribution to greenhouse gas emissions. The *Stern Review on the Economics of Climate Change* projected that average global temperatures could rise by 2-3 degrees C. within the next fifty years¹⁰, posing an obvious challenge to maintain agricultural yields, particularly in Africa.

Our approach to managing these risks

The Government has chosen to take a 'balanced scorecard' approach to the risks and challenges to our food security seen in the Assessment. This reflects the complex and cross-cutting nature of our food supply. It means the indicators in the Assessment provide insights into the range of issues underlying our food security and how they fit together, and an evidence-based framework for assessing the impact of different threats or "what if?" scenarios. They can be considered collectively in order to assess any material changes to our overall food security, as well as to highlight any potential trade-offs. Where we see indicators move in strange or unfavourable ways, we can produce the further in-depth risk analysis appropriate to the situation.

¹⁰ http://www.hm-treasury.gov.uk/stern_review_report.htm , p.vi.

Importantly, while there are a range of potential challenges to our food security, these vary in likelihood or are inherently uncertain. The elements in the Assessment can be integrated within a broader risk management framework to assess the probability of emerging threats. The combination of the risk and the likelihood of it occurring can then produce a map of the significance of individual indicators within the Assessment. This information can help us to identify which indicators to focus our attention on at any given moment.

Other types of analysis occurring across Government will help us understand the short, medium and long term risks and challenges affecting our food security. The Assessment will sit alongside the indicators for a sustainable food system <http://www.defra.gov.uk/foodrin/security/indicators.htm> , to present a picture of how well all of us are achieving our goal of a secure and sustainable food system. Additionally, the Foresight Project on Global Food and Farming Futures, is taking a longer term perspective. It aims to produce practical recommendations about how to feed nine billion people healthily and sustainably by 2050, and will report next year. Other work has also used different approaches, for example, the Strategy Unit (SU) has looked ahead into the future and identified a wide range of strategic challenges¹¹. We can use such studies to inform the ongoing development of the UK Food Security Assessment, and particularly our view of whether it explores resilience to the correct range of risks.

Defra is also working to analyse the policy relationships between UK food security and other key policy objectives of the Government. We need a more sophisticated understanding of the connections between UK food security and other policy areas such as biodiversity, water availability, and climate change. Some initial thoughts on these connections are given in Chapter Seven below.

The Assessment will be informed in future by outcomes from these other approaches to analysing the risks and challenges affecting our food security. It will be an evidence-based way of:

- communicating a better understanding of the elements compromising UK food security, and promoting informed discussion on a wide-basis of appropriate priorities and policies;
- assessing any material improvement or deterioration in the different dimensions of our food security; and
- signposting areas for more in-depth investigation or research.

¹¹ *Realising Britain's Potential: Future Strategic Challenges for Britain*, Cabinet Office (2008); http://www.cabinetoffice.gov.uk/media/cabinetoffice/strategy/assets/strategic_challenges.pdf

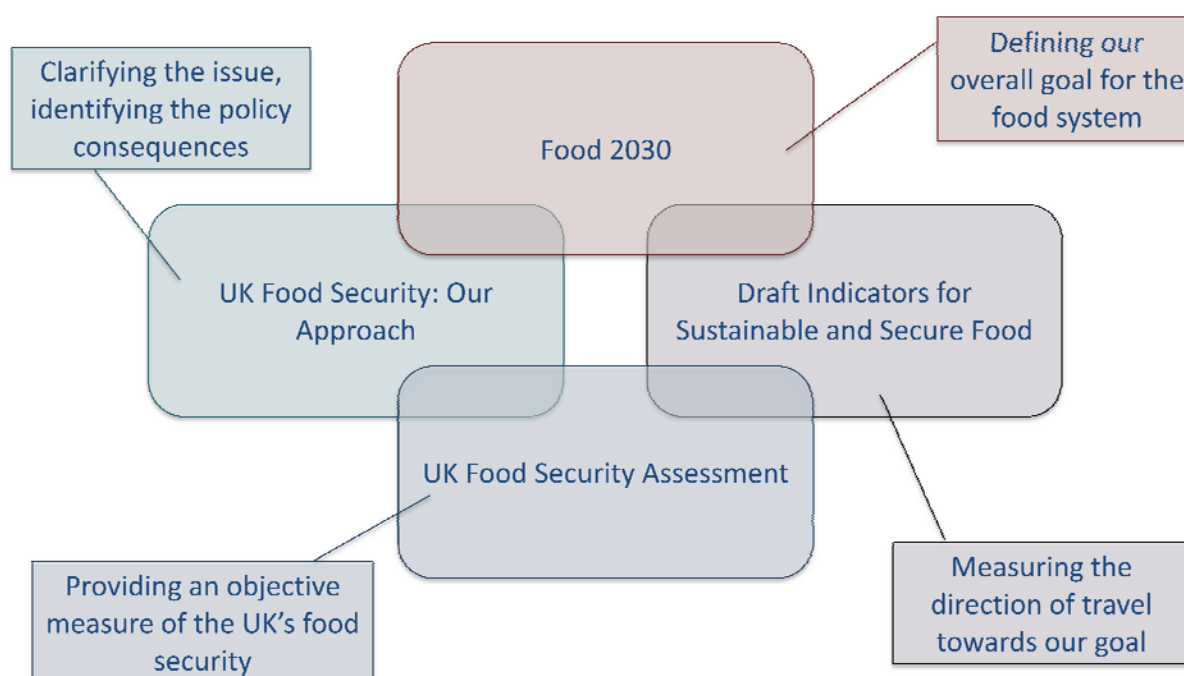
4. How food secure are we?

A table summarising the six theme areas in the UK Food Security Assessment, their rationale, and supporting indicators, is available at:

<http://www.defra.gov.uk/foodrin/security/assessment.htm>

For the full picture of food policy issues, the UK Food Security Assessment should be seen alongside Defra's indicators for a sustainable food system which are also being developed as part of a shared vision for a secure and sustainable food system. There is also the wider set of UK Sustainable Development indicators¹² which monitor progress across the economy and society more widely. The diagram below shows how the different facets of our work on sustainable and secure food fit together:

How it all fits together...



While the Assessment is specifically focussed on UK food security, it also supplements other national indicator sets of relevance. These include the indicators produced for the Sustainable Farming and Food Strategy¹³, and the Agricultural Change and Environment Observatory programme indicators¹⁴ which track the environmental impacts of farming in particular.

¹² <http://www.defra.gov.uk/sustainable/government/progress/>

¹³ <https://statistics.defra.gov.uk/esg/indicators/default.htm>

¹⁴ <https://statistics.defra.gov.uk/esg/ace/default.htm>

The importance of the global availability of food to UK food security cannot be over-stated. As Defra set out in its July 2008 discussion paper: ‘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.’ The indicators for this theme in the UK Food Security Assessment reflect the potential end-to-end challenges and risks to the relative abundance we enjoy. Evaluation of the current evidence suggests that the headline trend in the global availability of food per person is favourable, and has actually improved since the mid-1990s. The availability of food per person has increased in recent decades and shows no sign of falling. For a variety of complex reasons, 1 billion people remain poorly nourished even though 1.6 billion of us are overweight, including 400 million who are obese. The potential impacts of climate change, and the challenges facing developing countries in continuing to increase production suggest a more cautious view over the next five to ten years.

Food must be produced in a way that is environmentally sustainable or we store up problems for future generations. It is, however, difficult to capture all of the complex issues related to global resource sustainability in a relatively narrow indicator set. Hence the UK Food Security Assessment focuses on data for fertiliser and water use (along with global fish stocks) which, if found to move unfavourably, will provide indications of significant deteriorations in the world’s ability to produce food in the short and medium terms. One of the difficulties in this area is that while trends in water, fertiliser, and fish are unfavourable, the solutions are complex, and often regional, rather than globally-based.

We fully recognise that many longer term environmental and ecosystem issues cannot be fully captured within this type of indicator framework, and that the further we look ahead, the more difficult it is to make concrete judgements. These sorts of longer term challenges issues are being examined as part of the Foresight study on Global Food and Farming Futures (to 2050) being led by Professor John Beddington, the Government’s Chief Scientific Adviser. In due course it may be possible to capture some of that project’s conclusions in the form of suitable indicators.

The headline indicator for this Assessment theme is global land-use change to reflect the fact that the availability of land and the way in which it is used are key reflections of natural resource sustainability. The goal is, of course, increased production without significant and sustained damage to ecologically valuable land. On a global scale, reports such as the Millennium Ecosystem Assessment and The Economics of Ecosystems and Biodiversity have highlighted the role of land conversion and agricultural intensification as one of the drivers of ecosystem loss and natural environment degradation. Improving the availability of data on this, and properly valuing the services offered by our natural

environment – of which food production is one – will be key to addressing this challenge in the longer term. Given that the available data shows that the relatively small increase in global agricultural land area in recent decades has apparently been at the expense of forest cover, at least some of which will have been ecologically valuable, the UK Food Security Assessment for this theme area suggests a somewhat unfavourable or mixed picture. The five to ten year prognosis for global resource sustainability is for this to deteriorate further.

The diversity of our food supplies is fundamental to UK availability and access. Defra's papers on UK food security of 2006 and 2008 set out how trade spreads risks to disruption, encourages productivity growth, keeps prices competitive, and increases our supply options for abundant and nutritious food. Challenges and risks to this access include breakdowns in domestic or international sources of supply, and the capacity of our ports to continue to efficiently deal with flows of imports. The increased volatility brought about by climate change will make agricultural output in any one region more prone to disruption, and also needs to inform our approach to risk management. It is also another argument in favour of the Government's view that diversity of trade in addition to domestic sources of supply is crucial to our future food security.

Our openness to trade makes the UK very resilient in terms of disruptions from one or a few sources of supply. In particular, food retailers are able to switch sources of supply rapidly in case of disruption, as has been seen during animal disease episodes. The UK Food Security Assessment concludes that the productive potential of both the UK and EU agricultural sectors are in a favourable position to respond to price movements (a view supported by the supply response in the face of high international prices during 2008). Importantly in this context, life cycle analysis has shown that it is typically production method rather than distance to market that has the greater impact on sustainability, so we need not necessarily trade diversity of supply for greater local environmental impact. The current picture presented by the Assessment for UK availability and access is favourable, and we project that it will remain so over the next five to ten years.

Ensuring the UK's Food Security in a Changing World, July 2008's Defra discussion paper noted that UK food chain resilience is underpinned by 'the number of different supply chains and manufacturing and retail businesses.' It went on to say that resilience is about ensuring that critical elements work well. These include communication, transport, and energy networks.

Given the potential disruption that might be caused by interruptions to one or more of these networks, business continuity planning is an important risk management tool in ensuring UK food security. Our evidence suggests that a culture of business continuity planning is spreading across industry, particularly

among the larger players, but more needs to be done. The Government is keen to work with food chain businesses to ensure sufficient continuity planning occurs, particularly in light of the risks arising from just-in-time operations across the industry. The energy intensive nature of our food businesses makes this all the more vital as well.

Given this energy intensive profile, we have chosen to make energy dependency the headline indicator for the Assessment's resilience theme. Actual energy shortages might result in food production slow-downs or stoppages, with impacts on the availability and affordability of our food (and clear implications for the next Assessment theme, household food security). Defra believes the 2008 surge in energy prices was the most important driver of retail food inflation last year, reflecting this pervasive use of energy throughout the domestic food chain. Improvements in energy efficiency seen over recent decades mean, however, that the economy, and the food sector, are in better shape to withstand shocks to energy supply than previously. Energy intensity and absolute energy use is declining in UK agriculture and manufacturing, and the more recent surge in energy prices can be expected to increase the incentives to greater efficiency, as will pressures for more sustainable behaviours in food production and distribution.

While risks to our supplies of energy remain real whatever the level of intensity, the Assessment suggests that the trend over the next five to ten years will move from today's somewhat unfavourable position on energy dependency to a more positive one. This is not to say that we can relax our efforts to meet the low-carbon challenge. The Government will continue to encourage best practice and the use of technologies that can help our food supply chain to become even more energy efficient in future.

The kinds of challenges to household food security in the UK relate to access at all times to available and affordable food. This implies that the effects of rising food prices on affordability, or the impacts of major shocks to food supply chains affecting the production, distribution and/or retailing of food, are the sorts of challenges we face in this area of our food security. Other aspects of what people eat, and the nutritional composition of our food, are dealt with as a key element of the broader assessment of a sustainable food system.

Our chosen headline indicator for this UK Food Security Assessment theme is low income households' share of spending on food. A supporting indicator will give us a picture of trends in the cost of a healthy diet (a further supporting indicator will give us data on household access to food stores).

Compared to much of the rest of the world, UK households spend a relatively small share of their incomes on buying food. In 2005 in the UK this was 10% (in the EU as a whole it was 15%, while differences with the developing world are of

a much greater proportion). The share of spending on food in the UK has declined in recent years, although the effects of the food inflation witnessed in 2007/8 has brought a deterioration in purchasing power to lower income households.

For this reason, the current position of household food security in the UK Food Security Assessment is somewhat unfavourable. We project, however, that a resumption of economic growth, and an easing of food inflation, will result in a more positive picture in five to ten years time.

One caveat to this outlook concerns the medium-term trend in retail food prices. Between 1987 and 2006 food prices fell gradually in real terms (ie when compared with general inflation) by over 20 per cent. This trend reflected rising productivity and competition, trade expansion, and low energy and commodity prices. But, since 2007, sharp rises in energy prices, commodity prices and a decline in sterling, have fuelled food inflation and pushed real food prices up: by June 2009 they were back at 1997 levels. Food inflation is now easing, but whilst medium-term trends in energy and commodity prices remain uncertain, and general inflation stays very low, we cannot assume that food prices in real terms will quickly return to their 2007 levels.

Without consumer confidence, our food system would stop functioning normally, hence the importance of safety and confidence to UK food security. Indeed, for consumers, food safety seems to be synonymous with food security. *Food Matters* noted that public confidence in our food system rests primarily on food safety.

With that in mind, the UK Food Security Assessment measures public confidence in food safety measures by looking at trends in cases of food-borne pathogens. While there have been reductions in recent years in cases of campylobacter, salmonella, and Escherichia Coli (E Coli), estimated cases of listeria have more than doubled since 2000.

The drop in campylobacter cases, the dominant form of food poisoning, is encouraging, and it is hoped that with improved safety measures cases of food-borne listeria – a deadlier but less common form - will drop, but the evidence for this is uncertain at the moment.

5. What are we doing to increase our resilience? What policies are we pursuing?

Food Matters, published last July, called on the Government to set out a more coherent and joined-up idea of what it wanted to achieve on food policy, and how it would do so. It suggested the following goals, which we have endorsed:-

- a. fair prices, choice, access to food, and food security through open and competitive markets;
- b. continuous improvement in the safety of food;
- c. the changes needed to deliver a further transition to healthier diets; and
- d. more environmentally sustainable food chain.

These goals comprise our framework for food policy, and we are publishing a one-year update on what we have achieved. Defra's over-arching objective throughout this past year has been to work with individuals and organisations, other Government departments and agencies, and the Council of Food Policy Advisers, to define our vision for a sustainable and secure food system in the UK, as called for in *Food Matters*.

The Government's approach to UK food security fits within this framework of activity. We have identified the main risks and challenges to food security in section three, and described the thematic indicators in the UK Food Security Assessment and how these will provide us with a picture of the key components that affect our food security. So, what do we need to be doing now to meet the challenges and risks to our resilience that we have identified? The following section explains that our approach entails:

- Meeting increased global demand sustainably, in part by increasing global production;
- Improving trading and market conditions;
- Managing crises effectively; and, in all this,
- Working together.

(i) Meeting increased global demand sustainably, in part by increasing global production

Global

Meeting global demands for food is partly about increasing production sustainably. However, in addition, the international community also needs to make more efficient use of what is already produced by taking practical steps to reduce post-harvest losses, and by the more effective and sustainable use of

inputs like seeds, fertiliser, and water, to name a few. The UK is taking a leading role in addressing these needs through bilateral and multilateral engagement with governments and international bodies, through the approach we take to our development assistance, and by improving the evidence base for more sustainable and productive agriculture through research funding.

The Government is leading efforts with international partners to tackle global hunger sustainably through the Global Partnership for Agriculture and Food Security (GPAFS). GPAFS aims to deliver an ambitious, sustainable increase in collective efforts to tackle world hunger, building on the work of the UN/World Bank Comprehensive Framework for Action which addresses both short term and longer term resilience and sustainability. It will have a crucial role in promoting better co-ordination of funding at country level, and as a forum for identifying and addressing emerging international issues which are not appropriate for other international fora.

The Government has Sustainable Development Dialogues (SDDs) with a number of other key governments in different parts of the world which address sustainable agriculture. In China we have a joint work programme on Sustainable Agriculture & Fisheries, and we have established a Sustainable Agriculture Innovation Network (SAIN).

UK-China Sustainable Agriculture Innovation Network (SAIN)

SAIN is a new platform for UK-China collaboration on sustainable agriculture and the environment. It brings together researchers, policy experts, farmers and other stakeholders to undertake joint research and stimulate innovative thinking to ensure that policy and science is translated into practice on the ground. Launched in November 2008 by Defra Secretary of State Hilary Benn and Chinese Agriculture Minister Sun Zhengcai, it has already attracted the involvement of over 25 leading agricultural institutes in the UK and China. The first approved research projects are addressing issues around climate change mitigation and adaptation, nutrient management, bio-energy and resource efficient agriculture, with the overall aim of contributing to a resource efficient, low carbon economy and an environmentally friendly society.

www.sainonline.org/English.html

The Government is supporting the global initiative through the G8 +5 group¹⁵ to better understand the state and value of our global ecosystems. The Economics

¹⁵ Italy, Brazil, Canada, the People's Republic of China, France, Germany, India, Japan, Mexico, Russia, South Africa, the United Kingdom, and the United States of America.

of Ecosystems and Biodiversity, the TEEB initiative, published its interim report in 2008, and a further report is expected in 2010. This assessment will result in a significant step forward in our understanding of the state and value of our global ecosystems, and our impacts on these.

The research and evidence needs required for more efficient and sustainable agriculture are being met in a number of ways. Defra has commissioned research to look at what needs to happen to sustainably meet global food needs by 2030. This research will provide a medium-term analysis to accompany the findings of the world-class scientists and global decision makers who the Government's Chief Scientific Adviser has assembled for his Foresight project examining how to healthily and sustainably feed the nine billion expected by 2050. This activity is in addition to the £400m DFID has committed to support the Consultative Group for International Agricultural Research (CGIAR) over the next five years.

UK <http://www.defra.gov.uk/foodrin/pdf/food-assess-analysis-0908.pdf#page=11>

Domestically, we want a thriving, competitive UK food sector to continue to play its part in keeping us food secure. It should produce as much food as possible, as long as that is driven by demand for our food, and that increases in production are achieved as sustainably as possible. Our ability to take advantage of growth in demand will depend primarily on the competitiveness of UK agricultural production, as well as the nature of the demand. So we need to create the conditions for competitive, sustainable, domestic production to thrive, including strong sector skills, fair supply chain relationships, access to raw materials and well-informed consumers.

Primary responsibility for action to improve competitiveness rests – as in other sectors of the economy – with the sector itself. Government's principal role in this area is encouraging and enabling. In doing so we may be able to help tackle issues such as: information failures around innovation and technological practices; problems associated with investing in human capital, like skills; and issues related to enterprise, with new businesses replacing old only slowly. At the same time, we need to ensure that - as on a global scale - domestic production is sustainable, and that the ecosystem is able to produce in the future. Here Government is able to use a range of levers including regulatory and fiscal measures, the encouragement of voluntary approaches, the provision of robust product or business information, and/or grant funding for particular projects.

The Government's UK Low Carbon Transition Plan published in July 2009 set out how we will meet the emissions targets in the budget while maximising economic opportunities and job creation. As part of this, it announced:

- For the first time ever, an ambition for agriculture to cut emissions. Changes to farming practices can save farmers money and contribute 6% cuts from current projections by 2020.
- Support for anaerobic digestion, a technology that turns waste and manure into renewable energy.
- Support for energy efficient and low carbon farming. Within the limits imposed by the current EU rules on state aid, the Government and the Carbon Trust will work to make farming businesses eligible for its interest-free loans for low-carbon activity.
- Agreeing an action plan with the agriculture sector to reduce emissions and developing an advisory service to help farmers.

Examples of other actions the Government is currently taking to ensure a thriving and sustainable agri-food sector are set out in Box 1.

Box 1: Examples of action to ensure a thriving and sustainable agri-food sector

Helping industry improve skills: the £3.9bn Rural Development Plan for England (RDPE) is investing £70m in skills and training in areas like adding value to food production, business management and marketing, supply chain efficiency, climate change adaptation and mitigation, and resource use (including waste reduction and management, water use, energy efficiency, and bioenergy), and environmental land management.

Encouraging a more resource efficient and environmentally sustainable agri-food sector agriculture by: providing guidance on nutrient management (Code of Good Agricultural Practice issued January 2009); reducing water pollution (Catchment Sensitive Farming Programme and Nitrate Vulnerable Zones); Environmental Stewardship schemes; encouraging anaerobic digestion; helping develop product road maps on milk and red meat; raising awareness and influencing behaviour (Rural Climate Change Forum, Farming Futures); and undertaking the analysis to enable us to better understand the food chain's contribution to Carbon Budgets.

Defra is **supporting the first ever assessment of the state and value of the UK's ecosystems, under the National Ecosystem Assessment**. This two year project will provide important information about the current and possible future impacts on our UK ecosystems arising from a range of pressures including land-use change. It will assess the value of the services provided by these ecosystems and the possible changes in these values. It will also provide a range of options for society about how we manage and enhance our natural environment.

Addressing adaptation to the impacts of climate change. Helping to raise awareness of the issue, and identifying what needs to be done to make agricultural systems both more resilient to and more able to accommodate change. Providing more detailed projections and information through UKCIP 2009, enabling the agri-food sector to prepare.

Helping rural businesses through the economic downturn by raising funding limit on grants to 100% for projects under the RDPE.

Encouraging co-operation in production and marketing: for example, the pig meat supply chain taskforce.

Taking regulatory burdens seriously, and arguing strongly within the EU against those we see as unnecessary or inappropriate. (For example, legislation on the electronic identification of sheep, and pesticides).

Raising the public's personal connection with food (e.g. through part-funding Reynolds-Cheshire work on growing your own); labelling; and Government procurement.

Helping build a picture of competing pressures on land through the Foresight Land Use project, which will also develop practical ideas, for example, ensuring, where appropriate, land is put to multiple uses.

Getting the right R&D in place:

The Government's Chief Scientific Adviser is working with the private sector, civil society, and key public funders to develop a cross-Government strategy to ensure co-ordination of departmental research and innovation relating to safe, low-impact food, and a healthy diet.

Joint funding with industry - LINK programmes and on-going discussions with the Technology Strategy Board. Taking forward research exploring a wide range of areas, including the environmental impacts of local and seasonal foods; water impacts of our food supply; and, integrating water quality, ecology and production at farm and catchment scale.

(ii) Improving trading and market conditions

Getting trading and market conditions right is another key objective of the Government. We need to ensure the international framework is able to meet the challenges ahead. We have touched on the importance of our development assistance in helping to bring developing country agriculture into mainstream world markets. We also need further radical Common Agricultural Policy (CAP) reform, and a successful conclusion to the Doha Development round to continue towards our goal of a competitive and level playing field in Europe and internationally, and an international trading system that rejects protectionism. Mutual economic interdependence, rather than national economic isolation, is the way to both prosperity and security.

At home, we are improving our evidence base by looking at linkages between social exclusion and food. We want to understand what the barriers are to the most disadvantaged households eating well to inform potential policy options later this year. We are also looking to get better information about how consumers relate to food markets, and what that can tell us about behaviours and attitudes relating to food prices and food security. We are also monitoring the effects of the recession on food supply chain businesses, and working with retailers, manufacturers, and others to find positive outcomes to improve country-of-origin labelling.

(iii) Managing crises effectively

The UK has highly effective food supply chains that provide wide consumer choice. Retailers have robust, resilient business continuity plans to deal with disruption, and we saw this resilience in action during the flooding in Gloucester and the southwest in 2007. Our supermarkets, processors, wholesalers, and food service companies are the best organisations to manage risks associated with their businesses. Defra's role in a crisis situation is to assess the impact of disruption to food supply in England and consider policy measures to support industry's actions to continue to deliver food. The Secretary of State acts to provide strategic leadership over preparations and response, to implement any policy measures needed to support the distribution of food, to represent the food sector at meetings of the Civil Contingencies Committee, and to gain Cabinet agreement for measures to support the distribution of food where these lie outside Defra's powers.

Defra's role in a crisis

In the current outbreak of H1N1 pandemic flu we are providing regular updates on the outbreak each week to a wide range of food chain industry stakeholders so that the sector can assess to what extent the pandemic has spread, the likely impact on them and what business continuity measures they need to introduce to continue working as normal. Many of the concerns raised by the industry relate to how the flu may affect their staff and how they can provide their staff with the necessary advice and support.

We have shared with industry the Government's planning assumptions so that it knows what to expect from us on issues such as our approach to the use of anti-virals, or the closure of schools. We are also working closely with the industry to identify all the interdependencies in the supply chain to see what action needs to be taken and by whom to ensure that the food supply chain continues to work effectively.

(iv) Working together

One thing is clear from this description of how we are meeting the challenges and risks to our food security: all of the actions we are taking depend on the co-operation of others to enable them to succeed. Mobilising resources for agriculture in the short and medium terms through GPAFS requires a breadth of membership and engagement by governments, the private sector, and civil society. Taking forward the Strategy Unit (SU) recommendation to develop ideas about what a secure and sustainable food system looks like requires the active engagement of individuals and organisations interested in our future food policy. Managing risks to our food security from climate change and environmental degradation requires farmers everywhere to adapt to new ways of thinking and working; managing risks from unforeseen catastrophic failures or natural events requires food chain businesses to develop and maintain contingency plans with others; and, resisting moves to protectionism requires the Government to work diplomatically with its European and international partners.

The Government can play a unique role in communicating to people how all of this activity fits together and why the challenge is so vital.

Looking ahead, some of the big and difficult questions we will have to address in our world of scarce resources are:

How, on a global scale, can the Government, industry, civil society, and consumers fully assess the value of all the services provided by our natural environment, including food, and make informed choices between them ?

How do we address water availability alongside carbon?

How do we reconcile differing demands on land use?

How can we promote behaviour change? What do we want consumers to do?

Clearly, we will need to think through and take action on these and other issues together. Further ideas for meeting our food security goals will form part of our strategy for developing a sustainable and secure food system later this year.

6. How will we ensure ongoing delivery?

We assessed the current state of the UK's food security in Chapter Four. This set out our detailed assessment of the resilience of the UK food system to risks and challenges and suggested areas where further actions may need to be taken. In Chapter Five we set out our approach and the actions we are already taking to face the challenge of meeting our future food security. However, it is clear that given these future challenges, we will need to continue to assess and manage the risks to food security on an on-going basis.

We will review the most significant risks under each of the six themes on a regular basis, drawing in any new insights from wider horizon-scanning and scenario-based approaches, such as those used in the Foresight study. We will use this information to look at what the risks might be in five and ten years time, and further ahead to 2050.

We will keep the indicators under review and revise them or develop them as necessary, for examples as new evidence becomes available. As part of this work, we will be seeking the further views of the Council of Food Policy Advisers on the Assessment in the Autumn. We will also continue to assess any trade-offs between the different issues underlying the assessment.

It is intended that the UK Food Security Assessment will be a working tool for decision-makers, including Government, business and other individuals and organisations, and we will continue to make updated information available in order to help inform decision-making and prioritise action. In the immediate future, the Assessment will also feed into the cross-Government strategy for food, to be developed in the Autumn. This will set out the further action the Government will take to ensure our continued food security.

Progress in strengthening our food security will be monitored through Defra's own performance management system. We have as a Departmental Strategic Outcome *A sustainable, secure and healthy food system*. Progress in meeting

this, and intermediate outcomes currently being determined, will be assessed using the indicators for a sustainable and secure food system also being published in draft today.

7. Conclusions and Recommendations

In our global and interdependent world, the UK is relatively fortunate. We are food secure, and we have the ability to access a wealth of nutritious food products from abroad, as well as enjoying our own domestically produced food. We have outlined the challenges ahead, and we have detailed an approach to give us the best possible chance of meeting these challenges.

We said at the end of Chapter Five that further ideas for meeting our food security goals would form part of the cross-Government strategy for sustainable and secure food being developed in the Autumn. We also stressed in that Chapter that the only way to meet the challenges facing food security in future was through co-operation between all parts of our food supply chain, individuals and organisations with an interest in our food and how it is produced and brought to market, and the Government. We plan, therefore, to continue to engage with stakeholders to build a consensus on what our strategy should be for developing a sustainable and secure food system.

In the meantime, as well as publishing the Assessment, we are doing the following:-

- The Government remains committed to an ambitious, pro-development outcome to the Doha Round of trade talks. The DDA has the potential to deliver a substantial increase in agricultural market access (through reduced import tariffs), and a reduction in domestic support and subsidies, which distort trade and raise prices.
- Given UK production's contribution to our food security, and the need to meet our European and international obligations, we will continue to take forward a range of activities to advise the agri-food sector and, in particular, SMEs, on what they can do to improve resource efficiency, adapt to climate change, and promote biodiversity.
- We will pay particular attention to the need to fill knowledge gaps through research on the effects of climate change, in particular, the identification of alternative crops, smarter inventories, mitigation methods, and the efficient use of water in the food chain.
- In addition to research we are commissioning on the environmental and social impacts of UK production and consumption of embedded water

in products, we are looking at the need to sponsor further research into water use in the food industry, in particular on improving water tolerance, diffuse pollution, and new technologies.

- We have begun a new dialogue with stakeholders to identify measures by which the UK agricultural sector can sustainably increase its productivity, thereby adding to the contribution it makes to our food security. The appropriate role for Government in supporting this activity is likely to be enabling the industry to improve its performance through better self-assessment of the relative economic performance of individual businesses, more effective take-up of new technology and better management skills.
- Following a review of our initial response to the H1N1 virus, we will work with representatives of the UK food supply chain to adopt lessons learned, and to further improve and encourage cross-sector communication and best practice in business continuity planning.
- Defra is co-operating with the Department for Transport and other Government departments on the production of a comprehensive research and development strategy for the development of more advanced bio-fuels which could potentially improve environmental performance, and reduce competition with food production.
- Defra is continuing to work closely with DfID and international partners, to put the Global Partnership on Agriculture and Food Security (GPAFS) into effect. GPAFS will act as a mechanism for governments and others to deliver an ambitious doubling of efforts to tackle hunger and food insecurity sustainably, for both the short and longer term, and in the context of climate change.
- The Government will work through EU and UN agencies and bilaterally to offer further policy-level assistance to help developing countries make the best choices about their approach to bio-energy and to put in place effective regulatory frameworks.
- The Government will continue to negotiate within the EU for radical reform of the Common Agricultural Policy (CAP) to produce an industry that is genuinely sustainable and internationally competitive, and one that is rewarded by the market for its outputs (safe & good quality food), and by the taxpayer for producing environmental and societal benefits that the market cannot otherwise deliver. We want to phase out the market distortions and subsidies which increase costs to producers and consumers, and which maintain barriers to new entrants and to innovation.