

# Food 2030



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## **Front cover photographs**

Left: Defra Photo Library

Middle: North News and Pictures (students from Linthorpe Primary School, Middlesbrough)

Right: Federation of Bakers

# FOREWORD



Good safe food on our plates is taken for granted by most people – and so it should be. The last few decades have seen a transformation in the choice, quality,

safety and affordability of the food we all eat day in, day out.

But we face big challenges today which mean we need to think differently about food. We can't carry on just as we are. We need to produce more food without damaging the natural resources – air, soil, water and marine resources, biodiversity and climate – that we all depend on. We need to feed more people globally, many of whom want or need to eat a better diet. We need to tackle increasing obesity and encourage healthier diets. And we need to do all these things in light of the increasing challenge of climate change and while delivering continuous improvement in food safety.

I am proud of Britain's food sector, and I believe it has a vital role to play as we build a flourishing low-carbon economy for the future. Food contributes over £80 billion to our economy and is our largest manufacturing sector, with food and farming employing 3.6 million people. Looking forward, we will work to help ensure it can thrive as an innovative, competitive and resilient sector, and a sustainable source of growth and jobs.

Everyone has a role to play. That is why this strategy has been developed with, and will be delivered together with, a wide range of partners:

- Consumers can support healthy and sustainable food, and can try to throw less food away;
- Food producers – farmers and fishermen – can reduce the impact they have on the environment, manage natural resources and biodiversity even better, and adapt to a changing climate;

- Food businesses can strive to be as efficient as possible in the ways they use energy and transport;
- Food manufacturers, retailers and caterers can help consumers to eat a healthy, sustainable diet;
- Government can help to lead the change, bringing people together to act in partnership, through legislation where that is needed, by funding research, and campaigning for change in Europe and internationally.

This strategy sets out the Government's vision for a sustainable and secure food system for 2030, and the steps we will take to get there. Working together, we can make Britain a world leader in food policy and production, and we can help to ensure that everybody has the chance to eat safe, healthy, affordable and sustainable food, now and in the future.

*Gordon Brown*

# INTRODUCTION

This new strategy for food has been drawn up following the publication of the Cabinet Office Strategy Unit's report in July 2008<sup>1</sup>. *Food Matters* called for better integration of food policy across Government and highlighted two challenges: climate change and obesity. 2008 also saw food prices rising sharply for the first time in a generation, provoking riots in some parts of the world. In August 2009 we published our assessment of UK food security and set out what we need to do to maintain it. This document brings all of the challenges together for the first time.

It is now clear that we face a big challenge in feeding the world. With a growing population, climate change and the pressure we are putting on land, we will have to produce more food sustainably. We also need to provide the right information for people to make more informed choices about what they eat. Diet will have a huge impact not only on our health and our economy, but most importantly on sustainability.

This is a challenge for the world that will require action by a lot of people. To help this, the UK Government's Chief Scientific Adviser is leading a Foresight project on Global Food and Farming Futures bringing academics and experts together.

This strategy is a response both to the big food challenges – sustainability, security and health – and to the call for more joined up food policy. It sets out the priorities for the UK Government on food.

Many of the things we need to do to move towards a sustainable, secure and healthy food system are already in place, for example the Change4Life campaign, the UK Low Carbon Transition Plan, and our approach to ensuring the UK's continued food security. But there are other things we need to do. We hope that farmers, fishermen, food businesses, local and regional government, voluntary organisations and others will use this as a basis for deciding what they will do. This is a matter for all of us; it is time to get on with it.



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<sup>1</sup>: Cabinet Office (2008) *Food Matters* - Towards a Strategy for the 21st Century



# OUR APPROACH

## Coordinating food policy across Government

Defra coordinates all UK Government policies on food. The Secretary of State for Environment Food and Rural Affairs chairs a dedicated Cabinet sub-committee on food, formed in October 2008. And to make sure that Government gets the best advice on food policy, a Council of Food Policy Advisers was established at the same time, for a duration of two years.

## Working in partnership with the food and farming industries, consumers, the third sector and international organisations

Achieving a sustainable and secure food system for 2030 depends on everyone in the food system working together.

The final section of this document describes how all parts of the food system can help us achieve our goal, and sets indicators for measuring our progress.

This includes sharing knowledge and good practice with others in Europe and internationally, in support of our EU and international objectives, particularly given much of what Government and industry is doing in the UK is seen as new and innovative. Likewise we will continue to look for opportunities to learn from others.

## Basing our work on sound science

High quality research and evidence will be really important in guiding what we do and in making things fit together. Alongside *Food 2030*, a cross-Government Strategy for Food Research and Innovation has been launched to provide a framework to coordinate food research and innovation.

## Building on existing work

There is a lot of good work going on across the food supply chain. Reviewing and evaluating the success of this work will inform what further action will need to be taken to achieve our vision.

We will look to learn from previous experiences and build on successful examples of delivering sustainability in the food system, for example the Milk Roadmap<sup>1</sup>, and the Love Food Hate Waste campaign<sup>2</sup>.

## Using the most appropriate ways of achieving what we want

We will try and find the best way of doing things and will only regulate where we need to.



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1: Dairy Supply Chain Forum (2008) Milk Roadmap; 2: [www.lovefoodhatewaste.com](http://www.lovefoodhatewaste.com)

## Working across the UK, EU and internationally

This is a UK Government strategy. Many aspects of food policy are devolved. There are separate food policy arrangements in Scotland<sup>1</sup>, Wales<sup>2</sup> and Northern Ireland<sup>3</sup> and we can learn from each other. We are working with the Devolved Administrations to ensure that as the UK, we share a common understanding of the future of food policy and can collaborate whenever it makes sense to do so.

As members of the European Union, the UK food sector benefits from being part of the single market. It also means much of our food policy is influenced by EU legislation. And as the biggest trading block in the world, the EU is a powerful figure on the international stage. EU engagement will therefore continue to be a priority, particularly in emphasising the importance of integrated food policy that meets the needs of Europe's citizens, and enables a competitive and sustainable food system that supports global food security.

Beyond Europe we will continue to ensure that food security, including the food security of developing countries is given the highest international attention.



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**1:** Scottish Government (2009) Recipe for Success - Scotland's National Food and Drink Policy; **2:** The Welsh Assembly Government is developing the 'Wales Food Strategy' and expect to publish in 2010. See [www.wales.gov.uk/food](http://www.wales.gov.uk/food) for details of current food-related policies; **3:** Food Strategy Group (2004) Fit For Market (*currently under review*)

# OUR VISION FOR A SUSTAINABLE AND SECURE FOOD SYSTEM FOR 2030

## What we want by 2030...

- Consumers are informed, can choose and afford healthy, sustainable food. This demand is met by profitable, competitive, highly skilled and resilient farming, fishing and food businesses, supported by first class research and development.
- Food is produced, processed, and distributed, to feed a growing global population in ways which:
  - use global natural resources sustainably,
  - enable the continuing provision of the benefits and services a healthy natural environment provides,
  - promote high standards of animal health and welfare,
  - protect food safety,
  - make a significant contribution to rural communities, and
  - allow us to show global leadership on food sustainability.
- Our food security is ensured through strong UK agriculture and food sectors and international trade links with EU and global partners, which support developing economies.
- The UK has a low carbon food system which is efficient with resources – any waste is reused, recycled or used for energy generation.

# GOVERNMENT'S ROLE IN CREATING A SUSTAINABLE AND SECURE FOOD SYSTEM

Government's core role in the UK food system is to correct market failures where they arise (for example distortions to the food economy caused by poor information, imperfect competition, the failure to price externalities and the under-provision of public goods), and to ensure that social equity is safeguarded. Generally, this will be achieved through the tax and benefit system, but special measures may be needed in some cases to ensure that the more vulnerable in society have adequate access to nutritious food, for example through the Healthy Start<sup>1</sup> scheme.

Government also has a role in setting the tone and direction of public debate about food, and a role in fostering cultural and behavioural change. This leadership and agenda-setting role can be a powerful complement to direct interventions, but needs to be based on an understanding of its place and influence – national government is only one part of a big, diverse and influential sector<sup>2</sup>.

## **To play our part in delivering *Food 2030* we will:**

### **Encourage change through voluntary, regulatory, or economic approaches.**

Government will favour voluntary industry-led and owned measures wherever possible, but we recognise that regulation may be required in some instances. Where we do need regulation, we will make sure that it is proportionate, accountable, consistent, transparent and targeted, helping to ensure benefits are delivered, costs kept as low as possible, and that perceptions are positive<sup>3</sup>. We will continue to work with the supply chain and European institutions, to reduce unnecessary burdens on industry.

**Lead by example** by making the changes that we are aiming for across the whole of the food chain in what we do, for example food procured in the public sector. We will also promote the importance of integrated food policy in Europe and beyond, that emphasises

the needs of the consumer and a competitive and sustainable food system that supports global food security.

**Enable change** by providing tools, evidence, and advice to businesses, and information to consumers, as we have already done through PAS 2050 for measuring the embodied greenhouse gas emissions in goods and services<sup>4</sup>, and will do through integrating nutrition and sustainability information and advice to consumers on the *eatwell* website<sup>5</sup>.

**Build evidence** on sustainability in the food system, make research publicly available, and help to translate research into practice.

**Provide policy leadership** by finding ways to reconcile the big choices and tensions between achieving our vision for food and other major challenges.

<sup>1</sup>: [www.healthystart.nhs.uk](http://www.healthystart.nhs.uk); <sup>2</sup>: Cabinet Office (2008) Food Matters; <sup>3</sup>: BIS (2009) Better Regulation, Better Benefits: Getting the balance right; <sup>4</sup>: BSI (2008) PAS2050 - Specification for the assessment of the lifecycle greenhouse gas emission of goods and services; <sup>5</sup>: [www.eatwell.gov.uk](http://www.eatwell.gov.uk)

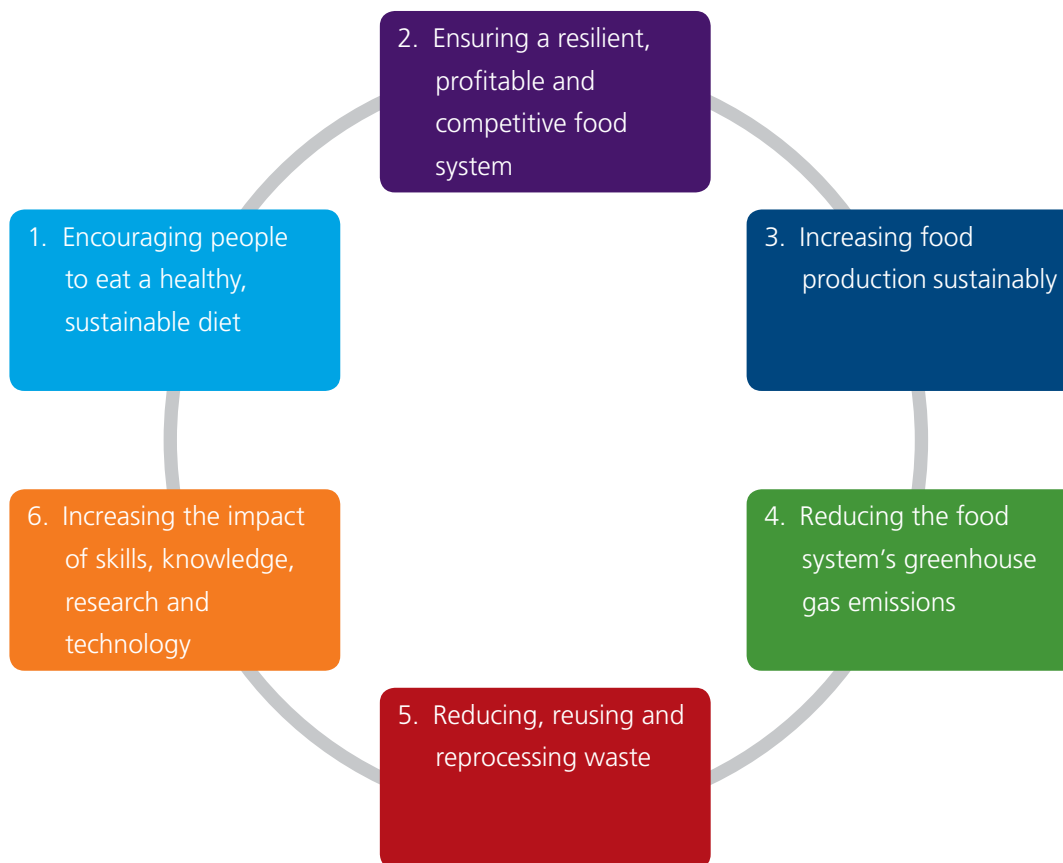


# PRIORITIES FOR *FOOD 2030*

This Strategy considers the food system at national, EU and global levels. A secure and sustainable food system will need us – government, farmers, fishermen, business and other stakeholders – to focus on a number of important issues. The Strategy is structured around these issues – what the challenges are, our goal for 2030, and the steps we will need to take to achieve this.

Particular focus is given to the global dimensions of food policy in sections 2 and 3 – on having a resilient, profitable and competitive food system, and on increasing food production sustainably.

**The Strategy is structured around six core issues for the food system:**



# 1. ENABLING AND ENCOURAGING PEOPLE TO EAT A HEALTHY, SUSTAINABLE DIET



FACE – Farming and Countryside Education [www.face-online.org.uk](http://www.face-online.org.uk)



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## Diet-related disease and rising levels of obesity are a significant public health concern in the UK. Many people want to eat healthily, but often do not follow nutritional advice.

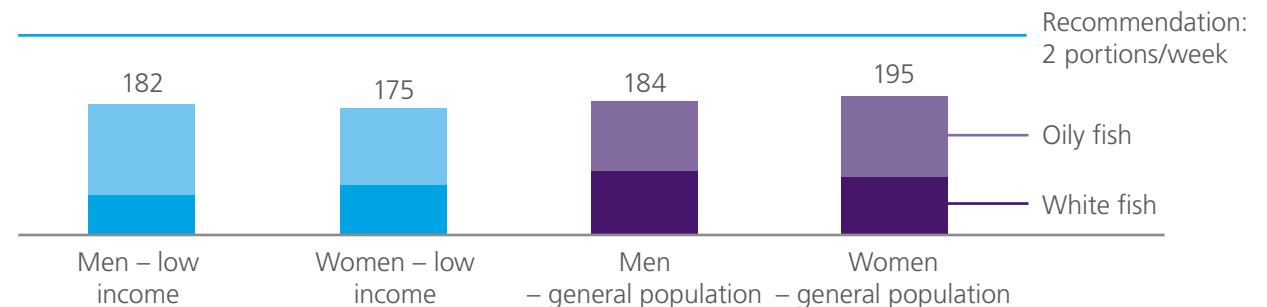
- 90% of people claim that healthy eating is important to them<sup>1</sup> and public awareness of the health implications of diet is fairly high. This has been achieved over a number of years, through campaigns by Government (for example 5-A-DAY, Change4Life, the Food Standards Agency's (FSA) salt and saturated fat campaigns), NGOs and the media, with support from the food industry.
- National nutrition surveys indicate some positive changes in the diet of adults in the UK over the past 15 years, but we are still eating too much salt, saturated fat, and sugar, and not enough fruit and vegetables.
- Poor diet is estimated to account for a third of all cases of cancer, and a further third of cases of cardiovascular disease. Obesity, which has more than doubled in the last 25 years, increases the risk of developing Type II Diabetes, cardiovascular disease and some types of cancer. Left unchecked, projections show radical increases in the years ahead with 40% of the population being obese by 2025 and 60% by 2050<sup>2</sup>.

- Diet-related chronic disease is estimated to cost the NHS £7 billion a year, including direct treatment costs, state benefits and loss of earnings. The health benefits of meeting nutritional guidelines are estimated to reach almost £20 billion a year, and are estimated to prevent 70,000 premature deaths a year<sup>3</sup>.
- Fish contains a range of nutrients and is a good source of fatty acids. The FSA recommends that we eat at least two portions of fish a week, one of which should be oily, but this cannot be managed unless we have globally sustainable fish and aquaculture industries. Our current

consumption of fish falls significantly short of the guideline – the challenge is to make up this shortfall from sustainable fish stocks by actively managing our seas to conserve fish stocks and by raising awareness and consumption of alternative species of fish.

- The food industry has already made progress in helping consumers eat a healthy, balanced diet. For example through reformulating food products so that they contain less salt, fat and sugar, and by giving clear information about the nutritional content of food, both on packaging and on menus in cafés and restaurants.

**Fish consumption, g per week, UK<sup>4,5</sup>**



<sup>1</sup>: FSA (2008) Consumer Attitudes Survey; <sup>2</sup>: Foresight (2007) Tackling Obesity: Future Choices; <sup>3</sup>: Cabinet Office (2008) Food Matters; <sup>4</sup>: FSA Henderson et al (2002); National Diet and Nutrition Survey; vols 1-5; <sup>5</sup>: FSA Nelson et al (2007); Low Income Diet and Nutrition Survey (Consumption figures for LIDNS are oily fish and dishes and for NDNS include canned tuna)

Although cases of foodborne illness have reduced in recent years, there were an estimated 926,000 cases in England and Wales in 2007, costing the economy £1.5 billion.

- The food we eat in the UK is the safest it has ever been. Illness and deaths from eating contaminated food have fallen dramatically and we have a robust system to get safe food to the consumer.
- The public need to feel confident that the food they eat is safe. Any decline in confidence can have negative knock-on economic effects on the rest of the food system. Vigilance is essential for imported

and domestically-produced food, to ensure the safety of our food system.

- Since the animal disease outbreaks of the early 1990s, the food and farming industries have worked hard to increase public assurance, mainly through certification and traceability schemes. 56% of us have confidence in the current food safety measures taken by everyone in the food system<sup>1</sup>.

- In 2007 18,900 people required hospital treatment for food-borne illness, and 440 died. The majority of these cases and their associated costs could have been easily avoided by anyone preparing food adhering to some basic food hygiene and safety precautions such as the '4Cs' promoted by the FSA – cleaning, cooking, chilling and avoiding cross-contamination.

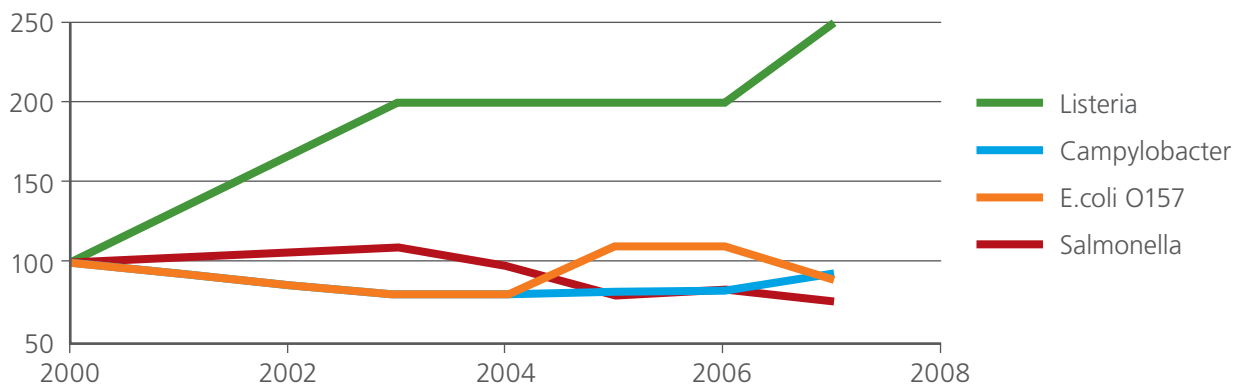
- Although the number of reported food contamination incidents increased from 421 in 2000 to 1,312 in 2007<sup>2</sup>, this could be because of better reporting and a wider definition of 'incidents' introduced during that time, and improved engagement between Government, local authorities and the industry.

- Awareness and understanding of foodborne illness has improved in recent years<sup>4</sup>. However, to achieve more it is crucial to understand the reasons why people and organisations fail to follow the simple, yet essential, principles of good food hygiene.

- Vigilance in the home and the food industry remains central to combating foodborne illness.

**Though reported cases of foodborne illness have reduced since 2000, cases of listeria have more than doubled. Chilled ready-to-eat foods, that are not cooked or reheated before eating, are considered to be the main source of listeria infections. Listeria causes more deaths than salmonella and E.coli combined<sup>3</sup>.**

**Trends in the number of cases of food-borne illness in England and Wales, 2000 - 2007**



1: Defra (2009) Food Statistics Pocketbook; 2: Figures include both food and environmental contamination. FSA (2009) Annual Report of Incidents ; 3: Defra (2009) Food Statistics Pocketbook; 4: FSA (2007) Consumer Attitudes Survey

# Affordable, nutritious food is vital for everyone.

## In the UK...

- Rising food prices over the last two years have exerted great pressure on budgets in low income households. UK households spend an average of £36.32 per person per week on food and non-alcoholic drinks<sup>1</sup>. This accounts for 11% of all expenditure for an average household, but nearly 17% for a low-income household, up from 15% in 2005<sup>2</sup>. In the EU, the Common Agricultural Policy (CAP) keeps food prices higher than they should be, as the CAP results in higher prices for farmers. In the UK, this meant that consumers paid an extra £3.2 billion, or £52 each for food in 2007. The associated market price support and high import tariffs impact on poorer households disproportionately.
- Low income families have poorer health than the general population. The reasons for this are complex, but diet plays a role.
- Households need access to affordable, nutritious food to give them food security. The Government's *UK Food Security Assessment* shows that physical access to food is not itself a significant problem, nor

a significant negative factor in diets<sup>3</sup>. There are however a number of other barriers to accessing healthy food including lack of income, education and skills, which affect low income and other vulnerable groups more acutely.

- A lot of work is already underway to address these barriers, such as increasing access to fruit and vegetables through the Healthy Start<sup>4</sup> initiative, and small-scale local initiatives, including food distribution charities and community food growing initiatives.

## In global terms...

- High food prices have a greater impact in developing countries. Households in developing countries spend over 60% of their budget on food.
- Maternal and child under-nutrition in developing countries remains a concern. There are significant new global threats to good nutrition including the volatility of food prices, climate change and its impact on livelihoods, household food security, conflict and governance.

**The Convenience Store Project** – in partnership with the Association of Convenience Stores – promotes greater consumption of fruit and vegetables in deprived areas, encourages people to make healthier food choices and achieve their 5-A-DAY.

**Healthy Start** supports low income families to eat nutritious foods and lead healthier lifestyles. 450,000 families are sent vouchers for fresh fruit, vegetables, milk and infant formula.

£30m has been invested in the **Healthy Towns Initiative**, which encourages local areas to change their communities' built environment to support people to become more active and promote healthy eating. Two 'Healthy Towns' – Middlesbrough and Halifax – have incorporated food growing as part of plans to make their towns healthier.

The **Change4Life** campaign promotes healthy eating and demonstrates how a partnership between Government, the food industry and the third sector is removing barriers to accessible, affordable food.

<sup>1</sup>: Defra (2009) Food Statistics Pocketbook; <sup>2</sup>: Defra (2010) UK Food Security Assessment; <sup>3</sup>: Ibid Based on 2007 figures - % of households within 15 minutes of a supermarket or food shop by car, public transport, walking or cycling was 97.8%, and 99.8% within 30 minutes; <sup>4</sup>: [www.healthystart.nhs.uk](http://www.healthystart.nhs.uk)



# Defining a healthy, sustainable diet will help give consumers clear and consistent information on the impact of what we choose to eat.

- Defining a sustainable diet would make it easier for people to make informed choices about food, but it is not easy to do. A sustainable diet has many attributes – health, nutrition, access, affordability, carbon footprint, and things like production methods, sustainability of supplies (for example fish, palm oil), transport, water use, animal welfare and support for food growers in developing countries (for example Fairtrade or Rainforest Alliance).
- Ways of measuring the footprint of food products tend to focus on single issues, such as carbon or water. Presenting the full picture is a much greater challenge, but would help consumers cut through confusing and often conflicting information on diets, and would help the food supply chain to develop sustainable choices for consumers.
- People value different aspects of food, but not all consumers are able to purchase foods according to their values. The Government's role is to ensure robust evidence to support people's choices, and to give advice, for example through the *eatwell* website<sup>1</sup>. Retailers and food manufacturers can support consumers by offering products that fit with their values.
- Evidence of what constitutes a sustainable diet is still developing, but there are things people can do now in order to reduce the impact of their diet. If we all did the one thing that is most important to us, the impact of our collective action could make a big difference.
  - Wasting less food – food wasted by households in the UK makes up 3% of total UK greenhouse gas emissions per year, and costs households an average of £480 a year. Wasting less food would mean that greenhouse gas emissions associated with food production would be reduced. Halving household food waste would be equivalent to taking 1 in 8 cars off the road<sup>2</sup>.
  - Eating food that is in season – food that relies on natural sunlight and temperatures to grow (and tends therefore to be grown in its natural season) tends to cost less as production and distribution costs are lower. Seasonality also relates to produce grown overseas and imported to the UK, complementing the UK growing season – for example importing Seville oranges in January.
- Buying food which has been shown to be produced sustainably, indicated by an industry label like the MSC<sup>3</sup> certification or equivalent for fish, produced to higher animal welfare standards, or which supports food growers in developing countries.
- Government can also lead by example by developing sustainability criteria for food provided in the public sector. The Healthier Food Mark<sup>4</sup> will be awarded to public sector organisations in England meeting a range of criteria for healthier, and more sustainable food. Government is also integrating its online advice to consumers on food nutrition, sustainability and safety based on the evidence currently available. Advice will be given through the *eatwell* website.

<sup>1</sup>: [www.eatwell.gov.uk](http://www.eatwell.gov.uk); <sup>2</sup>: WRAP (2009) Household Food and Drink Waste in the UK; <sup>3</sup>: Marine Stewardship Council [www.msc.org](http://www.msc.org); <sup>4</sup>: [www.dh.gov.uk/healthierfoodmark](http://www.dh.gov.uk/healthierfoodmark)

## Education plays an important role in reconnecting us with how and where our food is produced, and in knowing how to cook and prepare healthy, nutritious food.

- Having an interest in and knowing about food – where it is from, how it is produced, what effect it has on our health, and how to prepare and store it – are all likely to lead to us eating a better diet, better for our health and better for the environment.
- Though still a niche interest, public debate on sustainable diets has become more sophisticated with the various complexities, trade-offs and knock-on effects of food choices coming into play, such as different production methods with different environmental, social and economic impacts.
- Information alone is only part of the solution to help us shift to a healthier, more sustainable diet. Growing, cooking, and enjoying food can help this. A number of community food groups and cooperatives have been established teaching food growing and cooking skills. Although these are usually small-scale, the projects are often innovative and can have real impact in their local communities.
- Government's reintroduction of cooking to the school curriculum and the uptake of cookery clubs, such as *Let's Get Cooking*<sup>1</sup> led by the School Food Trust and partners, are steps in the right direction in reintroducing lost food preparation and cooking skills. However, this should be strengthened to include education about the whole food chain, from production through to disposal.
- The popularity of 'grow-your-own' has risen significantly over recent years. An estimated 33% of people already grow or intend to grow their own vegetables<sup>2</sup>. Growing food – at home, in a community garden or allotment – can produce a number of other benefits including better mental and physical health, bringing people together and improved skills.

**The Hornbeam centre** in north east London is home to a local food hub running a number of local food initiatives, including a market stall selling local sustainably-grown food, a vegetarian café, a vegetable box scheme, fruit picking projects and regular workshops and events. The centre is managed by volunteers and run by the people who use it. It brings the community together over food and has economic benefits to the local area<sup>3</sup>.



Sophie Tomlinson

1: [www.letsgetcooking.org.uk](http://www.letsgetcooking.org.uk); 2: TNS (2009). Public attitudes and behaviours towards the environment - tracker survey: A report to Defra; 3: [www.hornbeam.org](http://www.hornbeam.org)

## Our goal for 2030 – enabling and encouraging people to eat a healthy and sustainable diet.

### Access and affordability

- People from all parts of society should be able to choose and eat a sustainable diet with reliable access to affordable, healthy and safe food.

### Education, information and personal responsibility

- People feel connected to their food and treat it as a source of wellbeing and enjoyment, for example through leisure activities such as growing and cooking food.
- People take responsibility for their health through the food they choose to eat, understand the impacts their diets can have on their health and the environment, buy what they need and do not waste food.
- People are aware of the origins of their food, and understand the environmental and social impacts of their choices. They know that buying some food from developing countries can reduce poverty for some of the world's poorest communities.

### Tackling under-nutrition in developing countries

- The neglected crisis of under-nutrition has been effectively tackled, particularly in the poorest countries and for the poorest families. By 2015, the first millennium development goal on poverty and hunger is achieved and the proportion of underweight children in the world is halved (compared to 1990 figures).

## Small beginnings, big potential – case studies.

### Fish & Kids: Serving sustainable fish at school

- The Marine Stewardship Council's (MSC) *Fish & Kids* project encourages schools and restaurants in England to serve sustainable, MSC-labelled seafood. Through *Fish & Kids*, children, teachers, parents and caterers can find out why choosing sustainable seafood is vital for the future of fish, fishing communities and the environment.
- Three years from launch, 18 Local Education Authorities across the country are now certified, with over 2,400 primary schools in England (around 14%) engaged in the project and offering MSC-labelled seafood school meal choices to over 800,000 pupils.
- The project was set up with support from Defra's Environmental Action Fund. The MSC has now been given support through Defra's new Greener Living Fund to build on the experience gained with the *Fish & Kids* model to further develop demand for sustainable seafood on a national scale by providing learning opportunities for the food service sector and, more importantly, improved buying behaviour amongst their customers.



Defra Photo Library

### Cook4Life

- The *Cook4Life Cooking with Families* initiative will be piloted in early 2010. It is part of Government's Change4Life campaign to tackle obesity.
- The pilot will develop an effective model for helping 'at risk' families to cook healthy and nutritious food.
- It aims to build confidence and skills in food preparation and cooking among parents and carers and to provide guidance and recipes on weaning, first family foods and beyond.
- The pilot will start in the North West and South West regions and will aim to train staff from 60 Sure Start Children's Centres so that they can deliver cookery programmes.



FACE – Farming and Countryside Education [www.face-online.org.uk](http://www.face-online.org.uk)

## Action: to enable and encourage people to eat a healthy, sustainable diet

Who	What	How	Result
<b>Government</b>	Improving access to healthy and sustainable food for socially excluded groups.	Help individuals to identify where they can get access to existing support, for example giving Healthy Start beneficiaries advice and information about breastfeeding and a healthy diet, broader nutritional and public health issues, and other relevant schemes; review Government's online advice (for example DirectGov) on food and social exclusion.	Those in socially excluded groups are better informed on healthy, sustainable diets and know where to go for further advice and information.
<b>Government, industry, regulators</b>	Reverse the trend in diet-related disease, including obesity.	Take forward the Healthy Food Code of Practice <sup>1</sup> , on: <ul style="list-style-type: none"> <li>• front-of-pack labelling;</li> <li>• smaller portion sizes for energy-dense foods and those high in salt;</li> <li>• promotion of food to children;</li> <li>• reductions in consumption and the levels of saturated fat and sugar, particularly sugary drinks;</li> <li>• increasing consumption of healthier foods;</li> <li>• single set of healthy eating messages;</li> <li>• nutritional information on food eaten out; and</li> <li>• raise awareness to achieve and maintain an appropriate energy balance.</li> </ul>	Everyone is able to achieve and maintain a healthy weight; People can easily find out the nutritional content of their food choices and understand the impacts on their health.
<b>Government, industry, consumers</b>	Public confidence in food safety.	Threats to the food system are managed efficiently and quickly; Continued public awareness campaigns about preparing and cooking food safely.	People have confidence in the food industry's ability to manage food safety risks; People know how to ensure food is safe to eat.
<b>Consumers</b>	Consumers adopt healthy, sustainable diets.	People make use of the opportunities available to learn more about food, creating a greater demand for healthy, sustainable food.	Diet-related ill health is reduced; The food chain responds to demand signals for more healthy, sustainable food.

<sup>1</sup>: HMG (2008) Healthy Weight Healthy Lives: A Cross Government Strategy for England



## Action: to enable and encourage people to eat a healthy, sustainable diet.

Who	What	How	Result
<b>Government</b>	Clear information and advice on healthy and sustainable diets	<p>Identify and fill gaps in the evidence through research to define a healthy, sustainable diet.</p> <p>Deliver clear information and advice on a healthy and sustainable diet through an enhanced <i>eatwell</i> website<sup>1</sup>.</p> <p>Understand better the role of environmental labelling schemes.</p>	People can make informed decisions on a healthy and sustainable diet.
<b>Government, third sector</b>	Making land available for community food growing	<p>Develop a 'meanwhile lease' for land: facilitate local partnerships between land owners and community groups to make land available on a temporary basis for food growing.</p> <p>Support a feasibility study for a community land bank which would act as a broker between land-holders and community groups wanting land on which to grow food.</p>	More people can have the chance to grow their own food.
<b>Government, industry</b>	Learning about how and where our food is produced	<p>Providing additional funding to the <i>Growing Schools Programme</i><sup>2</sup> to enable a further 65,000 pupils, parents and staff to gain hands-on experience of growing food;</p> <p>Food producers and industry to provide more consumer education (particularly for children).</p>	People understand the origins of their food, and how the food chain works. As a result they are more aware of the importance of a healthy, sustainable diet.
<b>Government, third sector, industry</b>	Enhanced food skills	<p>All schools should be providing food that meets the required nutritional standards and should be encouraging all pupils to take up the offer of healthy school lunches. Every pupil should go to a healthy school that promotes healthy eating, an active lifestyle and emotional health and wellbeing. Cooking and food preparation skills are already on the school curriculum. We can build on this by:</p> <ul style="list-style-type: none"> <li>• Encouraging community groups to educate people, including the vulnerable, on cooking healthy and sustainable food and developing food skills, for example the Cook4Life initiative; and</li> <li>• Food manufacturers and retailers producing marketing and educational aids, for example recipe cards, in-store demonstrations.</li> </ul>	People are educated about the health and sustainability impacts of their diets and have the right food skills to choose, prepare and cook healthy, safe and sustainable diets.

1: [www.eatwell.gov.uk](http://www.eatwell.gov.uk); 2: [www.growingschools.org.uk](http://www.growingschools.org.uk)

## 2. ENSURING A RESILIENT, PROFITABLE AND COMPETITIVE FOOD SYSTEM



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## The UK's food sector is big, diverse and innovative.

### The UK food sector in figures<sup>1</sup>...

**£80.5 billion** – the agri-food sector's contribution to the economy in 2007 – 6.8% of the total, and the UK's largest manufacturing sector.

**3.6 million people** – the number employed in food and farming.

**£13.2 billion** – the value of food exports from the UK in 2008. We imported £31.6 billion worth of food.

**196,000** – the number of food chain enterprises ranging from large retailers to small cafés.

### Food is an essential part of our lives and our economy but the food system faces a number of diverse challenges

- Food sustains life. The food system also provides jobs, adds value to the economy, enables us to eat at home or out, and helps manage the character of our landscape and countryside, which in turn attract tourism trade, adding further to the sustainability of rural economies. A rich food culture has developed in the UK reflecting the diversity of our communities.
- Food production depends on an extensive and complex infrastructure including the national road and rail networks, port facilities, power plants and the national grid, water processing and supply, and sewage treatment.
- In order to provide sufficient safe and nutritious food, employment and profitable businesses, the sector needs to make sure that the natural ecosystems which provide many of the inputs it needs are protected and enhanced. Most of these 'services' are currently free – for example pollination, the water cycle, soil production and nutrient cycles.
- Climate change is predicted to have a serious impact on food production – globally and in the UK. In some countries, this will result in some land changing from arable use to pasture, or going out of production altogether. In others, including the UK, there may be opportunities to grow new crops. As well as continuing to reduce its contribution to greenhouse gas emissions, the food system and its supply chains need to be ready for these changes, while meeting increasing demand.

# The realities and opportunities the international trading system presents to the food system.

## The realities

- **We live in an inter-connected world with globalised food systems.** Global trade offers a way to manage volatility by spreading risk, encourages productivity growth, keeps prices competitive and increases diversity of supply – it is critical to global economic prosperity and food security.
- **Expansion of membership of the EU has provided greater market potential** but trade barriers continue to inhibit access to new materials and to greater diversity of supply.
- **The UK gains considerable advantages from trading** with over 100 different countries including European and global markets.

## The opportunities now and in the future

- International trade has been a major driver of global growth and prosperity, especially important for many developing countries. As trade has expanded, global incomes have grown and open economies have been able to harness the power of trade to boost competitiveness and productivity, helping to improve living standards and sustain economic growth. However despite major reductions in trade barriers, protectionism continues to affect economies, most significantly those of developing countries.
- Government, industry and other stakeholders must work together to ensure food is available and accessible, even for the poorest, reducing market volatility, by ensuring national, regional and international trading systems work efficiently, and that the very poorest have access to social protection measures to enable them to buy enough food. The Global Partnership for Agriculture and Food Security offers a way of co-ordinating national and regional strategies for food security.
- Continued reform of the CAP should enable farmers to be fully responsive to the market and consumer demand, and enable profitable farming to thrive in a liberalised global market, without the need for subsidies across the EU.
- While working to tackle sustainability challenges for key agricultural products such as biofuels and palm oil, the UK will continue to press for improved market access through trade liberalisation, for trade distorting domestic support to be significantly reduced globally, and for the elimination of all export subsidies by 2013.
- The aim of the UK's approach to reforming the Common Fisheries Policy (CFP) is to achieve a prosperous and efficient fishing industry that is managed alongside marine conservation, so that fishing can contribute to vibrant local communities while managing fish stocks within safe biological limits, and providing a high quality sustainable food supply.
- Investment in science and innovation can help improve resource efficiency and productivity, underpinning sustainable global agricultural growth, and CAP and CFP reform to increase competitiveness of farmers and fishermen.



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The UK's food system has to cope with a series of risks – managing these is central to ensuring the system's short term operation and long term sustainability.

### Keeping things going

- A resilient food system can withstand, or quickly recover from sudden shocks. These can be financial – such as commodity price spikes; caused by natural disasters – such as a large scale flood; or caused by disruption to fuel supply or the road network. They can occur at any point in the food supply chain, including in retail and distribution. They are usually short term, and do not cause profound changes.
- The challenge to the food sector is to plan and prepare for these events, in the interests of long term sustainability. Government works with the food industry to promote business continuity planning.

### Markets that work

- Policies designed to make agriculture more efficient would make agricultural production more responsive to price signals (both domestically and internationally).
- No one can guarantee that there will not be price spikes in future. But policies to improve the productivity and responsiveness of agriculture should tend to make it less likely that the conditions for a spike might arise; reduce the size and duration of a price spike, and hence reduce its impact, as well as generating broader benefits such as the growth and jobs arising from international trade. These issues are considered in more detail in the analysis of the 2007-08 price spikes, accompanying this Strategy<sup>1</sup>.

### Environmental risks

- Climate change may itself be a source of new and unexpected shocks. Possible threats include increased frequency of extreme weather and new pests and diseases arriving in the UK. A profitable and resilient food system will need to be able to meet a variety of economic and environmental challenges by planning, and adapting to these changes.
- Damaging use of natural resources or damage to the ecosystems that produce renewable resources will make food production more difficult in future. The food sector will need to innovate to reduce inputs or discover alternatives<sup>2</sup>.

### Food safety

- Food safety needs to remain a central priority for the entire food system, protecting the health and safety of consumers from both disease and contamination.

<sup>1</sup>: HMG (2010) The 2007/08 Agricultural Price Spikes; <sup>2</sup>: for more information on business risks from natural resource scarcity, see "The Corporate Ecosystem Services Review - Guidelines for Identifying Business Risks and Opportunities Arising from Ecosystem Change", World Business Council for Sustainable Development.



The food chain is one element of our Critical National Infrastructure – it depends on the smooth running of the national transport and utilities systems.

### Seaports

- Approximately 99% of our food imports arrive by ship or the Channel Tunnel, as well as much of the chemicals, fuel and machinery needed for food production and processing<sup>1</sup>. Ports are also the main gateway for food exports.
- Ports are potentially vulnerable to coastal surges and storm damage, but having a greater number of ports can allow substitution of traffic and help spread the risk.

### Transport system

- Efficient infrastructure is the key to productive supply chains, and is a major difference between developed and developing countries.
- Agricultural inputs, food and waste are all moved around the UK by road and rail.
- Increased demand on the transport system, especially the road network, raises the risk of delays, accidents and congestion which imposes extra costs on businesses, especially those with perishable products.

### Energy, water and sewage utilities

- The food supply chain depends particularly on energy, water and other critical national infrastructure.
- The food sector demonstrated its ability to deal effectively with flooding in Gloucestershire and the South-West in 2007 and more recently in Cumbria in 2009, where supermarkets remained open and were able to provide food and drink to those affected.
- Elements of the national infrastructure will face a number of challenges in future – from increased demand from a growing population, and from declining supply such as increased water stress due to climate change.

<sup>1</sup>: Defra (2007) Food Transport Indicators to 2006 (revised)

## Skills and the right regulatory balance are two factors in the success of the UK food sector.

### The UK agri-food sector supports a workforce of 3.6 million people with a range of skills

- The farming industry faces particular challenges in maintaining and building its skills base, innovating to stay profitable, and attracting new entrants to the sector.
- Similarly, few young people want to join the UK fishing industry. With the right incentives and reforms, fishing can provide sustainable livelihoods for vibrant coastal communities.
- A major problem with training and skills within the food system is a lack of demand rather than a shortage of opportunities. It is important to raise the skills levels of current owners, managers and workers within the food sector. Investing in equipping staff with a range of skills will enable them to be more flexible in responding to future challenges.
- Even at times of rising unemployment in the UK, many British people are unwilling to take critically important jobs in food harvesting or processing.
- Opening up the EU labour market has provided employers with opportunities to bring in skilled workers from other Member States.
- Recent rises in migrant labour from the EU has raised political issues as well as placing a strain on rural services.

Farming and fishing skills are discussed in more depth in Section 3.

### Applying the principles of better regulation helps protect consumers while allowing food businesses to get on with the job

- Given the cumulative impact of regulation on the economy, it is important to keep a focus on efficiency and effectiveness, only regulate where there is a strong case for doing so, and avoid creating unnecessary burdens.
- Policy making and interventions should allow flexibility, so that businesses throughout the food chain can develop the best solutions for themselves, society and the environment as well as responding to consumer demand.
- Better regulation approaches can help identify interventions where benefits justify costs, and get the most out of Government intervention.
- We are committed to regulating smaller businesses in a way that considers simplified or more flexible approaches, to find the most effective way to meet intended outcomes and minimise burdens for them.
- We are exploring with business representatives better ways of joining-up inspections where possible and using risk-based criteria. More efficient enforcement can support compliance across the food sector, delivering targeted, effective interventions, without unreasonable administrative cost to business.
- The Rural Payments Agency has made changes to the way the Single Payment Scheme operates and is working with farmers' organisations to confirm that those changes have reduced the administrative burden. We are seeking to influence the reform of the Common Fisheries Policy so that fishermen have greater control over their livelihoods through regional management and better regulation.
- We will continue working with the farming industry and the European Commission to explore further ways to reduce the burden of regulation.

## The UK can play a leading role in developing a sustainable global food supply.

- International trade and economic globalisation has improved efficiency and brought jobs and investment to developing countries. At the same time, production in some developing countries is held back by, among other things, a lack of markets, poor access to credit, poor storage or transport facilities, and poor information and extension services.
- The UK has a moral responsibility to ensure that what we do does not damage the natural resource base of developing countries, or the other services they derive from a healthy, natural environment.
  - Developing countries produce 55% of world cereal production but use 70% of world fertilisers, and the use is rising. Developed country fertiliser use has been falling over the last 20 years<sup>1</sup>;
  - Some developing countries routinely apply two or three times as much fertiliser to their agricultural land than is necessary. This is both wasteful as yields are barely increased, and is damaging to the environment as too much fertiliser pollutes water courses. Conversely, in much of Africa the high cost and lack of availability of fertiliser mean that too little is applied, leading to depleted soils, and yields barely better than those achieved in the UK 700 years ago. Where fertiliser can be applied, yield can be vastly improved: Malawi has been able to export a substantial maize surplus to neighbouring countries in each of the last three years.
- The UK's food supply chain can have a significant impact on natural resources overseas. Some of these impacts are direct, others are caused by knock-on effects like clearing indigenous habitats for food-related crops. For example the UK imports water-intensive products like palm oil, coffee and cotton and recent studies have shown that 62% of water needed to produce goods consumed in the UK is in the form of water embedded in imported agricultural and industrial goods. It is likely that some of these goods will be grown in water scarce regions, where local water governance may not be suitably robust. Even if sourcing goods from these countries is set against the provision of potential economic benefits to the region, it is sensible to consider the long term impacts and sustainability of food production and encourage sustainable practices.
- Responsibility for ensuring the sustainability of food supply chains is shared:
  - The food industry has a business interest in making sure that its supply chains are resilient – whether resilient to economic impacts of world financial markets, or to the environmental impacts of deforestation or climate change;
  - Civil society plays a role in raising awareness of unsustainable practice and in working with the food industry to improve the sustainability of their supply chains; and
  - Government can support action by providing research and gathering evidence on both the impacts and potential solutions, and by providing development assistance to improve markets in developing countries which could have a large positive effect on global food supplies.

1: Defra (2009) UK Food Security Assessment; 2: WWF, Chapagain and Orr (2008) The UK Water Footprint

## Our goals for 2030: a resilient, profitable and competitive food sector.

### A resilient and competitive food sector

- The whole supply chain is able to support profitable businesses, and provides good value for consumers as well as fair prices for suppliers.
- Intellectual property rights are protected and respected encouraging innovation and investment in research. Provision is also made for transferring ideas and innovations to relevant sectors as well as sharing best practice.
- New enterprises, including social enterprises, enter the market stimulating diversity and competition.
- The food system manages risks responsibly – financial, environmental, and food safety risks. The food system is able to respond rapidly to changes in world markets and changes in prices, through an increased focus on international trade with less distortion, helping to promote sustainable competitive farming and global food security.

### A innovative and skilled sector, providing good jobs

- Training opportunities are available and support is provided for career development.
- The food, farming and seafood industries are seen as attractive sectors for new entrants.

### A constructive relationship between Government and industry

- Food, farming and fishing businesses are provided with clear and consistent guidelines which give them confidence to make investments in improving their long term environmental and economic sustainability.
- Government policy, including regulatory flexibility, allows businesses throughout the food chain to do the right thing for themselves, society and the environment as well as responding to consumer demand.
- There is international cooperation over research, innovation, and knowledge sharing on methods for reducing the food system's contribution to climate change and other environmental impacts of food production.

### Efficient use of resources

- Food businesses use inputs efficiently, in particular reducing their energy and water demand. As a result of this, waste is reduced, and cost savings are made.
- Environmental and social goods are valued, and incentivised.

## The potential – examples of how progress is already being made.

### Working in partnership with the industry

We want to encourage voluntary action where possible, for example with the Campaign for the Farmed Environment. Government and the farming industry agreed on a voluntary approach to achieve environmental benefits rather than legislate. This is an important example of the farming industry, environmental groups and Government showing what they can deliver cooperatively.

### Helping make fishing sustainable in Africa

Fishing has great potential for contributing to Africa's food security and economic growth. But while current values of fish exports from Africa are about \$4.5 billion a year, weak governance and management of fisheries has led to serious levels of illegal, unreported, and unregulated fishing by both African and international fleets. Local fisheries and particularly small-scale vulnerable communities often fall foul of illegal vessels – conflict is rife, and livelihoods and local economies dependant on effective fisheries are threatened.

Defra is funding work in South Africa with the Sustainable Development Dialogue to help build capacity for regulation of the trade in fish products. DFID is also funding the pan-African Partnership for African Fisheries with the African Union and the New Partnership for Africa's Development. This aims to create political momentum for fisheries governance reform in Africa, drawing on international best practice and evidence from successful fisheries. It will also target specific issues of concern to African nations, in particular illegal fishing.

### Investing in sustainability to ensure the longevity of supply chains

Kraft Foods are the largest buyer of coffee from Rainforest Alliance Certified™ farms with approximately 30,000 tonnes purchased in 2008. The Rainforest Alliance is an independent, non profit organisation which promotes standards for sustainability that conserve wildlife and ensure the wellbeing of workers and their communities.

Kraft Foods' relationship with the Rainforest Alliance is estimated to have benefitted more than 306,000 farmers and helped preserve more than 61,261 hectares of forest across Latin America and Asia. Consumers are assured that their coffee comes from farms that meet demanding standards for environmental, economic and social improvements. Following a move to using Rainforest Alliance Certified™ coffee, one of Kraft Foods' UK coffee brands, Kenco delivered exceptional business performance with a 17% increase in sales.

By incorporating sustainability as part of its business strategy – sourcing sustainably farmed agricultural commodities, reducing water, energy and packaging use, transporting goods more efficiently and minimising waste – Kraft Foods aim to ensure the long-term health of their business while minimising their environmental impacts.

### Creating sustainable global supply chains by bringing governments, industry and civil society together

Palm oil is the world's most consumed vegetable oil but, according to UNEP, its production is also the greatest cause of deforestation in South East Asia. The Roundtable on Sustainable Palm Oil (RSPO) brings together all sections of the international supply chain and NGOs. It has already developed criteria for sustainable production and has begun certifying some producers. NGOs have played a key role in this through consistent scrutiny of those criteria and WWF recently published a 'scorecard' of European companies on progress in sourcing sustainable palm oil – a report that has been linked to a recent rise in sales against ordinary products.



## Action: to ensure a resilient and sustainable food sector.

Who	What	How	Result
<b>Food and farming sectors</b>	Improve competitiveness and efficiency	Business shares best practice and skills, makes improved use of IT, technology, and more efficient transport, and invests in long term sustainability.	Efficiency is raised across each sector. Exchange of skills improves UK competitiveness.
<b>World Trade Organisation, Doha Development Agenda (DDA)</b>	Create and protect open and stable world markets	Complete the DDA, secure greater tariff liberalisation for agricultural commodities and the removal of distorting and harmful subsidies.	Free global markets transmit clear price signals allowing for rational management of resources.
<b>Government, industry bodies</b>	Reduce the regulatory burden	Apply better regulation principles, including a preference for alternatives to regulation such as voluntary agreements where appropriate. Work in partnership with industry to simplify or remove unnecessary regulations. Reduce the administrative burden of inspection and enforcement while maintaining or improving regulatory outcomes.	Reduced administrative burden on farmers, fishermen and the food sector. The application of better regulation principles will cut unnecessary costs, increase efficiency and remove obstacles to innovation.
<b>Government, industry</b>	Making sure national infrastructure is well-prepared to withstand shocks	Investments are made in advance to adapt to new pressures and pre-empt threats. Business continuity plans are coordinated.	Barriers to invest in infrastructure are removed and private investment encouraged.
<b>Government, food industry</b>	Identify threats and risks resulting in natural capital degradation and scarcity of resources	Food businesses manage economic and environmental risks to their supply chains. Risks arising from potential changes to the climate are reported to Government <sup>1</sup> . Government monitors and identifies future threats to food security and risks due to climate change and takes steps to mitigate them.	Food businesses plan for climate change and future resource scarcity and can continue to source raw materials and provide food.

<sup>1</sup>: via the 'adaptation reporting power' see [www.defra.gov.uk/environment/climate/legislation/reporting.htm](http://www.defra.gov.uk/environment/climate/legislation/reporting.htm)

## Action: to support markets for a diversity of food businesses.

Who	What	How	Result
<b>Government</b>	Establishing rules for standard product labelling	Clear and unambiguous country of origin labelling; Better environmental and welfare information.	Encourage wider public interest in where food comes from and how it is produced.
<b>Government</b>	Public sector food procurement	Making it easier for small local businesses and social enterprises to access public sector food procurement contracts, for example by splitting contracts into smaller lots.	Competitive markets are developed, improving the quality and value for money of public sector food.
<b>Industry</b>	Assurance schemes	Recognition for farmers and producers who reduce greenhouse gas emissions, protect the environment and produce food to higher animal welfare standards.	The market rewards responsible behaviour.
<b>Government, industry</b>	Fairer supply chain practices	Profit and risk spread more fairly across the supply chain.	Competitive markets, enabling food businesses to compete freely and fairly, giving UK consumers more choice and better value.
<b>Industry, Government</b>	Promoting and marketing traditional and regional speciality foods	Encourage greater uptake of the EU Protected Food Name Scheme and the further development of sustainable farmers' markets and other direct sales outlets.	Provide farmers and producers with a way to add value to their product and meet consumer demand for more regional and local food and to find alternative routes to market for that produce.

### 3. INCREASING FOOD PRODUCTION SUSTAINABLY



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# Global economic growth, climate change and an increasing population are challenges that will have a significant impact on the natural environment, and therefore on food production.

- Food must be produced in a way that is environmentally sustainable or we will create problems for the longer term. 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. But we also depend on those ecosystems for other things – they provide us with drinking water, regulate our climate, stem flood waters and filter pollution. Choices about food production therefore need to take account of the other services we get from the same natural resources.
- The Millennium Ecosystem Assessment showed how, across the world, we are already damaging the natural environment – our soils, seas and biodiversity. Developments in agriculture have increased yields sufficiently to provide enough food for everyone on the planet. Yet over a billion people around the world are not able to obtain enough food while a billion people are overweight or obese. With continued economic growth, a large middle class is emerging in developing countries – as it did in the UK in the first half of the nineteenth century – increasing demands for goods and lifestyles with higher impacts on the environment.
- Globally, the costs and benefits of converting land for food production, need to be weighed-up carefully. The economic benefits of unconverted land, whose natural systems provide a range of important and valuable services, may outweigh the smaller and short term economic benefits realised through conversion to food production, housing or other use. It is also important to ensure that conversion of land for biofuel or biomass production as well as diversion of crops from food or feed to fuel, does not compromise local or global food security.

## Worldwide:

- 60% of the ecosystems examined for the Millennium Ecosystem Assessment were being degraded or used unsustainably<sup>1</sup>;
- The economic cost of the disappearance of forests, and the loss of value from the various services that forests perform such as providing clean water and absorbing CO<sub>2</sub> is estimated to be between €1.35 trillion and €3.1 trillion<sup>2</sup>;
- 35% of the Earth's surface is already used for agriculture – further expansion has serious implications for forests, peatland and biodiversity (a further 10-20% of grassland and forestland is projected to be converted primarily to agriculture by 2050)<sup>3</sup>;
- Livestock grazing uses more land than any other human activity, and in developing countries meat consumption is rising at a rate of 5% a year;
- Land degradation and desertification threatens the livelihoods of around a billion people who rely on land<sup>4</sup> – two thirds of Africa is desert or drylands. In China, since the 1950s, expanding deserts have reduced cultivated land areas by almost 700,000 hectares<sup>5</sup>;
- 70% of global freshwater withdrawal is already used for agriculture<sup>6</sup>;
- In developing countries, harvest and post-harvest waste are major issues. Losses are estimated to exceed 30% for some crops in certain areas due to inefficient methods of harvesting, difficulties in transporting and storing, and poor market information<sup>7</sup>. Similar levels are wasted in developed countries, but by consumers.
- Globally, agriculture contributes 14% of greenhouse gas emissions, while land use change – primarily deforestation driven by the conversion of forest to agricultural lands and cattle ranching – now accounts for a further 18% of global greenhouse gas emissions<sup>8</sup>.

1: Millennium Ecosystem Assessment (2005) Synthesis Report; 2: TEEB (2008) Cost of Inaction; 3: Millennium Ecosystem Assessment (2005); 4: IFAD/GEF (2002) Tackling Land Degradation and Desertification; 5: UNCCD, Secretariat of the Convention to Combat Desertification; 6: Defra (2010) UK Food Security Assessment; 7: Grolleaud (2002); 8: FAO (2006) Livestock's Long Shadow

Given the importance of our productive relationship with the environment we should go beyond simply protecting it, but actively engage in managing it for the ecosystem services we need.

- As well as providing the essentials for producing food, the natural environment provides a range of other services from supplying drinking water to regulating the climate. Depending on the way they manage land, farmers can help conserve and enhance biodiversity and landscapes, which can in turn also attract tourism which contributes directly to rural economic sustainability. Similarly, fishermen play a vital role in conserving and enhancing the marine environment, and fishing, aquaculture and fish processing provides jobs, often in areas where there are few other opportunities.
  - We already have measures in place to ensure farmers can be productive and protect the environment, for example Environmental Stewardship schemes, the Rural Development Programme for England and the Campaign for the Farmed Environment (see page 28).
- Farmers have demonstrated that they are taking their environmental responsibilities seriously through the uptake of these schemes – 66% of 'utilisable agricultural area' is currently under agri-environment schemes<sup>1</sup>.
- Over the last two decades, farmers in the UK have succeeded in increasing yields while reducing use of fertiliser, and greenhouse gas emissions:
    - Potato yields have increased by 18%, and sugar beet by around 45% over the last 20 years; wheat yields have increased by almost 8% over 10 years, and barley by 6%<sup>2</sup>.
    - Since 1984, the application rate of fertiliser has decreased by up to 52% and between 1990 and 2007, total greenhouse gas emissions from agriculture have fallen by 20%<sup>3</sup>.
  - However there are still issues which can incur costs to the environment and society:
    - Soil erosion in England is estimated to cost agriculture £45 million a year, and may incur further costs by reducing water quality and increasing flood risk when that soil enters our rivers<sup>4</sup>;
    - The food system is a major water user, taking 10% of all industrial abstractions and another 10% of total industrial water from the public supply. Although agriculture uses only 1% of our water resources, this masks significant seasonal and regional differences;
    - Over 60% of nitrates, up to 40% of phosphorus and the majority of silt in UK waterways is due to agriculture.

Globally, fish is the main animal protein source for a billion people<sup>5</sup>, but 28% of global wild capture stocks are overexploited and poor management of fish stocks costs the global economy around US\$50 billion a year. Another \$10bn - \$25bn worth of fish is caught illegally each year, threatening the food security and livelihoods of hundreds of millions of people. As the UK imports fish from the developing world we have a responsibility and an interest in ensuring its long term sustainability.

**1:** Natural England (2009) Agri-environment schemes in England; **2:** Defra (2009) Sustainable Farming and Food Indicators; **3:** Defra (2009) Sustainable Food and Farming indicators – since 1984, the application rate of nitrate on tillage fell by 6% and on grass fell by 52%; application rate of phosphate on tillage fell by 48% and on grass by 52%; **4:** Defra (2009) Safeguarding our Soils; **5:** [www.who.int/nutrition](http://www.who.int/nutrition)



## The natural environment and the economy are intrinsically linked – each providing services for and impacting on the sustainability of the other.

Our whole economy has been built on the base provided by the environment, which has itself been shaped by the economic use we have made of it. Many ecosystems provide benefits that are still essential to our economy. These benefits are often referred to as ecosystem services and are vital to the entire food system:

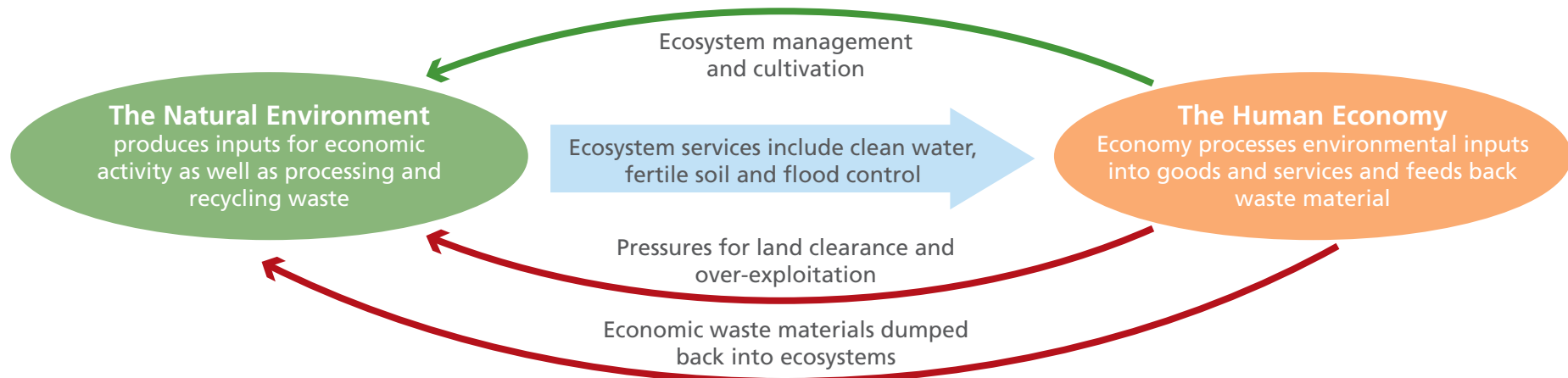
- providing inputs, such as food and water,
- regulating systems, such as reducing the risk of floods, land degradation, and disease,

- supporting, such as forming soil and cycling nutrients,
- cultural, such as recreational (including tourism), spiritual, and other non-material benefits.

As we use natural resources to produce food and other goods, we create economic benefits. In doing so we can return some benefits to the natural environment, such as responsible management of ecosystems to allow them to thrive. But we can also incur costs on the natural environment by over-exploiting

its resources, and damaging its ecosystems. These make us poorer in the long term by limiting our ability to continue in this cycle (figure 3.1 below). We need to consider the effects our behaviour has on the health of ecosystems, as these impact on their ability to supply us with essential goods and services in the future.

**Figure 3.1: the positive and negative relationship between economic activities and the natural environment**



## Sustainable increases in food production can be achieved through improving productivity and competitiveness, while conserving and enhancing the natural environment.

- The route to increasing food production sustainably is through improving productivity and competitiveness, while using natural resources responsibly:
  - Production must become increasingly competitive and responsive to demands from the market and consumers while allowing food businesses to be profitable (see also Section 2 of this Strategy).
  - Food production needs to make sustainable use of natural resources:
    - Reducing and being more efficient with man-made inputs, like fossil-fuel based energy and chemical fertiliser and using natural alternatives like biogas and manure wherever possible;
    - Using better land management or cultivation practices, to allow for wider benefits of protecting and enhancing soil, water and wildlife; and
    - Where possible, integrating food production flexibly with other types of land use – at the same time or in rotation – to gain multi-purpose benefits from land-use, such as wider water management, outdoor access and habitat creation.
- The UK is the first country to do a national-level assessment of the state of our ecosystems – the changes that have happened to these over the past 60 years from a range of pressures, the changes likely over the next 50 years and the economic and social value of these changes to our country. This will be completed in 2011 and, alongside the results from the forthcoming Foresight Land Use project will inform the future development and implementation of this Food Strategy.
- Farmers are stewards of more than 70% of EU land. The UK is working for reform of the CAP so that farmers are subsidised only for producing societal benefits (particularly for environmental outcomes) which the market cannot otherwise provide (see also Section 2 of this Strategy).
- Globally, we will continue to work with others, including the EU, to build on the L'Aquila Food Security Initiative (through which the UK committed £1.1bn over three years) and FAO World Summit outcomes to sustainably increase production in the context of climate change and water scarcity. This includes building support for the Global Partnership for Agriculture and Food Security, involving effective multilateral institutions including a reformed FAO, to deliver co-ordinated in-country action. Reducing post-harvest losses and food waste could improve food availability, increase access to food, and reduce the need for additional production.
- The UK Government is also strongly supporting the establishment of a new Intergovernmental Platform for Biodiversity and Ecosystem Services (IPBES) which could have a similar impact for biodiversity, as the IPCC has done for climate change. UN meetings in 2010 will discuss whether an IPBES should be established and what functions it would have, including looking at agricultural biodiversity and ecosystems.
- Science, innovation and putting research into practice on farms and in the seafood industry, are critical to sustainably improving food production – helping us produce more food and improve efficiency along the whole food chain. By focusing on productivity and resource efficiency, the food sector will be able to compete effectively in an increasingly global economy. The role of research and development is discussed in more detail in Section 6.

## Putting a financial value on the natural resources the food system receives from ecosystems could lead to better management and accountability.

- Many of the services and inputs that the global food system receives from the natural environment are free. In some cases, this means that they can be undervalued, or used inefficiently as there is no financial incentive to use them responsibly – short term profitable food production is achieved by ‘overusing’ natural resources. This limits our future ability to use those natural resources for food production and other essential services (such as drinking water).
- This is an example of where the real cost of an activity is not fully factored into business decisions. Taking these costs into account when making decisions about production, investment or expansion would give producers a better understanding of the points in the system at which we are ‘overdrawn’. To do this, we need to

develop ways to measure and value these natural services. A range of public and private standards are being developed to measure certain aspects of environmental sustainability, and groups such as the EU Round Table on Sustainable Consumption and Production of Food are bringing policy makers, food manufacturers and retailers from around Europe together to develop common standards.

- Industry targets based on the Food Industry Sustainability Strategy, for example the Food and Drink Federation’s Five-fold Environmental Ambition<sup>1</sup>, the British Retail Consortium’s “A Better Retailing Climate”<sup>2</sup>, and food companies’ own environmental plans show what can be achieved while remaining profitable.

The English Beef and Lamb Executive’s (EBLEX) ‘Better Returns’ Programme is a knowledge transfer initiative for beef and sheepmeat producers. It provides training events and easy-to-use information covering selection, breeding, feeding, health, and systems and costings issues. This initiative, which received start-up support from Defra, is supporting our environmental goals by focusing on increasing the productive efficiency of our livestock farmers.

1: [www.fdf.org.uk](http://www.fdf.org.uk); 2: [www.brc.org.uk](http://www.brc.org.uk)

## Our goals for 2030: UK farming and fishing need to produce more and impact less on the natural resources on which food production depend.

### Natural resources are valued

The benefits of the natural environment are valued, ensuring a sustainable supply of natural resources from which people can benefit now and in the future. Extraction and use of natural resources is balanced so that farmers, fishermen and food businesses can continue to produce food, while ensuring our natural environment is healthy, can function effectively and be resilient to challenges such as climate change.

### Globally, agriculture needs to produce more food sustainably and impact less

We see an increase in availability of and access to food in developing countries, in support of our MDG 2015 targets and beyond, including through increasing smallholder productivity and sustainable agricultural growth, sustainable fish production, improving market efficiency, reducing post-harvest losses, continuing trade reform, establishing appropriate land tenure arrangements, empowering women farmers and encouraging livelihood diversification.

Fairer international trading systems and international markets working better through trade reforms, and the end of import restrictions and subsidies to producers.

### Competitive, flexible farming and fishing industries

Domestically, we want a profitable, thriving, competitive UK food sector to continue to play its part in keeping us food secure. UK farming should produce as much food as possible, as long as it is responsive to demand, and recognises the need to protect and enhance natural resources. Our ability to take advantage of global 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.

Fish and seafood products provide for an increasing proportion of our diet, and are a valued, accessible and readily available source of sustainable protein, supported by a strong UK fish and seafood sector.

Fishing and aquaculture industries are profitable and balance economic return with responsible long-term stewardship of marine resources and protection of the marine environment and are flexible, skills-led, and attractive industries to young talent. Innovation and resilience in fish and seafood production allows fish to continue to provide an alternative source of protein that can cope with shifting demand. The industries are supported by reform of the Common Fisheries Policy that integrates fisheries management and conservation.

## Improving skills and competitiveness are central aspects of successful and productive UK farming and fishing industries into the future.

### **“A sustainable and profitable agricultural industry will only be achieved with a highly skilled, motivated, innovative and dynamic workforce” – Agriskills Strategy (Draft)**

- Farming requires a high level and wide variety of professional skills, but many farmers do not pay sufficient attention to keeping their technical skills and their craft up-to-date to meet the demands of a changing world, nor do they all have the business skills needed to maximise their profits.
- Government is supporting a range of initiatives to enhance the skills of farmers and land managers to produce food in ways that are more environmentally sustainable. These include the Farming Futures initiative, and support for the work of LEAF (Linking Environment and Farming), and the work of WRAP and Envirowise to improve skills and knowledge on resource efficiency and environmental management in the wider food industry.
- In April 2009, the Secretary of State for Environment, Food and Rural Affairs hosted a roundtable meeting on skills development. The industry is now in the final stages of developing their Agriskills Strategy which acknowledges the central role that investment in personal and continual professional development plays in the improvement of business performance, competitiveness and sustainability.
- The Agriskills Strategy sets out the actions needed by the industry, training providers and Government to recognise existing and develop new skills, promote skills development as central to business success and professionalism, promote the industry as a good place to work and for industry, Government and the wider public sector to work in partnership on skills.

### **There are a number of opportunities for farmers and fishermen to improve their competitiveness including sharing knowledge and information, being better connected to and aware of their markets and improving resource efficiency.**

- The Rural Development Programme for England includes £600 million (over 2007-2013) to improve competitiveness in the agriculture and forestry sectors and to fund wider rural business development and sustainable rural communities. The Programme can fund a range of activities that will improve farms' competitiveness, including vocational training and knowledge transfer, adding value to and marketing agricultural products and modernisation of agricultural holdings.
- The Fruit and Vegetables Task Force was launched in October 2009. It brings together growers, processors, wholesalers, retailers and others to tackle the barriers to increasing the production and consumption of fruit and vegetables in England. It will seek to help our farmers compete better and to encourage young people and low-income families to eat more fruit and vegetables.
- Similarly, the Dairy Supply Chain Forum<sup>1</sup> and the Pig Meat Supply Chain Task Force<sup>2</sup> aim to facilitate industry action to address the challenges facing the sectors, and give opportunities to develop collective solutions.
- UK action on climate change should not result in food production, and the associated greenhouse gas (GHG) emissions, moving to other countries. Some measures to reduce greenhouse gas emissions can bring direct cost benefits to farmers (for example reduced input of fertiliser or increased yields). The Government will work with partners to ensure that comprehensive programmes of advice are available to farmers so that they are aware of what they can do practically to reduce emissions from their farming activities while saving money in the process. (This is discussed in more detail in section 4.)
- We will continue working with the farming industry and the European Commission to explore further ways to reduce the burden of regulation.

<sup>1</sup>: [www.defra.gov.uk/foodfarm/food/industry/sectors/milk/supplychainforum](http://www.defra.gov.uk/foodfarm/food/industry/sectors/milk/supplychainforum); <sup>2</sup>: [www.defra.gov.uk/foodfarm/farmanimal/pigs/task-force](http://www.defra.gov.uk/foodfarm/farmanimal/pigs/task-force)



Action: increasing food production through improving the productivity and competitiveness of farming and fishing, and increasing their responsiveness to the market.

Who	What	How	Result
<b>Government</b>	Policies aimed at reforming the CAP	Helping to foster an internationally competitive industry without reliance on subsidy or protection, and one which does not distort international trade and the world economy	Greater opportunity for competitiveness and efficiency, enabling UK and EU farmers to realise their full productive potential and provide what the market requires; consumers benefit from greater choice and better value
<b>Government, research councils, industry</b>	Research and development (see also Section 6 of this Strategy)	Develop new technologies and techniques for sustainable agriculture and land use, and better knowledge transfer including through the Sustainable Agriculture and Food Innovation Platform <sup>1</sup>	New techniques and technologies in practice on farms and in fisheries to increase production using less resources and producing less pollution
<b>Industry bodies, Government, training sector</b>	Improving skills	Agriskills Action Plan for industry, training providers and Government to recognise existing and develop new skills, promote skills development and professionalisation	Improved business skills will make farmers quicker to respond to the changing market and able to focus better on improving productivity and competitiveness; the industry is increasingly seen as a professional and attractive place to work
<b>Industry, Government</b>	Improving supply chain relationships, competitiveness and responsiveness to markets	£600m RDPE funding Work through the Fruit and Vegetable Task Force, Piguement Supply Chain Task Force and the Dairy Supply Chain Forum	Farm businesses more competitive and productive; benefits to wider rural business development and sustainable rural communities.  Expand fruit and vegetable production and consumption in England

# Action: protecting and enhancing natural resources while continuing to produce food.

Who	What	How	Result
Food, farming and fishing industries, Government	Valuing ecosystems	<p>Applied research looking at how food production and consumption in the UK links to the value of ecosystem services</p> <p>Principles for decision-making which help in considering whether to convert land or intensify food production in the UK based on a proper assessment of costs / benefits based on ecosystems services</p>	A better understanding of the points in the system at which we are 'overdrawn' and which points we invest in natural capital and its services
Government, farming industry, international stakeholders	Increase productivity sustainably	Encourage development and dissemination of sustainable production methods to increase agricultural output without undermining the natural resource base and avoiding large-scale land use changes. This should incorporate efforts to improve nutrient and water use efficiency, and sustainable land management techniques.	Help meet increased demand for food sustainably while avoiding large-scale land use changes; ecosystem losses are avoided
Farming and fishing industries, Government	Managing the farmed and marine environments responsibly	<p>Protect and enhance the farmed environment through Environmental Stewardship schemes, the Campaign for the Farmed Environment<sup>1</sup> and measures described in the Soil Strategy for England<sup>2</sup>, Future Water<sup>3</sup>, and the Water Framework Directive.</p> <p>Adapt or develop new farming and fishing techniques to support sustainable production</p> <p>Continue to build the evidence base through research and development</p>	Wildlife and biodiversity is protected and enhanced.

1: [www.cfeonline.org.uk](http://www.cfeonline.org.uk); 2: Defra (2009) Soil Strategy for England; 3: Defra (2008) Future Water

## Action: improving the sustainability of global food systems.

Who	What	How	Result
<b>Government, international stakeholders</b>	Effective multi-lateral processes delivering on the ground	Build on the L'Aquila Food Security Initiative and FAO World Summit outcomes to develop, and co-ordinate action through the Global Partnership for Agriculture and Food Security, in pursuit of country-led sustainable agricultural development on the ground, such as that taken through the Comprehensive Africa Agriculture Development Programme.	Integrated, country-led processes delivering sustainable agricultural development
<b>Government</b>	Support the growing global demand for fish	Improve the global sustainability and governance of fisheries, through the Partnership for African Fisheries, by implementing the IUU fishing regulations and Port States Controls, and by improving conservation with ICCAT, CITES and the International Whaling Commission	Seafood is a secure, environmentally friendly, nutritious food source
<b>Government, international stakeholders</b>	Increased availability and access to food	DFID committing £1.1 bn for sustainable agricultural development over 3 years, contributing to: reducing post-harvest losses in developing countries including through improved food storage facilities; better functioning markets; appropriate land tenure arrangements; empowerment of women farmers; and livelihood diversification	Supplies are used more efficiently – less pressure to produce more food globally
<b>Government</b>	Ensure that biofuel (and wider bioenergy) production does not compromise food security goals	Develop and implement sustainability criteria for biofuels/bioenergy at global and EU level, that address both direct and indirect impacts; ensure biofuel/bioenergy mandates are sufficiently flexible to enable adjustment between fuel, food and feed sectors; undertake further research, including through Foresight food project, informed by FAO and other international work; address food security in Commission-led review of EU biofuel/bioliquid provisions by 2014 and Commission proposals on biomass sustainability.	Bioenergy production and consumption does not compromise local or global food security, including through GHG and ecosystems impacts

## 4. REDUCING THE FOOD SYSTEM'S GREENHOUSE GAS EMISSIONS



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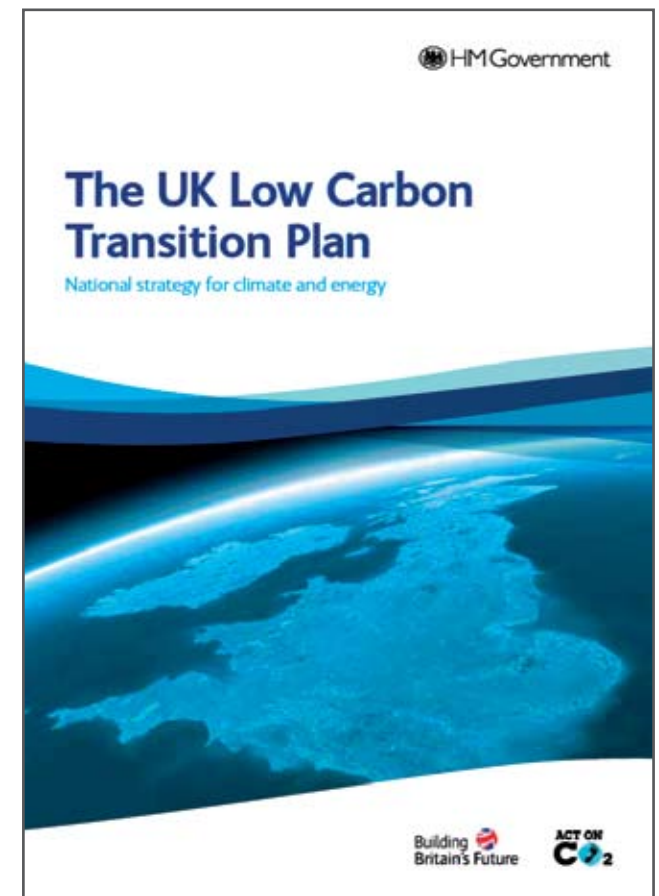


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Action on climate change is urgently needed to prevent human suffering, ecological catastrophes and political and economic instability. The UK, like every country, must act now to reduce greenhouse gas emissions.

- If greenhouse gases (GHGs), like carbon dioxide from burning fossil fuels or methane from agriculture, are not reduced, global temperatures could rise by up to 6°C by the end of the century<sup>1</sup>.
  - This would increase global instability, conflict, public health-related mortality, degradation of natural resources and migrations beyond any of our recent experience.
  - The Stern Review<sup>2</sup> concluded in 2006 that uncontrolled climate change could cost the global economy between 5% and 20% of global GDP.
- We must limit global average temperature increases to 2°C to avoid the most dangerous consequences of climate change. This means that global emissions must start falling before 2020 and reduce by at least 50% by 2050<sup>3</sup>.
- The UK, like every country, must play its part to reduce GHG emissions now.
  - Government has put in place a legal framework to ensure that we take significant steps to decarbonise our economy by 2050.
    - The Climate Change Act 2008 – the first of its kind in the world – enacts a legal obligation for Government to reduce GHG emissions by at least 80% on 1990 levels by 2050.
    - The Act also establishes the Carbon Budget system which sets a cap on the amount of emissions allowed over consecutive five-year periods beginning 2008-2012.
    - The 2018-2022 Carbon Budget requires Government to reduce GHG emissions by at least 34% compared to 1990 levels.
  - In 2009 the Government published the UK Low Carbon Transition Plan (LCTP) which sets out the responsibilities for reducing emissions for each sector of the economy along with policies to enable the UK to meet the first three carbon budgets<sup>4</sup>.

- **All parts of the food chain have an important role to play in delivering the targets of the LCTP.**



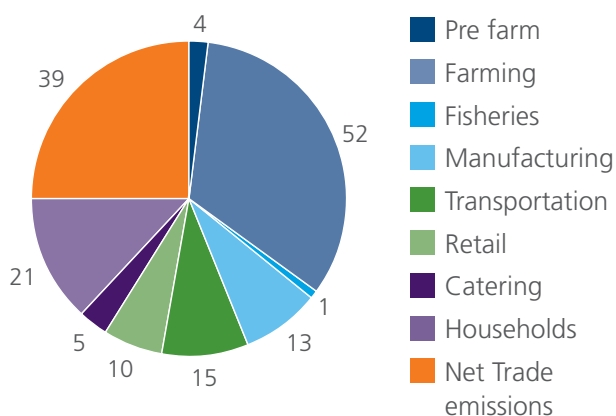
1: IPCC (2007) 4th Assessment Report; 2: Lord Stern, (2006), The Economics of Climate Change; 3: DECC (2009) Low Carbon Transition Plan; 4: Ibid



The greenhouse gas footprint of the UK food chain was 160mtCO<sub>2</sub>e in 2006, an estimated 22% of emissions associated with all UK economic activity<sup>1</sup>. Emissions arise at all points of the food chain, so everyone in the chain have a responsibility to help tackle climate change.

### Greenhouse Gas Emissions<sup>1</sup> associated with the UK Food Chain by sector, 2006

Million tonnes CO<sub>2</sub> equivalent



- Primary production in the UK accounts for a third of the UK food chain's greenhouse gas footprint. This is predominantly methane and nitrous oxide emissions from agriculture with a small amount associated with the fuel used by our fishing fleet.
- Collectively, the industries which process, manufacture, distribute and sell food (through retail or catering) account for a further third.

- Consumers are responsible for the remaining third which is made up of production emissions embedded in imported products (net trade) and the emissions associated with the ways we shop, store and prepare food.

For our food system to be sustainable, all parts of it need to reduce energy use and greenhouse gas emissions. This includes:

**Reducing electricity use:** to reduce demand on the National Grid and consequently reduce the total amount of electricity the UK needs to generate and the emissions associated with energy generation.

- **"Green" Electricity** – buying electricity from "green" tariffs demonstrates demand for renewables and other low-carbon electricity generation, but it does not deliver additional carbon savings. Businesses and consumers on green tariffs, therefore, should still reduce their electricity consumption and use it as efficiently as possible.

- Onsite investment in renewables or low carbon generation can deliver additional carbon savings. Technologies such as Combined Heat and Power and anaerobic digestion are well suited to those of the part of the food sector where energy needs are intensive and constant.

- **Decarbonising business and farming activities which directly emit GHGs.**

For example, businesses can reduce emissions by following processes that minimise the need for refrigeration, heating, or transport or by using more fuel-efficient equipment. Farms can also reduce nitrous oxide emissions by more efficient fertiliser use.

- **Influencing reductions in levels of embedded emissions** in products so that buyers value environmentally friendly products and suppliers are incentivised to meet this demand. For example retailers could choose to stock lower carbon products and so would encourage their suppliers to make lower carbon products.

<sup>1</sup>: Defra (2009) Food Statistics Pocketbook

## Retailers, manufacturers, distributors, and caterers will be affected by Low Carbon Transition Plan policies to reduce emissions from workplaces and transport.

### Workplaces

- The energy used in our workplaces accounted for 12% of UK greenhouse gas emissions in 2008. To reduce emissions we need to change the way we do business to cut down the amount of energy and other resources used – this could also help businesses save money and become more competitive.
- The UK Low Carbon Transition Plan and wider Government policies aim to deliver a 13% reduction in greenhouse gas emissions on 2008 levels from workplaces by 2020<sup>1</sup>.

### Transport

- In 2008 transport accounted for 20% of UK greenhouse gas emissions. Government is seeking to reduce these by 14% by 2020. Passenger cars account for the majority of transport emissions (nearly 60%), with commercial road vehicles the next largest contributor (approximately 30%).
- Food businesses have an important role in helping make significant reductions in

transport emissions related to their own activities and by influencing consumers to reduce journeys related to food shopping.

Food businesses can use these reduction targets as points of comparison to measure the success of their own efforts to reduce emissions.

### Policies

The Low Carbon Transition Plan and Department for Transport's *Low Carbon Transport: A Greener Future*<sup>2</sup> set out the policies and initiatives that help or require businesses to make reduce emissions. These include:

- Regulatory schemes and fiscal incentives such as the Climate Change Levy (CCL) Climate Change Agreements (CCA), the CRC Energy Efficiency Scheme (CRC) and vehicle emissions performance standards.
  - Many food businesses are already affected by a CCA or pay the CCL. For example, the Food and Drink Federation's (FDF) CCA

covers around 50% of the energy used in the food manufacturing sector<sup>3</sup>.

- The CRC, a new mandatory energy efficiency scheme starting in 2010, will extend the coverage of regulatory instruments to emissions from large organisations<sup>4</sup> outside the EU Emissions Trading Scheme and CCAs. This will affect many large food businesses including retailers and manufacturers. The large corporate clients of food service businesses may also be captured in CRC.
- Financial support services such as low cost loans, and grants for SMEs.
  - The Carbon Trust, for example, provides interest free energy efficiency loans.
- Advisory services including the Carbon Trust, Business Link, the Waste and Resource Action Programme, and Envirowise.

<sup>1</sup>: DECC (2009) Low Carbon Transition Plan; <sup>2</sup>: [www.dft.gov.uk](http://www.dft.gov.uk); <sup>3</sup>: DECC estimate; <sup>4</sup>: CRC will be mandatory for all large organisations that use more than 6,000 MWh of half-hourly metered electricity per year roughly equivalent to electricity bills of £500,000 or more

Agricultural emissions are a significant part of the UK's contribution to climate change, accounting for 7% of our total direct emissions reported annually to the UN and an estimated 33% of carbon footprint of the UK food chain<sup>1</sup>.

- The UK Low Carbon Transition Plan target for agriculture in England is a cut of 3Mt CO<sub>2</sub> by 2020. To deliver this the Government committed:
  - To provide advice on how to take cost-effective actions;
  - To work with the farming industry, and encourage an industry-led action plan to deliver emissions reductions;
  - To improve the way we measure and report agricultural emissions so that positive actions taken by farmers can be recorded accurately; and
  - To maximise the potential use of anaerobic digestion to reduce emissions and produce renewable energy.
- Some of the actions to reduce greenhouse gas emissions in the food system have benefits for the wider natural environment. But tensions do exist, for example between competing demands for land between food and bioenergy or between changes to livestock management for emissions reduction and the role of livestock in habitat management for wildlife. The choices and trade-offs between mitigation, the wider natural environment and food production need to be identified.
- The problem of greenhouse gas emissions from agriculture is global and accounts for 14% of emissions<sup>2</sup>. Solutions must be found nationally but agricultural products are traded internationally. So in reducing emissions in the UK we need to make sure that we do not simply transfer the problem to other countries. At the same time we need to facilitate low carbon agricultural growth in developing countries.
- Food security and climate change go hand in hand. This is recognised by the international community. The UN Secretary General, Ban Ki-Moon said in November 2009 that "there can be no food security without climate security."<sup>3</sup>
- The UK food system is intrinsically linked to global food security and developing countries are far more vulnerable to the effects of climate change and food insecurity. We have a responsibility to remain engaged with international actions on climate change mitigation and adaptation, sustainable agriculture and food for the benefit of other nations and for our own.

<sup>1</sup>: DECC (2009) 5NC: The UK's Fifth National Communication under the United Nation's Framework Convention on Climate Change; <sup>2</sup>: FAO (2009) Low Greenhouse Gas Agriculture; <sup>3</sup>: See also Box 5 p 48 of the UK Food Security Assessment for a further discussion of the links between climate change and food security

## Consumers can help develop a lower-carbon food system by creating demand for food with a smaller environmental footprint.

- Producers, manufacturers, retailers and the food service sector all respond to market signals that originate with consumers – it is their demand that drives the food system. But consumers' choices are constrained by knowledge, time, cost, convenience and retail offers.
- Business also plays a role leading demand through advertising and influencing consumer choice by what it chooses to stock. For example retailers that offer only fish certified as from sustainable fisheries prevent consumers making unsustainable choices.
- Although proportionally small, the number of consumers concerned about the impact of their food on the climate is growing<sup>1</sup>.
- If we are to reduce emissions across the food system, while also protecting consumer choice, we will need to find a comprehensive and accessible way of informing consumers about the climate impacts of their food as well as encouraging and enabling them to change their behaviour.
- Many people consider the "food miles" associated with a food product as a proxy for its environmental impact. But transport accounts for only 9% of the food chain's greenhouse gas emissions, and greenhouse gas emissions are just one of a number of environmental impacts associated with food production and consumption<sup>2</sup>.
- Not all systems of production have the same greenhouse gas impact and in many cases, emissions from transporting food will be offset by lower production emissions compared to a local alternative.

### "Food miles" is not a helpful measure of food's environmental footprint. It can mask other important considerations:

- **Impact on local businesses** – choosing local produce over imports can help deliver local economic benefits. But this depends on whether local producers would have a market or not should local consumers choose to buy goods from further afield. If they do have alternative markets the economic benefits of buying local products are small. Conversely, choosing local produce over imports can reduce the prosperity of communities in developing countries that do not have alternative high value markets for their products. For example, an estimated one million rural African livelihoods depend at least partly on the fruit and vegetable trade with the UK – UK shoppers spend £1 million a day on African fruit and vegetables<sup>3</sup>.
- **Seasonality** – buying foods when they are locally in season can mean buying products that have had to use less energy to grow, for example to heat or light greenhouses or to cold-store products for out of season sales.
- **Other environmental impacts** – greenhouse gas emissions are not the only damaging environmental output of food. Food requires water and fertiliser, for example. Food grown in warmer climates may require higher levels of irrigation which could contribute to water stress.
- **Mode of transport** – The type of vehicle and how efficiently it can be loaded affect the transport emissions associated with a product. Ships, for example, though individually high emitters, are very efficient in terms of emissions per unit of food transported. Similarly heavy goods vehicles can be loaded very efficiently, but in the UK they contribute to congestion which is the most costly social impact of food transport.

1: Opinion Leader Research (2007) Public Understanding of Sustainable Consumption of Food; 2: Defra (2007) Food Statistics Pocketbook; 3: www.dfid.gov.uk

Livestock production is a major contributor to greenhouse gas emissions globally<sup>1</sup>, and there are some groups that advocate a diet with less meat as a way for consumers to reduce the environmental footprint of their diet. But the evidence to inform appropriate consumer choices and policy responses is currently unclear. The following are important factors to consider in this debate:

### Greenhouse Gas Emissions

- Ruminant livestock produces methane, a potent greenhouse gas, and accounts for about 4% of UK direct emissions<sup>2</sup>. But not all types of meat have the same impacts, neither do all systems of production. Different types of livestock are responsible for different levels of emissions – the way livestock is fed, housed, and grazed all affect the level of GHG emissions. Chicken, for example, is the most popular meat protein in the UK and emits fewer GHGs per kg than any red meat.
- Land-use changes overseas, such as deforestation, release GHGs currently locked in trees and soils. These changes have been associated with the production of feed for livestock, particularly soya. Grain-fed livestock production systems may, therefore, be indirectly responsible for high levels of GHG emissions. However soya is a very efficient feedstuff for maximising meat production so

the carbon intensity (i.e. GHG emissions per kg of meat or litre of milk produced) may be lower than alternatives.

- Livestock can also be part of agricultural systems that contribute to locking carbon into soil, and upland livestock production is often the only economically productive activity possible in such areas.
- Further research is needed to quantify properly the life-cycle emissions of different livestock production systems. Government is challenging assumptions about home-grown alternatives to soya in order to progress this debate.

### Other Environmental Impacts

- The environmental impacts of livestock are not limited to GHGs. For example The EU estimates that it contributes to more than 50% of the eutrophication in EU waterways<sup>3</sup>.

- But livestock farming also delivers environmental benefits. For example valued and bio-diverse ecosystems have developed to depend on grazing by livestock and these contribute to the traditional character of the UK countryside. This landscape is also sustained in many areas by the economic and social support livestock farming provides to rural communities.

<sup>1</sup>: FAO (2006) Livestock's Long Shadow: environmental issues and options <sup>2</sup>: Defra estimate based on the UK Fifth National Communication under the United Nations Framework convention on Climate Change, DECC, 2009; <sup>3</sup>: EU (2006) The Environmental Impact of Products



## Health Impacts

- Meat and dairy products are good sources of essential nutrients, such as dietary iron in red meat and calcium and riboflavin in dairy products (though there are vegetarian and vegan sources of these nutrients).
- Colorectal cancer has been linked with high levels of red and processed meat consumption, and saturated fat (found in some meat and dairy products) can contribute to coronary heart disease, the biggest killer in the UK.

## Trade and Economy

- The UK meat and dairy supply chains are international. Reducing GHG emissions from meat and dairy through changes in production need to be matched by changes to demand to avoid simply exporting the climate impacts.
- Eating less meat or dairy does not necessarily mean a reduction in competitive, GHG efficient production with growing global markets, particularly in the developing world.

Going forwards **the livestock sector** should work to minimise its emissions and its environmental impact, as far as possible, here and overseas.

**Consumers** should be able to exercise choice over what to eat including choosing how to reduce the carbon footprint of their diet.

**Government** should continue to provide advice to allow consumers to make dietary choices based on up-to-date nutrition and

environmental evidence. Government should work with the UK livestock sector to help reduce its emissions, for example by facilitating product roadmaps like the milk roadmap<sup>1</sup>. Government should also work with global partners to reduce emissions overseas. For example through initiatives like DFID/Defra's co-operative work with Brazil which aims to improve the efficiency of ranching and avoid deforestation<sup>2</sup>.



Defra Photo Library

1: Dairy Supply Chain Forum (2008) Milk Roadmap; 2: UK-Brazil Sustainable Development Dialogue

Our goals for 2030: the UK is using low carbon techniques in producing, processing, and delivering food to consumers and influencing emissions reductions from food internationally.

**A competitive,  
productive food  
sector**

Businesses in the food system will decouple greenhouse gas emissions from productivity, where technology exists, in order to deliver economic benefits while making absolute emissions reductions.

**Consumer support for  
low carbon food**

Consumers play an essential role in driving demand for food with a low environmental footprint, while business plays an equally important role in influencing demand and responding to consumer needs. By 2030 consumers will be better informed about the climate impact of their food, empowered to change their behaviour and have the ability to exercise choice on environmental grounds to reduce this impact (see also Section 1: “Encouraging people to eat a healthy, sustainable diet”).

**A food sector  
supporting the  
UK Low Carbon  
Transition Plan**

Emissions from businesses across the food chain are reduced in line with the relevant targets for workplaces and transport in the UK Low Carbon Transition Plan recognising that some sectors may be able to reduce emissions more easily than others.

Agricultural emissions are reduced per unit yield, as well as absolutely, to deliver the sector’s commitment of a 3 million tonne CO<sub>2</sub>e reduction in England in the Low Carbon Transition Plan.

**Global goals for low  
carbon food**

Policies and measures for reducing GHG emissions of UK agriculture will be designed to avoid simply exporting the climate impacts of our food choices to overseas economies.

The UK will play a lead role in developing low carbon supply chains, deploying research and innovation, and transferring technology and best practice in order to help global partners, particularly developing countries, to reduce their climate impacts.

## Action: to achieve our goal for a low carbon food system.

Who	What	How	Result
<b>Farmers</b>	Improved agricultural practices	Improved livestock management and more efficient fertiliser use reduce methane and nitrous oxide emissions per unit output. Better slurry management, including anaerobic digestion, reduces methane and nitrous oxide emissions.	Reduced GHG intensity of agriculture and 3m tonne saving in England by 2020
<b>Government, retailers, consumers</b>	Consumers empowered to express environmental concerns in the marketplace	Clearer information on the climate impacts of food. Provides clear incentives for retailers to supply 'climate-friendly' products.	Market demand drives innovation and invention to find climate-friendly methods across the food system
<b>Food retail, manufacturing, logistics, catering</b>	Reduce electricity use, and decarbonise business and transport activities that directly emit GHGs	Identify and implement energy efficiency innovations reducing emissions per unit output and absolutely. Engaging with Government initiatives from the UK Low Carbon Transition Plan and using appropriate advice services.	Reduced emissions as well as financial savings from reduced energy and other input costs
<b>Government, food retail, manufacturing, logistics, catering</b>	Encourage and support decarbonisation of activities by supply chain partners	Exert influence on and assist suppliers to provide low-carbon products. Support low carbon initiatives by food chain suppliers and other businesses, for example providing anaerobic digestion for unavoidable food waste.	The supply chain supports innovation and uptake of climate-friendly methods across the food system
<b>Government</b>	Provide clarity on expectations for food businesses	Set trajectory for reducing emissions across the economy and levels of effort for key sectors. Work with industry on emissions reduction action plans.	Reduced emissions from food sector
<b>Government</b>	Policies drive decarbonisation of UK food and support businesses to tackle climate change	Continue to provide advice services, appropriate regulation and financial incentives. Assist businesses with interest free loans from the Carbon Trust.	Reduced emissions from food sector. Responsible businesses are not put at a disadvantage in the market through investment costs

## The potential – food businesses that are already reducing greenhouse gas emissions.

### The Tesco train link - Shifting freight from the road

- The Tesco train link between Daventry and Grangemouth saves 3.18 million road miles per year and reduces CO<sub>2</sub> emissions by 2,424 tonnes per year.
- The link received funding from the Department for Transport's 'Rail Environmental Benefit Procurement Scheme'.
- The train carries 28 containers, each one holding 48 cages. In total 1,344 cages are carried on the train which completes 10 trips each week.
- The cages carried by the train were previously moved by road by 18 double-deck trailers. This amounted to a saving of 180 double-deck journeys per week.

*From DFT Low Carbon Transport: A Greener Future.*

Original Source: Freight Best Practice case study 1094

### The Cavan Bakery Ltd is a small Middlesex business employing 33 people that used a Carbon Trust Energy Efficiency Loan to cut its bills and its carbon emissions.

- The bakery's two gas ovens, installed in 1946 and 1948 were "massively inefficient", according to the bakery's managing director Jeff Greenall – they lost a large amount of heat, and relied on two electric steam water boilers, which required frequent and expensive maintenance. Replacing them, though necessary, was a big decision since having the originals removed was an expensive proposition in itself, both in terms of labour and lost income. An interest-free Energy Efficiency loan from the Carbon Trust helped the business replace them with an efficient, up-to-date alternative.
- The new oven creates its own steam which allowed the bakery to get rid of water boilers that supplemented the previous gas ovens. This freed up working space in the bakery helping them avoid a costly move to larger premises in addition to guaranteeing significant electricity and gas savings.
- The new oven loses far less heat, and there are no electric boilers powering it. The bakery is now saving 1,000 units of gas and 500 units of electricity each month. In total, it has cut its gas consumption by 75% – which has enabled the bakery to counter rising energy costs, and therefore to help the business ride out the current financial difficulties.
- The bakery is now looking for an affordable, energy efficient alternative to its delivery vans.



### Savings at a glance

- Annual energy savings: 12,000 units of gas and 6000 units of electricity
- Annual CO<sub>2</sub> savings: 81.2 tonnes
- Size of loan: £31,000; Loan Payback 36 months



## 5. REDUCING, REUSING AND REPROCESSING WASTE



Photography courtesy of WRAP. [www.wrap.org.uk](http://www.wrap.org.uk)



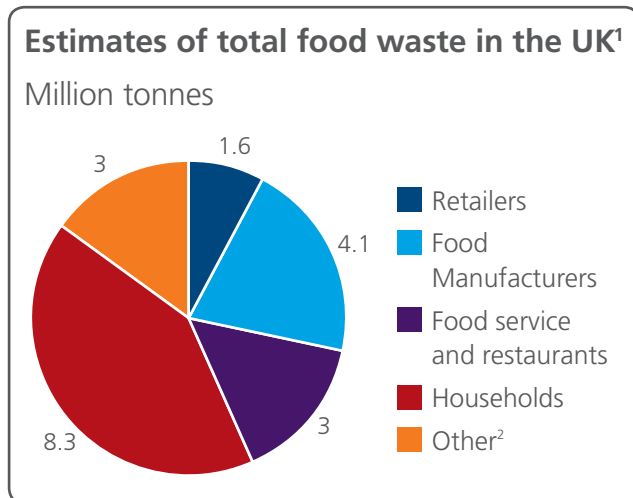
Photography courtesy of WRAP. [www.wrap.org.uk](http://www.wrap.org.uk)



Photography courtesy of WRAP. [www.wrap.org.uk](http://www.wrap.org.uk)



## Reducing waste in the food supply chain has economic and environmental benefits.



- In total, food waste in the UK is estimated to be 18-20 million tonnes. Although household food waste makes the largest single contribution (8.3 million tonnes) more than half of this is food wasted in the supply chain<sup>3</sup>.
- Every tonne of food waste prevented has the potential to save 4.2 tonnes of CO<sub>2</sub> equivalent<sup>4</sup>. This is from both the emissions released when making the food, as well as the methane released when it decomposes in landfill.

- Biological matter such as food waste can be recycled within the food production system. Appropriate treatment such as anaerobic digestion, composting and wormeries can produce good quality compost and soil improvers which provide high organic matter content and essential nutrients, helping maintain the productive capacity of soils (see box 5.1 on page 55).
- Excess packaging is often mentioned by consumers as something they would like to see retailers reduce<sup>5</sup>, but consumers also value the protection and hygiene that packaging offers<sup>6</sup>. Signatories to the Courtauld Commitment have halted the growth in grocery packaging waste, and are on target to meet their 2010 objectives of reducing such waste. Building on the industry's achievements, the 2009 Packaging Strategy<sup>7</sup> contains a raft of measures that will promote eco-design in packaging and build on the current rate of recycling and recovery – which in 2008 reached 60% of all packaging used in the UK.
- WRAP (the Waste & Resources Action Programme) is working with producers and researching new ways of reducing waste and creating new opportunities for recycling. This includes reducing the amount of unnecessary packaging used for food, as well as making more of the essential packaging recyclable. Work is ongoing to make packaging lighter, which would also be cheaper and more fuel efficient to transport (see case study on page 57).
- In developing countries, harvest and post-harvest waste are major issues. Losses are estimated to exceed 30% for some crops in certain areas due to inefficient methods of harvesting, difficulties in transporting and storing, and poor market information.

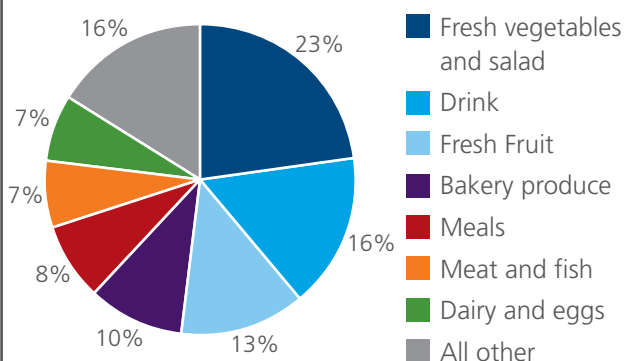
1: WRAP estimates; 2: "other" category includes food waste from agriculture, horticulture, and commercial food waste (for example from hospitals, schools, etc.); 3: WRAP [www.wrap.org.uk](http://www.wrap.org.uk); 4: Ibid; 5: Ipsos Mori (2007) in Cabinet Office (2008): Food – an analysis of the issues; 6: Cabinet Office (2008): Food – an analysis of the issues; 7: Defra (2009) Making the most of packaging

## Households throw away £12 billion worth of food every year wasting money and natural resources, and contributing to climate change.

- UK households throw away 8.3 million tonnes of food a year, of which 65% is avoidable – this represents £12 billion, or £480 for the average household every year.
- The main issues for households are buying and preparing too much food, and letting edible food go off either untouched or in opened packets.
- The significance of date marking and storage instructions on foods is not clearly understood by many consumers, which can result in unnecessary food waste (50% of people asked in an FSA survey did not fully understand date marking).
- Food manufacturers and retailers can help consumers to reduce waste by providing more information about meal planning, storing food, judging portion sizes more accurately, and better understanding of date labelling. Development and uptake of new technologies may also give food longer shelf life and make it easier to store safely, such as re-sealable packaging.
- Some food waste is unavoidable. Egg shells and banana skins could never be eaten. WRAP is working with local authorities to encourage more appropriate treatments of food waste, for example anaerobic digestion or composting to reduce the amount of biological waste going to landfill. This includes incentives and advice on appropriate solutions for householders, gardeners and farmers.

### Fresh fruit, vegetables and salad make up more than a third of households' wasted food<sup>1</sup>

Proportions of household food waste, by weight



#### Box 5.1: Anaerobic digestion and biogas

Anaerobic digestion is a proven system for producing energy and capturing greenhouse gas emissions. It uses organic materials such as manures and slurries, food waste and sewage sludge to make a gas that can be burnt to generate electricity and heat, further processed into transport fuel, or injected into the gas grid. The left over material (called digestate) can be used as a fertiliser and the technology can be used in large and small scale operations.

1: WRAP (2009) Household Food and Drink Waste in the UK

## Our goals for 2030: reducing, reusing and reprocessing waste.

### Food waste is avoided as far as possible

- Supply chains are efficient and minimise waste.
- Consumers are food- and waste-conscious and plan, store and use food effectively.
- Food packaging is designed in a way that minimises its environmental impact, but retains its purpose in protecting and prolonging the life of food products.

### Surplus food is valued

- Shared with or redistributed to vulnerable people.
- Used to generate energy through anaerobic digestion.
- Used to produce fertiliser through anaerobic digestion or composting to help grow more food.

### Tackling waste in developing countries

- Internationally, post-harvest losses are reduced through better storage facilities in developing countries, and the UK demonstrates international leadership in developing technological solutions to producing energy from waste food.

## The potential – case studies.

**Staples Vegetables is one of the largest producers of vegetables in the U.K. Based near Boston in Lincolnshire the company supplies a number of major retailers, packers and processors from its farms located around the country<sup>1</sup>**

- Staples Vegetables is developing one of five anaerobic digestion (AD) demonstration projects funded by Government. They are building an anaerobic digester which will process unsold vegetables created by the existing vegetable harvesting and packaging process.
- The AD plant will produce electricity which will be used on-site with the excess fed into the grid. The processed vegetable matter (digestate) will be applied back to the land using an existing irrigation network and spreading equipment, replacing the need for some of the fertiliser currently being used.
- The heat generated by the process will be used to chill processing areas through heat absorption coolers, which will reduce the amount of energy used by the business considerably. Excess heat will be used to heat offices and staff buildings on the site.

### Reducing the weight of cans

- WRAP has worked with Heinz to reduce the amount of material used to make their cans. The project resulted in a 10% reduction in the thickness of the can ends. By implementing the lighter weight ends, Heinz is saving 1,400 tonnes of steel and 585 tonnes of carbon emissions a year with corresponding financial savings.
- If similar reductions were achieved across the market, it would result in a saving of 15,000 tonnes of steel. Also, lighter cans need less fuel to transport reducing the greenhouse gases associated with the food.
- WRAP is now working with Heinz on the second phase of this project, which is to lighten the can body.

### FareShare is a national charity established in 2004 to support communities to relieve food poverty



- From 12 locations around the UK FareShare aims to help vulnerable groups through the provision of Food Redistribution – supplying surplus 'fit for purpose' product from the food and drink industry to organisations working with disadvantaged people in the community.
- Last year FareShare redistributed food to 600 local charities, benefiting 29,000 people a day. The food redistributed contributed towards 7.4 million meals and helped businesses save 14,000 tonnes of CO<sub>2</sub> emissions.

<sup>1</sup>: [www.wrap.org.uk/recycling\\_industry/information\\_by\\_material/organics/staples\\_vegetables](http://www.wrap.org.uk/recycling_industry/information_by_material/organics/staples_vegetables)

## Action: reducing food waste in the supply chain and at home.

Who	What	How	Result
<b>Government, local authorities</b>	Divert food waste from landfill	WRAP research, advice and support and £3.5m in grant funding for local authorities seeking to introduce new food waste collection schemes. Local authorities increase doorstep food waste collection, support development of infrastructure to process food waste; Government incentivises reprocessing over disposal.	Less food waste to landfill and fewer greenhouse gas emissions; opportunity to use food for power generation and nutrients are returned to the soil through the digestate produced by anaerobic digestion.
<b>Households, consumers/NGOs/ community groups</b>	Meal planning	WRAP's Love Food Hate Waste campaign and partner campaigns with retailers. WRAP's work with retailers to help consumers make the best use of offers, for example recipe suggestions.	Consumers know what they need to buy, and how much. Consumers can take full advantage of special offers, and know how to manage the extra food offered through these promotions.
<b>Food industry</b>	Help consumers reduce food waste	Promotional schemes are sensitive to the need to reduce food waste; flexibility offered in portion sizing.	Easier for consumers to waste less food and take advantage of promotional offers.
<b>Government, food industry</b>	Clear, unambiguous date labelling, food storage and usage guidance	Joint work between Defra, the FSA, WRAP and the food industry to improve the clarity and consistency of date labelling and storage guidance.	Consumers are clear on what to eat, by when and how to store food properly; Enables retailers to manage stock efficiently; Food safety is ensured.



## Action: reducing food waste in the supply chain and at home.

Who	What	How	Result
<b>Food industry</b>	Processors and retailers reducing waste	Measures to optimise packaging set out in the 2009 Packaging Strategy and second phase of the Courtauld Commitment.	Food appearance and shelf life is still protected; Innovative packaging uses fewer resources such as oil, water, and energy.
<b>Government, food industry</b>	Reducing waste in the food supply chain	Development of Anaerobic Digestion Implementation Plan, based on recommendations of Anaerobic Digestion Task Group; £10m Anaerobic Digestion Demonstration Programme Support under financial incentives for renewable energy and capital grant programmes; Online anaerobic digestion advice portal.	Fewer greenhouse gas emissions; Reduces the amount of waste going to landfill; Enables power to be generated from waste; Digestate can be used as a fertiliser.

## 6. INCREASING THE IMPACT OF SKILLS, KNOWLEDGE, RESEARCH AND TECHNOLOGY



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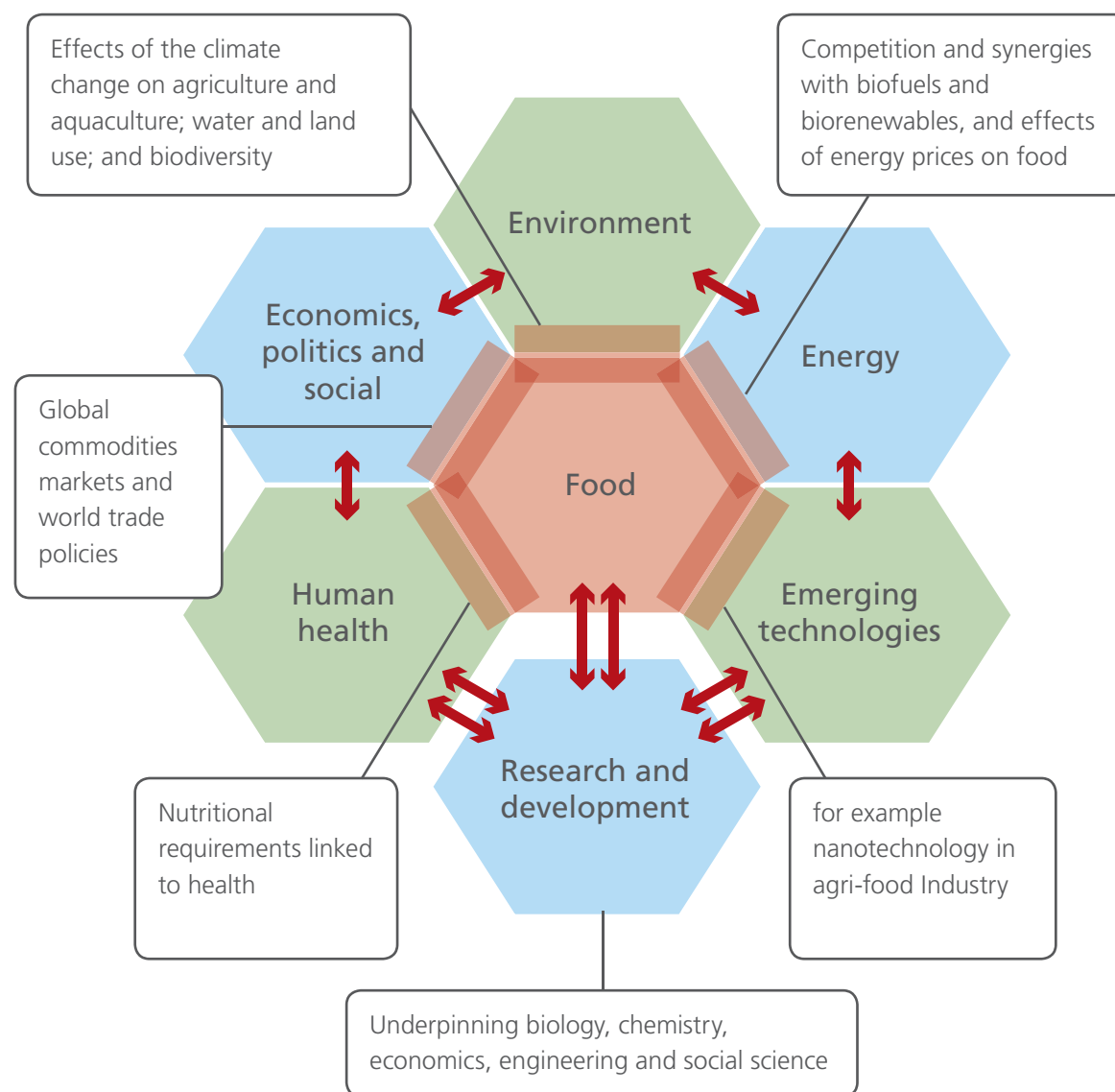
FACE – Farming and Countryside Education [www.face-online.org.uk](http://www.face-online.org.uk)

## Food research is a complex, multi-disciplinary field which requires collaboration between public and private sectors to innovate.

Research and development will be increasingly important as all countries learn to use the finite resources available sustainably to produce ever more food to feed the growing global population<sup>1</sup>.

Research could help towards our production and environmental goals in areas such as developing crop varieties which require lower inputs but still meet end-user and agri-ecological requirements, while recognising the value of agricultural biodiversity including plant genetic resources and crop wild relatives (wild plants from which crops are developed) to this work. Developing precision farming and Integrated Pest Management systems can also reduce chemical and energy inputs needed to grow our food.

GM, like nanotechnology, is not a technological panacea for meeting the varied and complex challenges of food security, but could have some potential to help meet future challenges. Safety must remain our top priority and the Government will continue to be led by science when assessing the safety of GM technologies. The Food Standards Agency is taking forward a programme of consumer engagement which will provide an opportunity to discuss with consumers their understanding of GM, their understanding of the benefits, and their concerns.



<sup>1</sup>: Global agricultural research spend is assessed under Theme 1 (Global Availability) of the UK Food Security Assessment (Defra, 2010)

## Realising the potential of UK science, innovation and skills and continuing to translate research into practice will all play a major role in achieving our goals.

- Historically the UK has led the world in the development of new crop varieties, livestock breeds, farming techniques, food manufacturing technology and product innovation. The advanced and sophisticated agricultural sector is well linked to a global system providing chemical, biological and informational inputs.
- We need to make sure that the results of research are transferred into the food system, public policy and our lifestyles, and that best practice is shared across the supply chain – both at home and abroad.
- Translation of research into practice is a major part of Government's support of sustainable farming and fishing, especially in developing collaborative projects with industry. This means that the food sector can readily use findings of new research to improve their products and processes. Closer communication between the research community and the food industry enables researchers to identify the challenges facing the food system, and help them develop

complementary research programmes. The Technology Strategy Board's Sustainable Agriculture and Food Innovation Platform<sup>1</sup> will bring together business, academia and Government to understand better the challenges and drive forward innovation in business.

- Total UK Government and Research Council spending on food and agriculture was over £350 million in 2008. Defra and BBSRC<sup>2</sup> encourage industry-led agricultural research and development. Government sponsored programmes have supported innovation by industry and will continue to do so through the Technology Strategy Board Sustainable Agriculture and Food Innovation Platform.
- The UK plans to double investment in agricultural research for development to £80 million a year by 2013 to provide poor farmers with access to technologies and help national governments with more effective agricultural policies, based on a robust evidence base. This includes support to the Consultative Group for International

Agricultural Research (CGIAR), and regional research organisations in Africa. The Foresight Global Food and Farming Futures project is looking at the challenge of how a global population of 9 billion by 2050 can be fed healthily and sustainably. The project takes a global view of the food system, considering issues of demand, production and supply as well as broader environmental impacts, to strengthen understanding and analysis of the global uncertainties and interdependencies.

1: [www.innovateuk.org](http://www.innovateuk.org); 2: Biotechnology and Biological Sciences Research Council

## 2030 goals for research, development and skills.

**Research is joined up across disciplines and translated effectively into practice**

Food research and innovation funded by the public and private sector is developed with end-users of that research, and is effectively translated into practice in primary production, to promote a thriving agri-food sector, and allow businesses to be more sustainable and efficient in meeting economic, environmental and social goals.

**Information and best practice are shared**

Knowledge, best practice and skills are accessible and exchanged across the food system.

**Skills are at the heart of successful food, farming and fishing businesses**

Farmers, fishermen, and employees within the agri-food sector recognise the importance of maintaining and developing their skills and have access to opportunities to learn through advice, informal and formal education, and encourage new entrants to join the sector. Similarly, new entrants are attracted to careers in food research and development.

**The public are engaged with and support food science and research**

People are well informed, and can participate in debate about the risks and opportunities posed by the use of new technologies in the food sector.

**The UK is a world leader on food R&D**

The UK is a world leader on food research and innovation and is co-operating with a range of international partners, through various mechanisms including the EU framework initiatives and Sustainable Development Dialogues, to find solutions to international challenges including reducing greenhouse gas emissions from primary production.



## Government is leading collaboration on research, by helping to connect funders, researchers and users of science.

- Our vision for a sustainable and secure food system can only be achieved through a strong contribution from research and innovation. This will provide the evidence to support effective, coordinated policies and ensure the development and dissemination of new knowledge, technologies and skills.
- The 'UK Strategy for Food Research and Innovation', developed under the leadership of the Government Chief Scientific Adviser, provides a framework to coordinate food research and innovation across Government and the Devolved Administrations. Many of the research issues, by their nature, are complex and multi-disciplinary, and will often cross departmental and organisational remits. Tackling these in an effective way requires strong links between funders to address the key questions while making best use of increasingly pressured resources.
- The Research and Innovation Strategy is centred on the contributions of the public sector, but also considers the important links and shared interests with the wider research communities and users, in industry and elsewhere.
- The Research and Innovation Strategy also sets out how we will engage internationally on evidence and innovation to promote policy interests and to influence European and other international research organisations. This collaboration offers opportunities to address common policy challenges through joint research, exploit the complementary strengths of different national research programmes and be able to fund large-scale projects. We will also promote development and poverty reduction in poorer countries, helping to provide poor farmers with access to technologies and helping national governments to make better policies on agriculture.

## Action: research, science and skills to underpin the transition to a sustainable and secure food system.

Who	What	How	Result
<b>Government</b>	Joining-up and integrating research across Government, private sector and third sector	A new research programme on food security, coordinated by BBSRC and being developed jointly with Research Councils and Government departments, as well as the Devolved Administrations, and including close engagement with industry and the third sector.	Better value for money is achieved from research budgets; research programmes across disciplines, organisations and sectors are coordinated and produce high quality research and practical applications.
<b>Government, industry, research community</b>	Effectively translating research into practice	A new Sustainable Agriculture and Food Innovation Platform led by the Technology Strategy Board, co-funded by Defra and BBSRC with £90m over 5 years, to fund innovative technological research and development in areas such as crop productivity, sustainable livestock production, waste reduction and management, and greenhouse gas reduction.	The whole food chain is supported in adopting new, more sustainable techniques encouraging more to do so.
<b>Government, research community</b>	Research and development to support improvements in sustainable global agriculture	DFID doubling investment in research and development to £80m a year by 2013 providing poor farmers in developing countries with access to technology, supported by Defra-sponsored work including on crop genetic resources and agricultural biodiversity.	Wider application of traditional and new technologies to support sustainable global agriculture, including through the conservation of agricultural biodiversity.
<b>Government</b>	Future challenges prepared for in advance	A major Foresight study <sup>1</sup> is looking over the long term at how a future world population of 9 billion can be fed healthily and sustainably. It is set to launch its findings in October 2010.	Long term planning reduces future threats to the food system.

## Action: research, science and skills to underpin the transition to a sustainable and secure food system.

Who	What	How	Result
<b>Government, skills councils, research community, Industry</b>	Maintain and improve the food sector's skills	A new BBSRC Advanced Training Partnership scheme to provide a range of specialist high level training (masters, professional doctorate and continuous professional development) to meet industry needs in partnership with higher and further education sectors.	Greater availability of training for those in and wishing to enter the food sector, including health and sustainability.
<b>Government, research community, food industry and civil society</b>	The public and civil society are engaged in and better informed about research, its outputs and applications	Make research priorities and outputs of research projects widely available and easy to understand.	Raised public trust in research.
<b>Food businesses, education system</b>	Demand created for food sector skills; food industry is seen as an attractive employer with a highly skilled workforce	Provide wider opportunities to the workforce and better address the needs of the sector, by making training available that supports entry into the sector, career development and vocational learning, for example Lantra's Skills Manager tool – an online tool to enable employers to manage staff more effectively by recognising and assessing employees' training needs in a cost-effective way.	The food system attracts talented people with the skills needed to adapt to new challenges, including into R&D roles.
<b>Government, EU</b>	Food system regulated in ways that continue to support and encourage innovation, while minimising the burdens on industry	Evidence based policy development, and appropriate and proportional regulation.	Producers, processors and retailers are able to innovate to improve their economic and environmental performance while protecting the public interest.

## Case studies – how research can help meet the challenges for sustainable food.

### Higher-sugar grasses for sustainable production of ruminant livestock and reduced environmental pollution

- Research carried out by the Institute for Biological, Environmental, and Rural Sciences (IBERS), developed high-sugar ryegrasses and assessed their benefits for meat and milk production – increased productivity and a reduction in environmental impacts (through increased nitrogen use efficiency).
- The aim was to provide a better-balanced supply of energy and protein to the micro-organisms in the rumen of cattle and sheep to enhance animal performance, to reduce the excretion in manure of surplus grass protein, and to reduce consequential emissions of ammonia and nitrous oxide to the environment.
- Animal feeding trials demonstrated that the new varieties resulted in improved animal performance when grazed and also when made into silage. The improved nitrogen usage in dairy cows fed high sugar grass had environmental value as well as economic benefit. The project resulted in several new varieties of grass being produced and marketed in the UK and elsewhere.

### Reducing the amount of water needed to grow strawberries by 70%

- East Malling Research, through a Defra LINK project, are improving water use efficiency and fruit quality in strawberries. Research shows that a 70% reduction in water use can be achieved through better scheduling of irrigation, with improvements in flavour and shelf-life potential. Results are now being transferred to potatoes - another crop with high water demand.

### Finding simple ways of reducing fish discards by 57%

- Because of the variety of fish species in our coastal waters it is hard for fishermen to avoid catching fish that aren't marketable, either because they are too small or because they have little commercial value. Sadly this means that the numbers of fish being discarded are high.
- Discarding is widely regarded as a waste of natural resources, disruptive to marine ecosystems and ethically undesirable. Globally, 7.3 million tonnes of fish are discarded every year.
- Using its knowledge of fish behaviour, Cefas (Centre for Environment, Fisheries & Aquaculture Science) set up a project to see if simple changes to fishing nets – such as altering mesh sizes and specialist escape panels for different species – could deliver significant discard reductions.
- Project 50% – a voluntary project – involved twelve Devon beam trawlers trying out different types of fishing nets to decrease discards by 50%. Many industry experts believed that target to be unrealistically high. The results from the trials showed an unprecedented average reduction of 57%.



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# DELIVERING *FOOD 2030*



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There are key challenges for all parts of the food system, for Government and the third sector.

Sector	Challenge
<b>Farmers</b>	Improve profitability, productivity and competitiveness, and produce safe food sustainably and in line with what the market wants. Build a highly skilled and innovative sector. Manage risk and plan for climate change.
<b>The fishing industry</b>	Ensure that fishing is a highly skilled industry, attractive to new talent and using the right technology to fish sustainably. Help fishing to provide livelihoods for coastal communities. Manage risk and plan for climate change.
<b>Food processors</b>	Develop sustainable supply chains. Improve resource efficiency, and build a highly skilled and innovative sector. Manage risks and plan for climate change. Ensure food safety.
<b>Retailers</b>	Develop and maintain resilient supply chains and help consumers lead greener and healthier lives. Improve resource efficiency, and build a highly skilled and innovative sector. Manage risks, and plan for climate change. Ensure food safety.
<b>Food Service</b>	Develop and maintain sustainable supply chains and help consumers lead greener and healthier lives. Improve resource efficiency and build a highly skilled and innovative sector. Manage risk and plan for climate change. Ensure food safety.
<b>Government</b>	Set clear strategic goals. Address market failures (through regulation where appropriate). Press for action globally on food security and food poverty. Provide accurate information to consumers. Lead by example through public food procurement and support for the industry.
<b>Local and Regional bodies</b>	Support action locally to help businesses, including primary producers, and consumers to get what they need.
<b>Consumers</b>	Find out more about food – how and where it is produced, and how to eat healthily. Use their influence and spending power to support those who produce sustainable and healthy food. Waste less food.
<b>Research and education bodies</b>	Undertake high quality research on the challenges we face. Improve public confidence in science.
<b>Third sector</b>	Use their networks and trust in communities to help deliver some of the goals described in this Strategy, working with all parts of the food chain.



## Our principles for engaging with partners to deliver *Food 2030*.

- The importance of working together was recently underlined by the EFRA Committee in its report: *Securing food supplies up to 2050*, which recommended the development of strong relationships in the food chain to secure food supplies in the long term. We will build on and strengthen our relationships with businesses in the food chain, and those with an interest in food to deliver a sustainable, secure and healthy food system, as set out in this Strategy.
- Our principles for working with stakeholders will include:
  - Mutual trust, openness and transparency in all our dealings, including no surprises;
  - Early engagement on issues;
  - Working together collaboratively;
  - Constructive challenge;
  - Acknowledging disagreement and being open about why we disagree;
  - Basing our discussions on evidence.



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## Delivering the Strategy and monitoring progress.

### Delivering the food strategy

Working together – across the whole food system – is essential for success

- Working in partnership and across the supply chain is a key theme in this strategy. The Milk Roadmap, the partnership development of PAS2050, the Food and Drink Federation's five-fold environmental ambition and the Campaign for the Farmed Environment show the benefits of this approach.
- Defra has already agreed a collaborative approach with the FDF, BRC and NFU to deliver a secure, sustainable and healthy food system.
- We will work with others, including the Council of Food Policy Advisers, to map out how we deliver this strategy and develop clear timelines for doing so.
- We will work to strengthen the capacity of civil society to provide debate and challenge, and a voice for citizens on food issues.
- Defra is accountable, on behalf of HM Government, for the delivery of this strategy.

### Monitoring and scrutinising progress

Making sure that we're taking the right steps, at the right pace to meet our goals

- Government will promote honest and open feedback about how this strategy is being delivered, and we will look to businesses and stakeholders in the food system to provide open, constructive challenge.
- To inform this process, we will continue to update and publish our food sustainability indicators, and develop further metrics where they are appropriate. We will take the indicators and other evidence into account in developing future food policies.
- We will hold an annual food event with food industry stakeholders, experts, and the third sector to take stock of progress towards our goals for secure and sustainable food.
- We will also continue to make updated information available through the UK Food Security Assessment, reviewing risks and indicators as new evidence becomes available.

# MEASURING PROGRESS – INDICATORS FOR SUSTAINABLE FOOD



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FACE – Farming and Countryside Education [www.face-online.org.uk](http://www.face-online.org.uk)



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## Measuring progress – indicators for sustainable food.

We have developed a set of indicators for sustainable food which we will use to measure progress in delivering this strategy. Indicators of course only provide an overview of the challenges involved – we will use them alongside other evidence gathered, as well as feedback from stakeholders.

The indicator suite will be subject to ongoing development. Although its scope is UK-wide, it also seeks to set the scene within a global context and, subject to data availability, measure the global impact of UK food production and consumption.




The indicators align to each section of *Food 2030*:

1. *Enabling and encouraging people to eat a healthy, sustainable diet*
2. *Ensuring a resilient, profitable and competitive food system*
3. *Increasing food production sustainably*
4. *Reducing the food system's greenhouse gas emissions*
5. *Reducing, reusing and reprocessing waste*
6. *Increasing the impact of skills, knowledge, research and technology*

The indicators on the following pages should be read in conjunction with the UK Food Security Assessment<sup>1</sup>. Detailed assessments for the sustainable food indicators can be found at [www.defra.gov.uk/foodfarm/food/index.htm](http://www.defra.gov.uk/foodfarm/food/index.htm)









<sup>1</sup>: Defra (2010) UK Food Security Assessment

## Measuring progress: indicators for enabling and encouraging people to eat a healthy, sustainable diet.

Theme description	Rationale	Headline	Headline indicator: Comparison of current level with base line	Supporting indicators
Generating consumer-led demand for sustainable food is central to developing a secure and sustainable food system. Informed choice, education, access and affordability of healthy food, and food safety all play a part in creating confidence in food and in creating this demand.	Consumers have access to an affordable, healthy and varied diet	1. Accessibility and affordability: Relative price of fruit and vegetables	 Clear improvement since 1990 <i>(although increase in vegetable prices relative to other food observed since 2000).</i>	<ul style="list-style-type: none"> <li>• Low income households' share of spending on food</li> <li>• Food prices in real terms</li> <li>• Household access to food stores</li> <li>• Purchasing behaviour in at risk groups (under development)</li> </ul>
	Consumer understanding and demand for sustainable food	2. <i>Engaged and informed consumers</i>	<i>Under development – understanding the gap between action and attitude towards sustainable food</i>	<ul style="list-style-type: none"> <li>• Public sector leading by example (no data as yet)</li> <li>• Contextual indicators: Consumer interest in ethical imports; Origins of UK food imports</li> </ul>
	Eating a healthy sustainable diet will create a healthier society	3. Diet related ill health: Obesity	 Deterioration since 1995 <i>(with some decline in obesity levels since 2004)</i>	<ul style="list-style-type: none"> <li>• Dietary health</li> <li>• Fruit and vegetable consumption</li> </ul>
	Food safety is key to public confidence in the food system	4. Consumer confidence in food safety measures	 Clear improvement since March 2001	<ul style="list-style-type: none"> <li>• Public confidence in food availability (under development)</li> </ul>

A number of these headline and supporting indicators are also used in Themes 5 and 6 of the UK Food Security Assessment, Defra (2010)





## Measuring progress: indicators for a resilient, profitable and competitive food system.

Theme description	Rationale	Headline	Headline indicator: Comparison of current level with base line	Supporting indicators
A sustainable food system is dependent upon efficient, resilient and profitable businesses throughout the production and supply chain.	For the agricultural sector to be focussed on the needs of consumers through the market, producing more efficiently to enhance incomes of competitive farm businesses and for a competitive food sector to provide fair prices for the consumer and be driven by productivity gain	1. Gross Value Added per person in the UK compared with EU14 (Direct subsidies are not included and the ratio has been adjusted to remove the effects of exchange rates)	 Clear deterioration since 1990 ( <i>the measure has fluctuated since 1996 and increased since 2004</i> )	Contextual measure: Agricultural resilience
		2. Total Factor Productivity of the food chain beyond the farm gate <ul style="list-style-type: none"> <li>Retail, wholesale &amp; non residential catering</li> <li>Food manufacturing</li> </ul>	 no change since 1998 (with some fluctuation over the period)  clear improvement since 1998	
	Monitoring water usage in food production is essential to ensure water is used within its environmental and societal limits	3. <i>Water usage post farm gate (under development) (see also indicator for water abstraction on page 76)</i>		Contextual measure: water usage post farm gate
	Food transport has external impacts such as GHG emissions and congestion	4. External costs of food transport: urban road congestion; infrastructure costs	 Clear deterioration since 1992	
	Assurance schemes give consumers confidence in safety and provenance of food	5. Traceability of food (assurance schemes)	 Clear improvement since Q1 2003	
	Food-borne illness has a serious effect on health, medical services and the economy	6. Food-borne disease incidence <ul style="list-style-type: none"> <li>E coli, campylobacter and salmonella</li> <li>Listeria</li> </ul>	 Improvement since 2000  Deterioration since 2000	
	Animal disease can have a significant economic impact	7. Animal Health: Impact on UK cattle exports trade following restrictions against the UK on animal health grounds	Assessment pending latest trade data	Incidence and prevalence of disease
	The demand for meat and meat products should not be at the expense of animal health and welfare.	8. Animal welfare	 Little or no change since 2005	

Some of these headline indicators are also used in Theme 6 of the UK Food Security Assessment. Also of relevance to UK food chain resilience is Theme 4 of the UK Food Security Assessment.



## Measuring progress: indicators for increasing food production sustainably.

Theme description	Rationale	Headline	Headline indicator: Comparison of current level with base line	Supporting indicators
<p>Meeting the two major future challenges of rising population and climate change requires us to increase food supply from both farming and fishing, but without damaging the natural environment on which they depend</p> <p><b>Contextual indicators:</b></p> <ul style="list-style-type: none"> <li>• UK production (commodity output)</li> <li>• Global food availability</li> <li>• Millennium Development Goal 1</li> </ul>	Water is used within its environmental and societal limits.	1. Water abstraction for agriculture (UK)	 Clear improvement since 1995	<ul style="list-style-type: none"> <li>• River water quality: nitrate and phosphate levels in rivers</li> <li>• Pesticides in water</li> </ul>
	Soil is an irreplaceable resource and an essential growing medium.	2. <i>Soil quality (organic matter) [in absence of other measures – and noting soil organic matter is only part of the equation]</i>	 Deterioration (caveat: infrequent sampling for this measure)	<ul style="list-style-type: none"> <li>• Proxy indicator: sedimentation in rivers (relating to soil structure and erosion)</li> </ul>
	Diversity within flora and fauna offers resilience in potential times of stress along with the ability for the ecosystem to recover more quickly	3. Biodiversity Action Plan (110 agricultural species and habitats)	 Little or no change since 2002 (caveat: infrequent sampling for this measure)	<ul style="list-style-type: none"> <li>• <i>Biodiversity (water environment – under consideration)</i></li> <li>• Plant diversity in fields and field margins</li> <li>• Farmland Birds</li> <li>• Genetic diversity</li> <li>• Ammonia emissions</li> </ul>
	Long term security in fish supply also depends on sustainable sourcing of fish and shellfish.	4. Fish stocks harvested sustainably and at full reproductive capacity	 Improvement since 1990 (but still well below sustainable levels)	<ul style="list-style-type: none"> <li>• Marine system integrity (North Sea)</li> <li>• <i>Contextual measure: fish imports (under development)</i></li> <li>• <i>Contextual measure: sustainable fish consumption (under consideration)</i></li> <li>• Contextual measure: Global fish stocks</li> </ul>

Also relevant to this issue are Themes 1, 2 (including land use change) and 3 of the UK Food Security Assessment

## Measuring progress: indicators for reducing the food system's greenhouse gas emissions.

Theme description	Rationale	Headline	Headline indicator: Comparison of current level with base line	Supporting indicators
Food production is a significant contributor to GHG emissions, and therefore monitoring progress to reduce emissions is important in aiding the move towards the UK being on a "permanent low carbon footing"	Reducing energy consumption is essential to meet commitments to reduce greenhouse gas emissions	1. Energy use across food chain	<i>Under development</i>	<ul style="list-style-type: none"> <li>Energy use of domestic food chain</li> </ul>
	Monitoring progress to reduce emissions is important	2. GHG emissions from the UK food chain	<i>Under development</i>	<ul style="list-style-type: none"> <li>Trends in food related GHG emissions from UK households</li> </ul>

Energy dependency of the UK Food Chain is the headline indicator for Theme 4 of the UK Food Security Assessment. Global land use change (Theme 2 of the UK Food Security Assessment ) is also important within the context of global GHG emissions from agriculture.

## Measuring progress: indicators for reducing, reusing and reprocessing waste.

Theme description	Rationale	Headline	Headline indicator: Comparison of current level with base line	Supporting indicators
Inefficient resource use and waste have significant environmental and economic impacts. For a food system to be sustainable, it must operate eco-efficiently (i.e. generate more value with less impact) across the supply chain and be supported by consumer action on minimising waste.	Waste reduction across the food chain needs to be considered	1. Food and drink manufacturing waste	... insufficient data at present	<ul style="list-style-type: none"> <li>Contextual indicator: Waste generated per household per week</li> <li>Contextual indicator: Consumer attitudes to household food waste</li> </ul>

## Measuring progress: indicators to measure the impact of skills, knowledge, research and technology.

Theme description	Rationale	Headline	Headline indicator: Comparison of current level with base line	Supporting indicators
A resource efficient and technologically advanced agri-food industry depends on harnessing innovative ideas and processes within its working practices. It therefore relies on the appropriate underpinning skills base and research.		1. Investment in training	<i>Under development</i>	<ul style="list-style-type: none"> <li>• Skills and training pre-farm gate; food and drink manufacturing; and processing</li> <li>• Higher education (<i>under development</i>)</li> </ul>
		2. Development and uptake of knowledge and innovation	<i>Under development</i>	

# Glossary

**AD** – Anaerobic Digestion

**BBSRC** – Biotechnology and Biological Sciences Research Council

**BRC** – British Retail Consortium

**CAP** – Common Agricultural Policy

**CCA** – Climate Change Agreements

**CFP** – Common Fisheries Policy

**CGIAR** – Consultative Group on International Agricultural Research

**CRC** – Carbon Reduction Commitment

**CITES** – Convention on International Trade in Endangered Species

**DDA** – Doha Development Agenda

**DFID** – Department for International Development

**EBLEX** – English Beef and Lamb Executive

**EFRA** – Environment, Food and Rural Affairs Committee

**EU** – European Union

**FAO** – Food and Agriculture Organisation of the United Nations

**FDF** – Food and Drink Federation

**FSA** – Food Standards Agency

**GHG** – Greenhouse Gas

**GM** – Genetically Modified

**ICCAT** – The International Commission for the conservation of Atlantic Tuna

**IPBES** – Intergovernmental Panel for Biodiversity and Ecosystem Services

**IPCC** – Intergovernmental Panel on Climate Change

**IUU** – Illegal, Unregulated and Unreported Fishing

**MDG** – Millennium Development Goal

**MSC** – Marine Stewardship Council

**NFU** – National Farmers Union

**NGO** – Non-Governmental Organisation

**NHS** – National Health Service

**PAS 2050** – A publicly available specification for measuring greenhouse gas emissions from goods and services.

**RDPE** – Rural Development Programme for England

**RSPO** – Round Table on Sustainable Palm Oil

**SME** – Small or medium sized enterprise

**TEEB** – The Economics of Ecosystems and Biodiversity study

**Third Sector** – voluntary and community organisations, charities, social enterprises, cooperatives and mutuals both large and small

**UNEP** – United Nations Environment Programme

**WRAP** – Waste and Resources Action Programme







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