Global Food Security

Sustainable, healthy food for all

# Global Food Security Programme – Exploring public views

# Executive Summary

Ensuring people have a secure, sustainable and nutritious supply of food is likely to be one of the most significant public policy issues of this century. This scoping study for the Global Food Security programme engaged members of the public to consider aspirations and concerns around the research needed to help address the challenges facing food security in the future. Specifically, the study aimed to help to characterise and identify issues that could warrant a deeper dialogue with a larger group of the public.

The project involved a total of 44 people in a two stage workshop process in London, Edinburgh and Aberystwyth.

The following key findings emerged.

- While the scoping study has demonstrated that the public can actively engage with global food security, its breadth and complexity of the issue makes it challenging for dialogue.

The key features of topics worthy of a deeper dialogue with the public were:

- *Topics that are controversial.* Those characterised by different views on the scope and limitations of research (including who benefits, uncertainties, and potential risks.
- *Topics which concern profits and interests.* Particularly relating to trade, the price of foods, the power of companies, and potential conflicts between corporate and public interests. The roles and responsibilities of business in this context were very important.
- *Topics that demonstrate the connectivity between demand and supply.* In particular, *issues* which bring to the fore the relationship between finding more efficient ways to produce more food and our consumption.
- *Topics that involve trade-offs.* For instance those related to maintaining the UK food supply at the expense of other countries.
- *Topics that focus on the purposes of research and its wider governance*. This was often more important than the specifics of the research itself.
- *Topics seen as disruptive.* For instance those which may involve adopting a less consumptive lifestyle or those that impact on people's views of naturalness.
- *Topics which shape individual and collective rights.* Such as the right of individuals to eat a wide range of foods; relative wider implications of such choices.
- *Topics impacting on legitimacy.* Such as the right of governments to intervene in personal choices.
- *Topics seen as personally relevant.* Particularly those demonstrating links between consumer behaviours and outcomes.
- *Topics that can raise awareness and promote behaviour change.* Such as to help galvanize people to take action.

In this context, there were a number of differences in the way in which the GFS programme and participants, conceived of critical issues concerning global food security. These were:

■ Global food

Participants generally focused on domestic rather than global issues. To broaden debate, thought needs to be given to common frames of reference and anchoring points, such as looking at the global consequences of local choices.

■ Supply and demand

The GFS programme tended to focus on supply side interventions, whereas for participants demand was seen as very significant. There was a strong sense that attempts to overcome food scarcity through innovation alone, were likely to fail.

■ Food technologies

Food biotechnologies should neither dominate the overall GFS agenda, nor be focused on to the exclusion of technical innovations that may offer solutions to food security. Specifically, the dialogue should start with the problem that needs to be addressed - food security - rather than presupposing particular solutions or presenting the issues as a choice between one technology and system against another.

■ Economics

There was a difference between a technical focus on the systems and processes that shape food trade (by the GFS), to one which centred on the power, ethics and the behaviours of those involved in those systems (by the public). Governance in this context will be a particularly important area, both to debate and research.

■ Resource efficiency

Other than food waste, resource efficiency was a particularly hard issue for people to engage with - being perceived as relatively abstract. One option could be to discuss resource efficiency not as a topic in itself, but as part of a wider discussion of particular approaches to food and farming – such as the impacts of eating a diet high in meat.

■ Research and outcomes

Participants wanted to know what actions were going to be taken to address food security. Participants were very keen on funding research activity where there was clarity around impacts (such as food waste). Research that may be valuable in aiding understanding but had limited practical application (either directly or due to a lack of political will) was less of a priority.

When specifically thinking about topic areas for future dialogue, 5 themes emerged.

**1. The sustainability of consumer choices**

- Do consumers have a right to a choice of foods?
- How can this be reconciled with poverty reduction and environmental sustainability in developing countries?
- What constitutes a sustainable and balanced diet?
- What are the resource impacts and wider implications of the 'de-seasonalisation' of foods such as fresh fruits, vegetables and salads?
- What are the environmental and social impacts of different ways of sourcing ingredients?
- How can food, environmental and economic resilience be developed in tandem?

**2. Demand for foods**

- What is driving rates of consumption of food in developing and developed nations?
- What should be done about this?
- What are the responsibilities of supermarkets/food industry, in encouraging consumption of foods?
- Are behavioural interventions legitimate and necessary to lessen demand for certain foods (e.g. food high in fat, food high in resource inputs).

**3. The role of technologies in relation to supply and demand**

- Who benefits from the use of new technologies?
- What are impacts on poor and wealthier farmers/ consumers/ societies?
- Is 'sustainable intensification' the right approach to address GFS?
- What is the role of less intensive farming in this context?
- How can we minimize the resource inputs in the production of meat and dairy?

**4. Global trade and food distribution**

- What is fair in terms of global food trade?
- Who profits from food production and what are the implications of trade reforms to address this?
- What are the causes of and remedies for mal-distribution and what are the implications for UK consumers of addressing this?
- What are the sources of food price volatility and implications of trying to diminish or manage volatility?

**5. The governance of food**

- Who should own and control the means of production around food?
- What does trustworthy governance of food look like?
- How can we link up research with action?

Finally, raising awareness was seen as a key part of a dialogue programme. This was not because people necessarily thought that communications would impact on behaviour, but rather that raising the issue helped to legitimise it - making global food security personally relevant for people, and potentially helping to pave the way to put policy options (potentially seen as regressive or unpopular) on the table.

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# 1. Background and objectives

## 1.1 Introduction

With the world's population predicted to reach 9 billion by 2050, the scarcity of natural resources and the impacts from climate change, food security is likely to be one of the most significant public policy issues of this century.

The Global Food Security (GFS) programme is a multi-agency partnership bringing together the research interests of the Research Councils, Executive Agencies and Government Departments. The goal of the partnership is to work together to support research to meet the challenge of providing the world's growing population with a sustainable and secure supply of safe, nutritious and affordable high quality food, from less land and with lower inputs.

Meeting this goal will be very challenging. GFS-supported research covers issues as diverse as the production, distribution and economics of food, as well as fair access, global markets and international intellectual property.

Moreover, possible solutions to global food security are highly contested by different groups and are likely to raise issues of public interest. For instance, different systems of production (intensive and lower intensity), the use of agricultural technologies (such as GM) and the effectiveness of global food governance, distribution and fair trade all raise a series of wider social and ethical issues.

Given the chequered history of debates around food research in the UK, there now needs to be a more constructive dialogue with the public and stakeholders, to help inform research agendas and address our future food needs.

This study, on behalf of the Communications and Public Engagement Group (CPEG) of the Global Food Security Programme, is the first stage in a programme of dialogue to help consider public views, aspirations and concerns around the research needed to help address global food security.

Given the breadth of this topic, this initial scoping stage of the engagement programme has involved the public in identifying areas which warrant future dialogue in more depth. Specifically, this stage was designed to inform and influence the potential for and possible direction of public and stakeholder dialogue work in the future.

Ultimately both phases of the dialogue will act to influence the GFS funding strategy and, depending on the outcomes of the dialogue, result in a re-profiling of the research agenda and priorities to reflect the issues discussed.

Though not part of this report, this scoping study also measured and benchmarked public views and attitudes towards global food security through a nationally representative survey.

### 1.1.1 Aim and objectives

The aim for the scoping study was as follows:

- To develop an understanding of public attitudes to the breadth of topics raised by research relating to global food security, and to provide guidance on which areas, subjects or issues might be best suited for deeper exploration in a public dialogue.

To meet this aim, there were three specific objectives for the study:

- to explore people's views on global food security and the issues surrounding it
- to introduce a range of challenges around food security and develop an understanding of people's reaction to these challenges with reference to the knowledge needed to address them
- to develop recommendations for areas of public interest that justify or would benefit from further in-depth work.

A summary of our approach to explore these issues is given in the next chapter.

# 2. Our approach

*To conduct the scoping study TNS BMRB worked in partnership with SPRU - Science and Technology Policy Research at the University of Sussex. The team at SPRU provided an advisory role on the project, in particular commenting on early drafts of our research materials. The project was steered by the GFS CPEG Oversight Group, who also provided comments on our design and materials. Our approach is described next.*

## 2.1 Methological overview

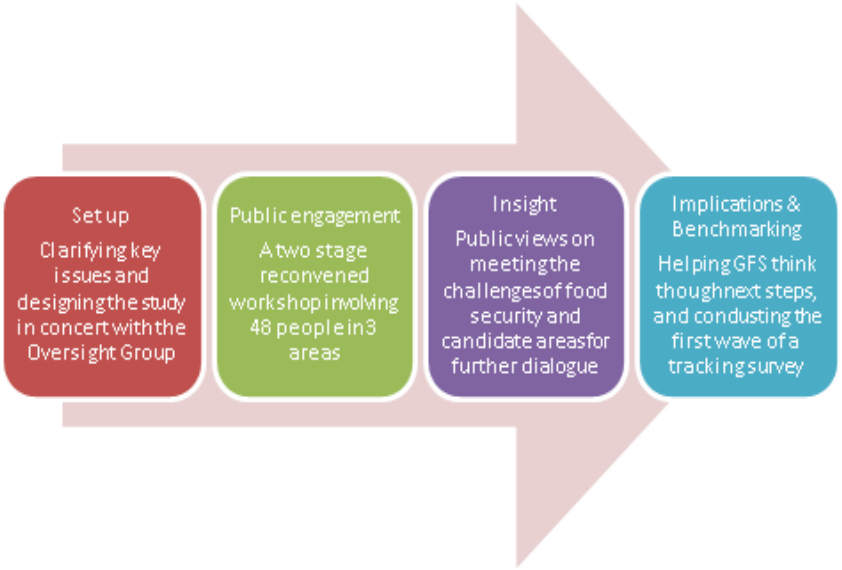
Our approach involved 4 stages: set-up, engagement, insight and implications (see figure 1).

### 2.1.1 Set up

The set up stage began with an Oversight Group meeting on 16 March 2012. At this meeting, key aspects of our proposal were reviewed and the broad method agreed.

- Workshop 1 focused on the challenges around global food security
- Workshop 2 focused on the knowledge/research needed to address these challenges, and prioritised issues for future dialogue in that context.

**Figure 1: Overview of approach**




After the scoping meeting, we undertook a document review to inform the stimulus materials for the study. These were analysed in a framework covering the following three areas:

- issues relating to food globalisation
- key drivers affecting global food security
- issues relating to GFS thematic research priority areas.

A list of reports and publications reviewed is given in the appendix.

#### 2.1.1.1 Sample and recruitment

The study was conducted in 3 areas: London, Aberystwyth and Edinburgh. Sixteen members of the public were recruited per area, with 48 people invited to take part in the study overall. Sampling was purposive, with participants recruited to the following variables:

- Gender
- Age group
- Socio-economic group
- Ethnicity

Quotas for each of these variables reflected local area demographics. Our achieved sample was 44 respondents - a breakdown is in table 1 below.

**Table 1: Achieved sample**

| Area | Age group | Socio-economic | Gender | Ethnicity | Children in household | Total |
|---|---|---|---|---|---|---|
| London | 18-34 5 | AB 3 | Male 7 | White 8 | Yes 7 | 15 |
| | 35-54 6 | C1C2 7 | Female 8 | BME 7 | No 8 | |
| | 55+ 4 | DE 5 | | | | |
| Aberystwyth | 18-34 4 | AB 7 | Male 8 | White 15 | Yes 5 | 15 |
| | 35-54 7 | C1C2 4 | Female 7 | BME 0 | No 10 | |
| | 55+ 4 | DE 4 | | | | |
| Edinburgh | 18-34 5 | AB 4 | Male 8 | White 9 | Yes 6 | 14 |
| | 35-54 6 | C1C2 5 | Female 6 | BME 5 | No 8 | |
| | 55+ 3 | DE 5 | | | | |

All participants were members of the local public recruited via free-find methods, which simply means that people were approached in the street to see if they would like to take part in the study. Participants were asked to complete a screening questionnaire to ensure quotas were met.

London groups were held at TNS premises, with the groups in Aberystwyth and Edinburgh being held at research institutes in the respective universities. An incentive payment of £90 was given to participants on attending both workshops.

#### 2.1.1.2 Recruitment of researchers

In the second workshop, we also engaged a range of academic and other researchers to help inform discussion with the public around research which could help address global food security. Names of researchers were canvassed from the Oversight Group as well as SPRU.

### 2.1.2 Public engagement

As noted above, a reconvened two workshop process was designed:

#### 2.1.2.1 Workshop 1

The first workshop explored public framing of the issues and the challenges facing global food security in the future. It specifically examined the following:

- public framing of food and food security
- reactions to the concept of *global* food security
- views on globalised food supply
- views on food imports and global food markets
- views on challenges facing food security including
    - demand
    - supply

- issues facing future production
- food losses
- energy and water resource

To enable debate, the first workshop used a number of stimulus and projective materials including food maps, handouts, prioritisation exercises and scenarios detailing future drivers shaping food security.

#### 2.1.2.2 Pre-task

Between workshops, participants were asked to consider global food security with friends and family. They were provided with the URL of the GFS website and encouraged to research the issue in more depth. In this context, they were specifically asked to help think about questions that could be asked to a wider group of the general public – these ideas formed the basis for the quantitative survey.

#### 2.1.2.3 Workshop 2

The second workshop explored future research that could help address global food security. Specifically, focusing on the four thematic priorities of the GFS programme, participants were asked to highlight research areas they believed were candidates for future public dialogue and/or interesting to fund.

The workshop was structured around the following areas:

- Review of issues emerging from workshop 1
- Review of questions and themes emerging from the pre-task
- Reactions to the concepts and features of the thematic research areas
- Reactions to four research issues within each of the thematic areas
- Prioritisation of issues for debate and/or funding

Again, a variety of stimulus and projective material was used to bring the discussion to life including:

- a video from Professor Tim Benton to answer participants' questions around GFS and the governance of food
- handouts highlighting different areas of research
- the use of 2-4 researchers per area to help inform debate
- Prioritisation games to rank areas for research and funding

Full topic guides for workshops 1 and 2 are appended separately.

### 2.1.3 Analysis and reporting

All workshops were audio recorded and transcribed. Immediately after the workshops, team members held a debrief session where topline findings were reviewed. Transcripts were then subject to a full framework analysis. Here, using the structure of the topic guide as a starting point, key themes and issues were summarized for each group and then compared. Issues which had explanatory power were particularly highlighted. This approach was used in conjunction with analysis of the research tools used in the process – for instance the ranking and prioritisation of cards detailing preferences for research in terms of dialogue and funding.

A draft report was written and circulated to the Oversight Group, before the final report was published.

Participants were also asked whether they would be prepared to support the GFS programme in any future dialogue work it may undertake. Twenty-six out of the 44 people attending agreed to this.

At the time of publication, dissemination plans were being finalised.

### 2.1.4 Limitations of the methodology

This project was designed as a scoping study. It involved relatively few participants (44) and was conducted within a tight timeframe. In particular, it was beyond the scope of the project to discuss the full breadth of issues relating to global food security in depth. In this context, findings should be viewed as indicative rather than providing definitive answers. The study provides a starting point for future dialogue in this area, rather than a blueprint.

# 3. Findings – Workshop 1

*The first workshop explored people's broader views on food before introducing them to the concept of global food security. After discussing issues around the production, cost and distribution of food, a series of challenges facing food security in the future were introduced, and reactions to these explored.*

## 3.1 What is important to people about food

In the initial part of the workshop, people were asked what was important to them about the food they eat and whether they had noticed changes to the ways in which food is grown and consumed over recent years. Four themes emerged: price; the value of food; environmental impacts of food; and health and nutrition.

### 3.1.1 Price

Price and value for money were the most immediate and significant concerns for participants – particularly for those with families. It was noted that food prices had risen in recent years – with items such as milk, bread, cereals, fruit and vegetables seen as more expensive. This, combined with wider financial pressures, meant people were changing shopping behaviours – from swapping brands (purchasing cheaper 'house brands' or economy ranges or going to lower cost supermarkets) to eating different and cheaper types of food. In this context, it was thought that supermarkets often discounted or had cheaper prices for processed foods, which were seen as less healthy options. Food offers, such as buy one get one free, were also cited as increasingly commonplace and though often used, they encouraged consumers to buy more food than they needed.

Participants were also concerned about the effects of food price volatility on poor people, especially in developing countries.

### 3.1.2 Value of food

Related to the discussions about prices, was that people valued food less – and as a consequence wasted more food and did not appreciate its importance.

There was a strong sense that people had lost connection with food - unaware of how it was produced and where it has come from. As one participant noted:

"*People just aren't aware of how food is produced nowadays. We're so far removed from the lamb in the field or the calf or whatever. People don't think about it*." (Female, Aberystwyth, Workshop 1).

There was also a sense that people have become disconnected with natural food production cycles. For instance, with regard to food seasonality, it was now taken for granted that shoppers could buy everything all year round. This was noted as a very recent phenomenon.

However, these changes were perceived to be linked to poor quality – both that food (e.g. strawberries) shipped long distances was often less fresh and appetising but also that our appetites were sated and that food was appreciated less when you could buy what you want, when you want.

### 3.1.3 Environmental and social impacts of food

Counter to this, there was an acknowledgement of greater information around the environmental impacts of foods. Though discussed to some extent in terms of organic farming, this was more readily associated with ideas of buying local, seasonally produced foods as well as the rise of initiatives like farmers markets. There was a particular unease around the long distances food and drink were transported and the associated environmental impact of this. Issues around who profits from food were also raised, with awareness of fair trade initiatives. As well as ethical foods, Halal foods produced to religious standards were also cited. Other campaigns looking to tackle issues such as food packaging and plastic bag use were noted. However, there was an overall sense that all these initiatives had fairly marginal impact on consumers – who predominantly made choices in terms of price and convenience.

### 3.1.4 Health and nutrition

Participants were keen to try and eat a healthy and nutritious diet, though noted that this was often hard to achieve in practice. As highlighted above, unhealthy diets were seen to be fundamentally tied to the way in which food was processed, marketed and consumed as part of a busy and convenience led lifestyle. Labelling (particularly RDAs) was highlighted as an important guide for consumers around the nutritional value of food. However, they were also concerned around how food marketed to be healthy or natural, can be misleading. There was an overall idea of trying to balance diets, not in a strict nutritional sense, but that if you ate food high in sugar or saturated fats, you should also try and balance this by eating meals that were healthier. 'Natural' foods were believed to be better for people than processed ones.

### 3.1.5 Views on concept of global food security

After this initial discussion, participants were then asked what they understood by the term 'Global Food Security'.

Whilst overall there was extremely low awareness of the phrase, upon reflection participants had a broad intuitive understanding of what the term implies. In particular, participants defined the issue in terms of the wider availability and distribution of food, and the need to ensure enough food for people everywhere

*"I think it means that's there's enough food to feed everybody" (Female, Wales, Workshop 1).*

*"The global flow of food from one part of the world to another, that's why you are talking about security, to keep that flowing". (Male, Edinburgh, Workshop 1)*

However, while participants were obviously aware certain foods were imported, overall they were not used to thinking about food in a global context – the frame of reference was too large. Rather, and as noted earlier, their 'engagement' with food was at point of purchase and concerned more immediate factors such as price and quality.

In addition, the idea of needing to build greater resilience into global food supplies was unfamiliar.

With reflection, participants also touched on the idea of food potentially running out, due to things like population growth, and also how innovations in food production and farming techniques have helped to maintain supplies over recent years:

*"Someone predicted it ages ago, I can't remember the person, but they said that we were going to run out of food, but they didn't take into account fish farms and GM foods, stuff like that". (Male, Edinburgh, Workshop 1).*

Following these discussions, participants were asked to reflect on the following description of global food security used within the GFS programme:

> Global Food security concerns how to provide the world's growing population with a sustainable, secure supply of nutritious and safe food from less land and using fewer inputs

When considering the description, three things emerged:

- 'Security' was predominantly associated with food safety – particularly around ensuring imports of food globally are safe to eat. To a lesser extent it was defined in terms of global availability and distribution of food.

- 'Inputs' had little meaning for people. Specifically, they struggled to understand what the inputs meant in this context.

- 'Sustainable', though widely recognised as a term, was seen to be an amorphous concept that was not well defined or understood.

It should be noted that the description also started a broader debate around the use of technologies, particularly GM, in meeting food needs. This was unprompted and specifically highlighted attempts to create foods that had greater yields and were more productive. There was also an immediate association with the reliance on science and technology to potentially address future food needs. Food technologies were often viewed as synonymous with intensive farming practices. In this context, it was also noted that there was a potential problem in using less intensive farming practices (both organic and conventional) relative to the challenge of producing more food.

The description of sustainability was seen as fairly academic, removed from the everyday experiences of consumers and not seen as personally relevant. As a London participant stated:

"I don't really think about it until you say it, when I go round Sainsbury's or whatever, I'm not thinking about that". (Male, London, Workshop 1.)

Overall, there was a tendency to assume these pressures on food supply predominantly affected the lives of others – particularly those in developing nations. The UK in particular was seen to be broadly self sufficient, not have significant population growth, and able to innovate out of problems should they arise.

## 3.2 Where food comes from

### 3.2.1 Food miles

*In the initial part of the workshop, participants were given world maps and asked to mark the countries involved in producing and processing two everyday products: a Kit Kat and a bag of frozen scampi (see figure 2). After revealing the answers, the discussion focused on how and why food was interconnected.*

**Figure 2: Food miles maps**


Participants expressed surprise at the diversity of ingredients and countries involved in producing a familiar chocolate bar. Though now owned by Nestlé, Kit Kat was still associated as a quintessentially British brand - and there was an expectation that many of the ingredients would be sourced more locally.

The globalisation of everyday food had both positive and negative associations for participants. On the positive side, it created trade opportunities for a large number of countries, encouraging economic growth and employment. It was also seen as reasonable for such products to have a wide supply chain, as it was not possible to grow all the ingredients in one country.

More negative associations concerned whether local economies really profited from global trade, or whether most of the money went to larger global businesses. The environmental impact of importing ingredients was also a significant concern.

The scampi example – involving food being caught in Scotland, shipped to Asia to be shelled by hand, before being returned to Scotland for processing - generally elicited more negative reactions. Many participants were shocked to hear that food can routinely travel such long distances during processing or production, perceiving this to have a significant negative impact on the environment. They believed such decisions were driven solely by economics – due to low labour costs. A minority of participants was less concerned – though surprised at the distances involved; they believed that cost rather than environmental issues shaped consumer behavior.

*"If another firm is going to China, doing it a lot cheaper, which one are you going to buy in Morrison's?" (Aberystwyth, RS)*

When considering food miles in more general terms, participants were evenly split between those who generally checked packaging for country-of-origin-labeling on food products (particularly in relation to meat products and supporting British farmers), and those who said they did not think about it.

#### 3.2.1.1 Food imports to UK

Participants were next shown information illustrating the proportion of imported food into the UK – which was broadly as expected or slightly higher than expected.[1]

As highlighted earlier, participants noted that imports have meant food is available all year round and this was environmentally damaging. Nonetheless, imports were highly valued due to the importance of having a varied diet and consumer choice.

More generally, the information presented reinforced the sense that UK food supply was unlikely to be seriously under threat. There was also seen to be spare agricultural capacity in the UK that could be utilised if needed, increasing the ability of the country to be self sufficient if needed (akin to the wartime effort).

[1] The UK is around 60% self sufficient in food supply (defined as the proportion of food consumed in the UK that is produced in the UK).

### 3.2.2 Global food

Finally in this part of the workshop, participants were provided with handouts on global food markets which illustrated:

- global reliance on a few staple crops - maize, wheat and rice
- ubiquity of products like soya in food and animal feed
- dominant use of imported, rather than native, seeds in food programmes.

When considering these issues, participants did not see significant concerns around homogenisation of diets – rather it was viewed as an artifact of global markets. There was also a perception that such crops are likely to produce good yields. Issues such as vulnerability to disease or crop losses was only spontaneously mentioned in one group – and likened to the potato famine.

There was however a greater sense during this session of the interconnectedness of food and such reliance potentially making food supply vulnerable to events across the globe:

*"The further you go down that route and the more dependent you become on something that is made elsewhere and grown elsewhere, it makes you more vulnerable to anything that's likely to happen elsewhere" (Aberystwyth, SD)*

When reflecting on global food supplies, participants highlighted that large businesses and the use of technologies to increase food supplies were also likely to be shaping food monoculture - as it permits standardised production processes. Again, this was seen as an inevitable consequence of globalization.

## 3.3 Supply, food and money

The next session presented participants with a range of stimulus materials to highlight the relationship between global food and business, including:

- comparisons of the percentage of national populations involved in agriculture
- the dominance of relatively few companies in certain markets
- impact of price spikes in commodities markets
- the impact of food subsidies.

In this session, participants particularly reflected on the roles and responsibilities of business in food production and supply – from large agri-businesses to the 'big four' UK supermarket chains. This dominance was seen to give companies a great deal of power over consumers, farmers and other suppliers. There was a concern that the impetus to grow the bottom line in companies could override the longer term sustainability of food production and also create incentives to market food where it's most profitable, rather than where it's most needed.

*"It's concerning because the amount of control that they have is far too much, and the companies by their very nature, they're there to make money, that's how they survive, that's what they do, and they're not going to have the worlds hunger high in their priorities even though they could play a large part in influencing it. (Male, Edinburgh, Workshop 1)*

Price changes were however the most significant concern. It was acknowledged that price spikes and food shortages abroad could have significant and destabilising effects on developing countries, which far outweighed impacts in the UK.

"We can afford food; it means that we'll have less disposable money. But in more developing countries, they don't have any disposable money in the first place, and then potentially it's famine". *(Male, Aberystwyth, Workshop 1)*

Despite this, there was discussion as to whether more focus should be placed on protecting UK food supplies, even if to the detriment of other countries. This issue was raised again in the second workshop in terms of a potential area for wider public debate.

Agricultural subsidies were also discussed in this context. Subsidies for UK farmers were not universally supported, with some feeling that they encourage consolidation into large scale farming businesses, to the disadvantage of smaller scale farmers. However, it was felt that:

- Any reduction in subsidies would ultimately be passed on to consumers through higher prices
- Subsidies could be seen as partial compensation for the regulatory burden imposed on farmers.

The role of subsidies in pushing down prices for producers in the developing world was barely touched upon.

The most significant perception of market failure related to the over production of food. This not only depressed prices and potentially wasted food, it also encouraged over consumption. That obesity is a major public health issue in the UK, while malnutrition and famine are a real concern in many developing countries, was a significant moral issue. Distribution of food globally was also felt to be a major problem.

Overall there was an ambivalent relationship around food prices. On the one hand a belief that current markets were not functioning particularly well and caused significant externalities (food waste, environmental damage, social

inequality); on the other a concern that not subsidising food could destabilize markets and cause widespread civil unrest.

## 3.4 Five challenges facing food security

Participants were next shown a variety of stimulus materials highlighting different trends and drivers shaping global food security.

**Figure 3: Demand for food**


### 3.4.1 Demand

First people considered factors shaping demand for food (see figure 3).

This included:

- Rates of population growth
- Resource impact of changing diets
- Global levels of obesity and malnutrition

Whilst population growth was seen to be a self evident driver of demand, what was particularly striking for participants was the coupling of growth to changes to diet.

There was a strong sense that without significant changes to these drivers, there would likely be significant food shortages in the future.

There was a perception that in the UK and other western countries, social and economic development had stabilised the numbers in the population. Population growth was rather perceived to be a big issue for places like India and Africa. Attempts to lower birth rates were viewed as very difficult to achieve (the problems of the one child policy in China were highlighted) and there were mixed views as to whether policies to encourage smaller families should be developed.

To some extent, changing diets was seen as something that could be more easily addressed. It was viewed that people in developing nations had the right to aspire to eat a wider range of foods, including meat. As such, the issue was seen as very much a western problem, caused by the over consumption of resource intensive foods, driven by powerful market forces and a consumer culture.

In this context, there were mixed reactions as to the likelihood of getting people to change diets – the expectation to 'eat what you want' was firmly embedded in our society. Views on polices which could change this (such as taxation of foods high in fat) were also mixed.

Managing global demand was seen as a complex problem, however, for certain groups, it was one that (as consumers) participants could help to influence directly through their own purchasing habits.

### 3.4.2 Supply

Strongly related to demand, participants were then shown factors shaping the future supply of food (see figure 4).

**Figure 4: Food supply**


This included trends and information on:

- Land use and agricultural production
- Proportion of land dedicated to livestock production
- Yield increases likely to be needed to feed 9 billion people by 2050

Across all groups, this session was quickly and almost exclusively discussed in terms of the role of food technologies, in particular GM, to increase yields.

While there were mixed views as to its desirability, the use of such technologies was viewed as relatively inevitable – given the scale of the challenges faced.

*"All of these problems push you towards it [GM], because nature on its own won't let you increase the productivity of one piece of land." (Aberystwyth, SD)*

Broadly, there were two different worldviews that shaped perspectives of food technologies:

- *A Promethean view*: those believing in the ability of science and technology to transform nature and help overcome scarcity through innovation. This was generally, though not exclusively, more dominant in rural groups.
- *A Precautionary view*: those concerned about the health, environmental and social impacts of such technologies, seeing their use as part of a wider dynamic of large agri-businesses dominating food production with potentially unforeseen consequences. This view was generally, though not exclusively, more dominant in urban groups.

GM and food technologies were generally associated with more intensive forms of farming, including the use of artificial pesticides, herbicides and fertilizers. The use of such technologies to potentially reduce intensive farming practices was not mentioned.

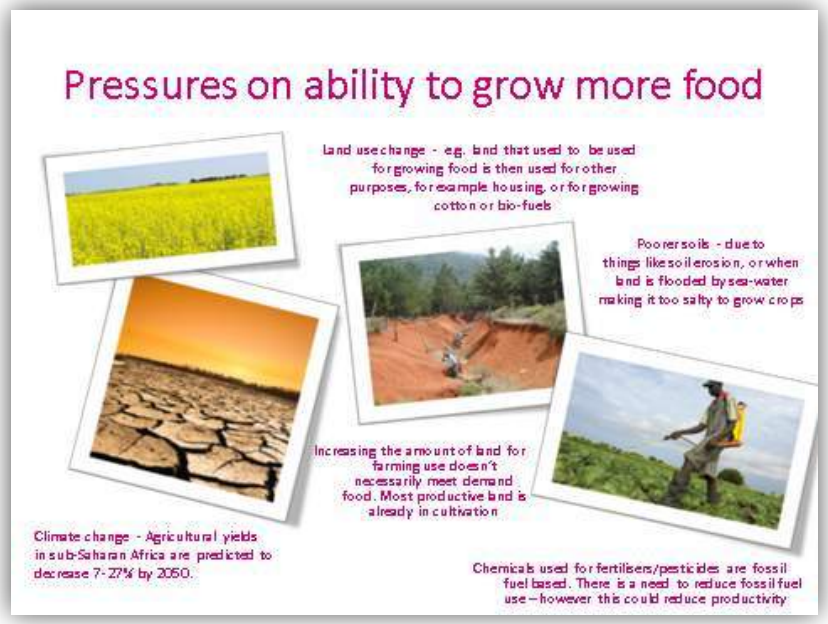
Whilst the need to increase yields was not doubted, a significant proportion of participants did not believe it was possible to address food security through supply side mechanism alone. Analogies were given with road building – in that just increasing supply acts to increase demand. Overall, there was concern that supply led

solutions were not sustainable. Without tackling demand, prices were seen as likely to increase significantly.

### 3.4.3 Ability to grow more food

The next issue explored different factors that impact on the ability to grow more food (see figure 5).

**Figure 5: Pressures on the ability to grown more food**




These included:

- Climate change
- Land use change
- Soil degradation
- Need to reduce fossil fuel based agro-chemicals and fertilizers
- That most productive land is already in cultivation.

Two themes initially emerged. The first, as in the previous session, was the role of science and technology to help overcome these pressures. Whilst GM again was mentioned, participants also flagged up the use of biofuels to help overcome our dependence on fossil fuels. Certain groups also highlighted 'organic' solutions to these issues e.g. using biological controls such as insects to help reduce pests. Overall, the interrelated challenges of GFS and climate change were significant concerns, particularly in terms of maintaining yields through less intensive farming.

Second, the global nature of the issue came to the fore during these discussions – in particular the need for a coordinated worldwide response. In this context, this area of debate was more abstract for participants, focusing on factors that were outside their frame of reference.

Overall, the debate in particular was quite disempowering for certain groups – who were pessimistic about the prospect of addressing the scale of such a complex challenge.

*"It seems like an impossible solution. Every time you try to do one thing, you're going to upset something else." (Male, Workshop 1, London)*

A final issue concerned land use – and how economic pressures to convert arable land to housing or other uses, placed profit over the public interest. Again, it was felt that the short term decision making, steered by market forces, was at odds with the need for long term sustainable planning for our food supply.

### 3.4.4 Food losses

Food losses explored a host of issues which impacted on the amount of food that gets from farm to fork (see figure 6).

**Figure 6: Food losses**


Specifically, this session focused on:

- Vulnerability to diseases
- Changes to disease patterns through climate change
- Post-harvest losses through poor storage and transport
- Food waste

The most immediate concern for participants related to food waste – with people shocked at the amount of food thrown away in the UK. Again, this was quickly related back to the roles and responsibilities of supermarkets and consumers, described earlier. More importantly, it was an issue that participants felt personally empowered to take action on - seen as a relatively simple and quick win, given the intractability of many of other food problems. Post-harvest losses were also seen as an area where immediate action could be taken.

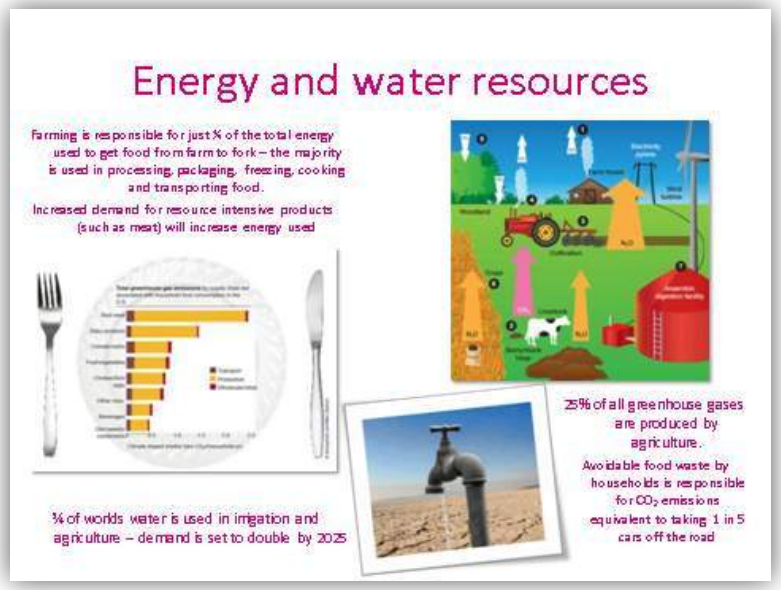
*"These are easy to change, I mean the increase in population and all these things are much more difficult problems, but there must be easy solutions to stopping the rice harvest being lost or food being thrown away." (Male, Edinburgh, Workshop 1)*

With the link between disease susceptibility and dependence on a few crops clearly illustrated during this session, participants were concerned about potential impacts on food prices of poor harvests, as well as humanitarian crises and migration from areas facing famine. The impacts of diseases on cattle, such as foot and mouth, were seen as significant problems which wasted very large amounts of food – with pyres of burning cattle still vivid for rural groups. Disease outbreak was also thought to be facilitated by modern farming techniques and practices, particularly in terms of the movement of cattle.

### 3.4.5 Energy and water resources

The final challenge explored the use of energy and water resources in the food production system (see figure 7).

**Figure 7: Energy and water resources**




Specifically, this focused on:

- Amount of energy used to produce different foods
- Greenhouse gas emissions through farming practices and food waste
- Energy uses across the food production process
- Water use in agriculture.

Water and particularly energy resource inputs were viewed as abstract issues and were relatively hard for people to engage with, particularly as food production techniques were areas that participants felt they had little influence over.

Of the two issues, the pressure on water availability was more intuitive, with surprise expressed at the significant amounts used for agricultural purposes. Water resource pressures were particularly seen to affect arid regions of the world rather than the UK:

"*It's hard to see [how this will affect us]. We are just lucky we live in Scotland because we don't have that water problem*." (Male, Edinburgh, Workshop 1)

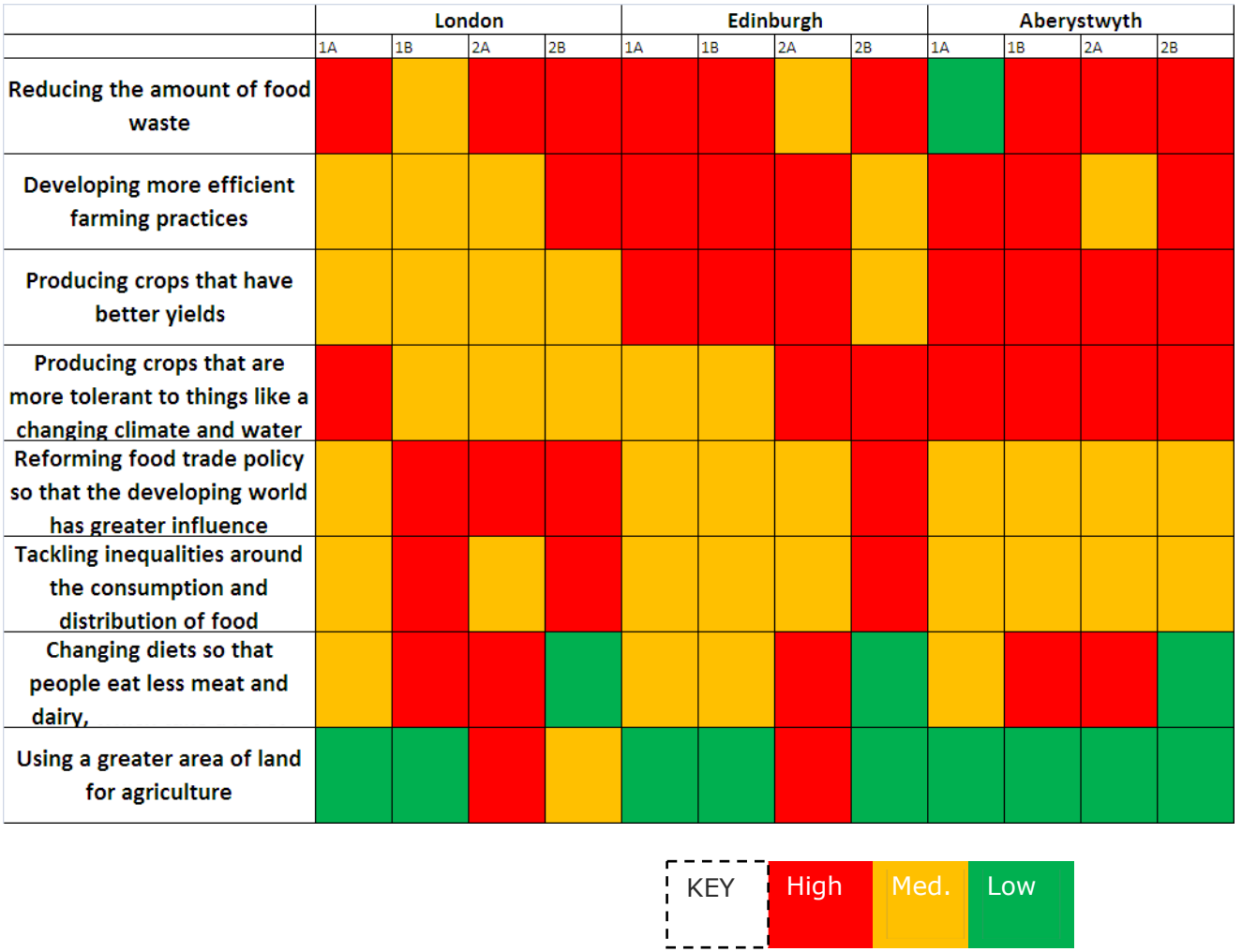
Technical solutions were highlighted as a means of addressing limits to energy and water resources, with processes such as desalination and low carbon energy sources cited. Market failures (from deregulation to the inability to cost environmental damage into different products) were flagged up in certain groups, as issues contributing to this problem. Finally, ensuring western societies consumed less food in general, and less resource intensive food in particular, was seen as needed. Participants also wanted to know whether food waste was a significant issue in other countries.

## 3.5 Participants initial priorities around food secruity

In the final part of the first workshop, participants were split into four small groups per area and given a series of statements about global food security. They were then asked to sort these statements from the most to the least pressing areas for research to address (see figure 8).

Overall, highest priority was given to those interventions which were seen as realistic and achievable, with significant emphasis placed on efficiency and reducing waste. More broadly, participants were split between those who focused on supply side issues, such as producing better yields and developing more tolerant crops through science (e.g. all Aberystwyth groups and certain groups in Edinburgh), and those who focused on more demand side issues and trade reforms (certain London groups and one group from Edinburgh). Changing diet was the most contentious issue.

**Figure 8: Priorities on food security after workshop 1.**



# 4. Findings - Workshop 2

The second workshop explored potential areas of research that could help meet the challenges around global food security. A range of examples were discussed under the four thematic research priorities of the GFS programme: economic resilience; sustainable food production and supply; resource efficiency; and sustainable, healthy and safe diets. The examples were selected as indicative of a broad range of food research.

In this context, the workshop aimed to understand the characteristics of research which made it suitable for future funding and/or debate, rather than the detail of individual projects.

Between workshops, participants were provided with a booklet to keep a record of food security issues they had discussed with friends and family. The workshop began with a review of these issues.

## 4.1 Reflections on food security

Overall, participants highlighted that they had found the first workshop interesting and that it had made them consider a range of issues that they had previously not thought about. Five themes emerged.

**1. Interdependencies and fragility of the food system**

The first theme related to the overall interdependencies of the food system and the extent to which this was perceived to be 'fragile'. There were concerns that the food supply was vulnerable to a host of issues including:

- Reliance on a handful of crops
- Dependencies on imports
- Climate change associated impacts on production and diseases
- Population growth.

Overall, this aspect of food security was viewed as 'very complex' and 'overwhelming'. As such, whilst people were concerned about these issues, they were discussed in the abstract, rather than in terms of agency to influence.

These challenges are at the heart of the framing of food security by the GFS programme. However, without appropriate 'hooks' into the issue, it was deemed too large and unfamiliar for most participants to meaningfully engage with.

Rather, issues framed in this way were seen as the responsibility of others - particularly governments and business. Participants wanted to know whether and how governance was being coordinated. There was concern and disappointment that there was no body with a mandate for global food security.

**2. Food markets and production of food**

A key issue for participants related to how markets seemed to have failed our global food needs. There were a host of issues that were flagged up:

- Over production of foods through subsidies

- Monopolies of production in crops through agri-business; monopolies of supply through supermarkets
- Demand leading to the export of food from developing countries, meaning local people go without.
- State food aid not delivering intended benefits.

Overall, these issues hit home due to the perceived waste, inefficiencies and inequalities in the food system. In this context, global food trade reform was seen to have significant social and ethical issues for respondents – this issue emerged again later when considering issues for future public dialogue.

**3. Responsibilities and motivations of business**

Tied to the above, were the responsibilities of business in the production and supply of food. The 'scampi example' highlighted in workshop 1 was cited by a large number of participants as symbolic of a food system that creates wrong incentives for companies. Fundamentally, participants highlighted concerns around the motivations of business. While they need to make profits, this should not always be at the expense of social goals, particularly if markets were subsidised.

**4. Novel food technologies**

Food technologies, in particular GM, were also discussed, particularly in the London workshops.

Participants wanted to know:

- What controls were in place?
- How we can make sure it doesn't go wrong?
- What research was happening in the UK?

The London group also highlighted the potential for a body, independent of government and business, to govern GM research in the UK.

**5. Public awareness and behaviour**

The final, and one of the most significant issues discussed by participants between workshops, was the need to raise wider public awareness about the issue.

Talking to friends and family had brought home that that 'no one really knows about it or has thought about it'. People also felt the issues were unlikely to affect them. In this context, having the opportunity to discuss food security in the workshops was seen as a real 'eye opener'. It had particularly made people think about:

- What food they were buying
- Where their food comes from
- Whether they really need the food
- What food they were throwing away

Any future dialogue was therefore seen to require a core awareness raising component.

**4.1.1 Public questions**

Finally, participants highlighted questions they felt were worthy of asking a broad cross section of the public. These included:

- What does global food security mean for you?
- Does it matter where your food comes from?
- Should we be trying to reduce imports and increase domestic yields?
- Whether we need to do more GM research to help safeguard global food security?

- Should the general public be made more aware of global food security so that their shopping behaviour and habits can be changed?
- Should governments directly intervene to limit pricing/exploitation by companies?
- How concerned are you that there could be a crisis in food supply by 2050?
- Would you be prepared to adjust what you eat so that the UK did not have to import food?

## 4.2 Framing of GFS programme thematic research priorities

In the next part of the workshop, participants were asked their spontaneous reactions to the key thematic research areas highlighted by the GFS programme. They were then given full descriptions and asked to reflect on these. Each of these descriptions is now considered.

### 4.2.1 Understandings of economic resilience

Economic resilience was not an easily accessible term for participants – with resilience in particular seen as conceptually complicated to express in terms of food.

It was spontaneously associated with understanding:

- The profit motives in food production
- How to maintain farming incomes
- The economic impacts of food safety
- Trade caps and European trade reform
- Food affordability and ability to cope with shocks/impacts of changes on supply in UK and abroad
- The need to develop stable food prices/ food affordability

The following GFS description was then provided to participants:

> **Economic resilience**
>
> Including research that explores global trade, food market economics, economic impact of food safety issues, competitiveness of farming and food businesses

Once the description was read, participants also highlighted they had not picked up on the food safety aspect of economic resilience. There was uncertainty as to how research in their areas could actually translate into action - specifically, how research could actually begin to influence global markets. In this context, research was not immediately associated with the subject area.

### 4.2.2 Understandings of sustainable food production and supply

Overall, this area was seen as more intuitive. It was spontaneously associated with:

- Producing enough food to meet the needs of a growing population
- The need to increase yields
- The environmental impacts of food production
- Living within our means
- GM crops

The GFS description was then provided to participants as follows:

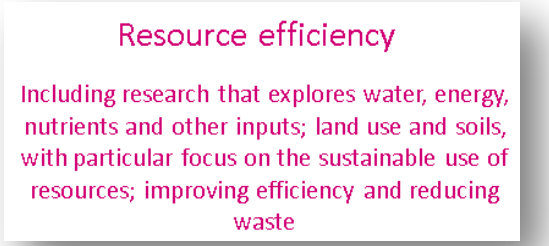

When the description was read it was thought that there should be a greater focus of the environmental protection aspects of sustainable production. The sustainability of fish resources was also thought to be a good way of engaging the public, due to the wider media interest in this issue.

### 4.2.3 Understandings of resource efficiency

Resource efficiency was the most abstract issue for participants. It was spontaneously associated with:

- The energy and water resources used in the production of foods (energy use was particularly related to the use of machinery)
- 'Making the best out of the land'
- Reducing food waste
- Creating the maximum potential yields from resources
- Intensive farming and research on impacts of agri-businesses
- Impacts on global warming

The GFS description was then provided to participants as follows:




The description was seen to be relatively clear, though there was ambiguity around what 'other inputs' meant. Reducing waste was seen to be the most personally relevant issue for participants.

### 4.2.4 Understandings of sustainable healthy and safe diets

This topic was viewed to be the most intuitive and easy to understand. It was spontaneously associated with:

- Being personally aware of 'what and how much you are eating'
- Whether food is safe to eat (particularly linked to the use of artificial additives and preservatives)
- What encourages consumers to buy certain foods and not others
- Lowering food prices for healthy foods
- Helping to educate young people and consumers
- Healthy eating policies in schools
- Trust in food producers and supermarkets
- Ensuring food is safe and healthy for the longer term
- Ensuring a varied diet.

The following GFS description was then provided:

> Sustainable, healthy, safe diets
>
> Including research that explores food safety throughout the supply chain, nutrition, consumer behaviour and food choice and accessibility

The description sparked a wide ranging discussion. Four issues emerged:

- whether it was legitimate for government to 'dictate to people to eat that or don't eat that'
- whether the government was too obsessed with health foods, rather than food security
- that the description did not explicitly highlight animal welfare
- that sustainable food may not be safe food

This last point in particular was discussed in terms of uncertainties inherent in novel food.

'*Sustainability and safe do not always go hand in hand do they…. Going back to GM, we don't know how safe they are because they haven't been round long enough to see the long-term effects'*. (Female, Aberystwyth, Workshop 2).

Finally, participants highlighted there needed to be strategic co-ordination of research and a clearer understanding of how the impact of the whole GFS programme was greater than the sum of the parts.

## 4.3 Priorities for debate and research

The next session comprised the main part of the workshop and involved participants reviewing illustrative areas of research in more depth. Specifically, within each of the GFS thematic research areas, four research topics were highlighted. Working in two small groups per workshop, participants discussed these with researchers and then were asked to undertake a simple prioritisation process.

Specifically, each research topic was ranked high (3 points), medium (2 points), low (1 point) or unrated (0 points) in terms of whether participants felt the issue was interesting or promising to:

- **debate** with a larger group of the UK public
- help **address** global food security

Participants were then asked to explain their reasons for the ranking process.

For the purposes of presenting the results:

- A total score of 15-18 is ranked high (shaded red)
- A total score of 12-14 is ranked medium (shaded amber)
- A total score of 0-11 is ranked low (shaded green)

Ultimately, these boundaries are arbitrary – and used to give a quick visual representation of public views.

In this context, it is the reasons underpinning the decision rather than individual ranking per se, that is more noteworthy. These reasons or factors in particular are explored in more depth in the conclusions section and form the overall rationale for areas for future dialogue. The ranking of individual research areas is now explored in more depth.

### 4.3.1 Research on economic resilience

The four research issues explored under economic resilience were:

- The factors (e.g. food distribution, market shocks, how markets and regulations operate) that impact on people's ability to afford and access food, with a focus on how to protect poorer households globally
- How to enhance and develop more efficient ways to increase the incomes and competitiveness of farm businesses
- The factors (e.g. climate change, price rises, crop and animal diseases) that impact on the UK's ability to continue to import sufficient levels of food in the future
- How to develop and enhance economic models that explore the relationship between trade flows, agriculture and hunger, and that also model the impact of environmental change on agriculture and agriculture on the environment.

**Figure 9: Public priorities on economic resilience**

| Issue | Priority to debate | Priority to address |
|---|---|---|
| Factors impact on people's ability to afford and access food | High | Medium |
| Efficient ways to increase the incomes and competitiveness of farms | Low | Low |
| The factors impact on the UK's ability to import sufficient future food | High | Low |
| Economic models on trade flows, agriculture, hunger, & climate change | Low | Low |

#### 4.3.1.1 Economic resilience – priorities for future debate

In terms of areas for future debate, two strong candidate areas stood out as high priorities:

- sustaining future UK imports
- food affordability

With regard to **sustaining UK imports**, there were three main reasons why this was deemed suitable for public dialogue.

- First, and most directly, was that it was seen to be directly relevant and tangible for UK participants to engage with, as opposed to issues with a much stronger international focus. Participants also felt they had a stake in the outcome.

- Second, people felt that there could potentially be trade-offs in protecting UK supplies, which could impact on the food security of developing nations – for instance farmers exporting food despite it being needed locally. In this context, there were concerns around social justice and the distribution of food. Overall, this issue was thought to be a good way to get people to consider whose interests were served through supplying the UK with food, as well as the wider ethics and impacts of food choices.
- Third and related to the above, was what constituted a sustainable supply of food to the UK. Specifically, should UK consumers have the right to consume such a wide choice of foods?

With regard to **food affordability**, there were three main reasons given:

- First, and most obviously, food affordability and food pricing was one of the most significant issues for members of the public throughout the debate – it was hence seen as personally relevant and likely to engage people more generally. It was also seen to be a key issue for the future. From an ethical perspective, people not only wanted to know how potential shocks to the system could affect them, but also those in developing countries. Potential trade-offs in protecting poorer households in such countries relative to the UK were also seen be an issue for debate.
- Second, reflecting discussions earlier, the role of supermarkets, agribusinesses and governments in controlling food prices was seen as problematic and needing reform. Thought needs to be given to how environmental, food, and economic resilience can be developed in tandem.
- Finally, there was a need to make markets work better for developing countries and to understand how food exports can be made to work for local economies, and promote local food production supply chains.

#### 4.3.1.2 Economic resilience – priorities to address

In terms of research to help **address** global food security, the main area noted as interesting or promising was also food affordability (a medium priority). Reasons cited included:

- It could help improve markets, by increasing efficiencies and reducing waste
- It could help reduce over dependency on a few producers/suppliers, and promote localised food production
- There was a strong moral imperative for the research, as it could help to understand and manage food demand, to help feed the poorest in times of crisis.

### 4.3.2 Research on sustainable food production and supply

The four research issues explored under *sustainable food production and supply* were:

- increasing crop yields, and the resilience of yields, through genetic improvement, better crop management and maintaining healthy soils
- enabling the rural poor, in developing countries, to produce more food for their own communities and to become less reliant on volatile markets

- reducing the use of water and energy in the production, processing, distribution and marketing of foods
- using new engineering technologies in agriculture. For example, this could include the use of robots, instead of large tractors for farming, that use less fuel (so less greenhouse gases) and reduce soil compaction, or the use of nanotechnology to develop slow release fertilisers that result in less pollution.

#### 4.3.2.1 Sustainable food - priorities for future debate

In terms of areas for future debate, two areas were viewed as a high priority:

- Increasing yields though genetic improvement
- Reducing water and energy inputs

A medium priority was:

- Enabling rural poor to produce more food.

**Figure 10: Public priorities on sustainble food**

| Issue | Priority to debate | Priority to address |
|---|---|---|
| Increase Crop Yields | High | Medium |
| Enabling the rural poor in developing countries | Medium | Low |
| Reducing the use of water and energy | High | High |
| Using new technologies in agriculture | Low | Low |

With regard to **GM technologies,** there were four mains reasons it was prioritised for debate:

- First and foremost, it was seen as a contentious issue - with views across groups differing considerably as to its scope and limitations in helping to feed the world
- Second, it differed from the other examples of agricultural technologies, in that it embedded change at a genetic level within the food chain. There were specific concerns around the safety and uncertainty of GM foods in this context.
- Beyond safety, GM was seen to be emblematic of wider issues around food governance - for instance, one group cited concerns around commercial exploitation of such crops as emblematic of current problems concerning big agribusiness and food. Debating what constitutes trustworthy governance was seen to be important. People also cited they were 'kept in the dark about GM food production' and hence governance needed to be opened up
- Finally, for proponents of GM, the drivers impacting on global food security meant it was an opportunity for

people to revisit the issue and reconsider potential benefits. Debate could hence improve the dialogue around whether such crops could be developed.

It should be noted that certain groups had concerns that GM had already been debated in a great deal of depth and hence there may be limited added value for a large discussion on the issue.

In terms of the need to reduce **water and energy** inputs, rights around water in particular was seen as an important area to debate. For instance, 'embedded water' in out of season fruit vegetables which are then transported around the world has an impact on the availability of water locally. Whether consumers were aware of such issues and the rights and responsibilities of eating such food was at issue.

With regard to **enabling rural poor to produce food**, debate was seen as needed, to convince people that believe taxpayers' money should be focused on issues with that do not directly benefit the UK. There were moral reasons to enable research to move forwards.

#### 4.3.2.2 Sustainable food - priorities to address

**Reducing water and energy inputs** was cited as the highest priority to address for food security. The primary reasons for this were:

- The strong need to reduce resource inputs (particularly water) given the need to increase yields. Essentially how to develop the sustainable intensification of agriculture was seen as key
- Global warming was also singled out in particular as a critical issue. Specifically, improvements in farming productivity should not come at the expense of big increases in greenhouse gas emissions.

**GM technologies** were also cited as a medium priority to help address food security. In this context, the promises around GM fitted well with needs to increase production with fewer resource inputs. As noted, an issue was the perception that GM crops may not deliver claimed benefits, or may have unintended consequences.

Finally, within this section, while the use of new technologies in agriculture was not highlighted for debate, it was discussed more than any other issue across the groups. It was rejected for being too technical (nanotechnologies) or too unrealistic (robot tractors used within the farming community). Nonetheless, it had caught participants' imagination – even if this was not explicitly recognised.

### 4.3.3 Research on resource efficiency

The four research issues explored under *resource efficiency* were:

- reducing greenhouse gas emissions from ruminant livestock such as cattle ,through enhanced understanding of their biological processes, leading to improved management practices in agriculture
- transferring the ability for nitrogen fixation into barley, rice and wheat

- manipulating the area of soil surrounding the roots of crops to intensify food production, while using less resources like water. For instance, working with farmers to understand land management.
- reducing the amount of energy consumed throughout the food system, by findings ways to make the production, processing, refrigeration, transport and storage of food more energy efficient. For example, using electric currents to purify and reuse water in food manufacturing.

#### 4.3.3.1 Resource efficiency - priorities for future debate

The only candidate area seen as a high priority for future debate was:

- Reducing the amount of energy consumed through the food systems

This was viewed as important for the following reasons:

- The immediacy of the issue for the general public, together with agency to help make an impact and contribute towards tackling global food security, was a key reason for highlighting this issue. It was particularly viewed as an issue people care about and could easily understand
- The holistic approach of the research – exploring impacts across the entire food system, rather than one part of it, was seen as helpful to debate, as it will give participants a sense of the overall nature of the problem and how making interventions in one area may affect another. Potential trade-offs around investment in food research could be looked at in this context
- The need to raise public awareness about the resource inputs going into food was also highlighted – for instance scampi example was cited as a way of bringing this issue to life in a way that will be engaging for consumers
- The issue was also seen to bring in wider stakeholders such as supermarkets and businesses, viewed

**Figure 11. Public priorities on resource efficiency**

| Issue | Priority to debate | Priority to address |
|---|---|---|
| Reduce greenhouse gas emissions from ruminant livestock | Low | Low |
| Transfer nitrogen fixation into crops like barley, rice and wheat | Low | Low |
| Understand how to manipulate the area of soil surrounding the roots of crops | Low | Low |
| Reduce the amount of energy consumed throughout the food system | High | Medium |

as a fundamental group needed to address the issue.

Reducing energy was also highlighted as a **medium priority to address**. Overall, waste reduction was seen as a vital and strongly supported part of dealing with the issue. It was also seen as a relatively 'quick win', relative to more intractable issues such as increasing yields or global market reforms.

#### 4.3.3.2 Difficulties engaging on resource efficiency

Overall, none of the other research areas were seen as a significant priority to either debate or help address global food security.

In this context, it should be noted that of all the thematic areas, 'resource efficiency' was the hardest one for people to engage with in the time available.

Two of the examples - the manipulation of the rhizosphere and transferring nitrogen fixation – were seen as complex, technical areas that people did not feel able to make informed judgments about. Moreover, people struggled to make a link to what was worthy for debate in these contexts – understanding the area around the roots of a plant in itself was not seen to be particularly controversial or having wider social significance.

Finally, reducing methane from cattle was generally not seen to be a major priority for research, though in the Edinburgh group, the impact of selective breeding on this context was seen as potentially having wider impacts on food production.

Research into ways to minimize the resource inputs for the production of meat and dairy was seen to be more important to debate.

### 4.3.4 Sustainable, healthy and safe diets

The final thematic area explored was sustainable, healthy and safe diets. The research issues discussed were:

- predicting and managing food safety risks arising from new factors such as climate change, demographic change and waste recycling
- Fortifying food crops with vitamins and minerals to help tackle malnutrition. For example, 'Golden Rice' genetically modified to increase the level of vitamin A
- How to improve understanding of what a healthy, low environmental impact diet might comprise and how this can be promoted, supplied, measured and labelled
- How to better understand consumers, their attitudes and behaviour - for example, why do some consumers add salt to low-salt foods? How do consumers make sense of nutritional information? What makes people panic buy food?

**Figure 12: Public priorities on healthy and safe diets**

| Issue | Priority to debate | Priority to address |
|---|---|---|
| Predict and manage food safety risks | Medium | Medium |
| Fortify food crops to tackle malnutrition | High | Medium |
| Improve understanding of low environmental impact, healthy diet | Low | High |
| Understand consumers, their attitudes and behaviours | Low | Medium |

#### 4.3.4.1 Sustainable, healthy and safe diets – priorities to debate

In terms of areas for future debate, the highest priority issue to debate was:

- Fortifying crops to tackle malnutrition – which was the only research issue ranked as high in all groups across the entire workshop.

A medium priority was:

- Predicting and managing food safety risks

In terms of fortifying crops, in part this was prioritised due to the GM example of *Golden Rice* given – and similar reasons prevailed to the discussion earlier on yields (controversy, significance of the problem and so on).

Where this issue was seen to be distinctive however, was through a clear focus on the use of such technologies in developing nations. There were two elements to this that participants thought were debate worthy:

- That GM could provide a strong public health benefit - in this instance in potentially helping to reduce blindness through fortifying Vitamin A in rice. The extent to which people in the UK should be able to limit research in this area, given this pressing need, was therefore seen as debatable.
- A strong counter argument to this was a perception that fortifying foods in such a way 'forced' GM onto people, as they would have limited choice whether to eat the food or not. The idea of a magic bullet solution involving one crop, rather than trying to address the wider issues around diet in developing nations was also seen as problematic.
- There were also concerns around the paternalistic elements of these types of interventions: as one participant noted "*who are we to tell these people what they should be eating*". Wales F, SD.

Beyond GM, for certain groups, while fortification was seen as a potential way to address other public health challenges given poor diets in the UK and the perceived difficulty in getting people to eat their 'five a day', the role of government and business to take these decisions for consumers was seen to be very controversial.

With regard to food safety, issues for debate were not about microbiological safety of food, but more broadly about the wider health aspects of eating western diets – such as the development of cardio-vascular diseases, cancers and so on.

The potential to regulate high sugar or fat foods, or to develop interventions (such as taxation) to lower demand in this context and help promote healthier diets was seen as important. The issue was also highlighted in terms of the growth of a fast food culture within emerging markets such as China and India.

#### 4.3.4.2 Sustainable, healthy and safe diets – priorities to address

Of all the thematic areas, diet was deemed the most interesting or promising to address in terms of research – with all four areas prioritised high or medium. The areas were seen as strongly interlinked.

The relationships between personal health, diet, the ability to change behaviours, and the role of individuals, the state and business in addressing these, was valued as a broad and holistic way to undertake research.

As noted earlier, this theme was an area where people felt they could make a personal impact on addressing GFS – so research to help facilitate this was broadly supported.

### 4.3.5 Research, policy and action

One final cross cutting theme that emerged across both workshops was the relationship between research, policy and action.

Specifically, participants were concerned that a number of the issues around global food security required urgent action rather than urgent research. The extent to which research on consumer behavior and economics in particular could make a substantive impact on food markets and consumption was questioned. In particular, participants wanted to know why, if this area was deemed to be such a major issue facing the world, there seemed to be little effective global governance and awareness to help address it.

At the level of the GFS programme, the extent to which research was funded, would have influence and make a substantive difference to food security was seen to be a very important issue to address.

# 5. Conclusions

*Global Food Security is a complex and broad topic, characterised by a host of public interest issues – from the ethics of global trade and the distribution of food, to the directions, motivations and beneficiaries of particular food technologies.*

*The core challenge for CPEG is to begin to develop a coherent programme of engagement that provides focus on the big picture, while also providing specific insight into research and funding priorities.*

*While the scoping study has demonstrated that the public can actively engage with aspects of global food security, the breadth and complexity of the issue makes it so challenging for dialogue.*

*Moreover, there is a disconnect between certain areas the GFS programme partners are most interested in and those deemed relevant by participants.*

*To help address these challenges, conclusions focus on three areas.*

- *First, the factors or principles that should inform the selection of candidate issues for dialogue are outlined. These factors represent the reasons why participants felt certain issues were worthy of deeper exploration with a larger group of the public.*
- *Second describes differences the GFS programme and public framings around food security.[2] These points provide insight into how the GFS may need to reconsider the meaning of certain issues when conducting the dialogue programme.*
- *The final section highlights potential topic areas for dialogue. These are not meant to be exclusive or exhaustive. However, they have emerged through both workshops as key areas the public were interested in. In reviewing these issues, attention has also been given to highlighting areas that also intersect with potential research agendas.*

*Our conclusions are given next.*

## 5.1 Factors that should inform the dialogue

From the analysis, there were a number of cross cutting criteria or factors that participants used to select topics for the dialogue. In particular, 10 issues emerged that could be used to help scope candidate research issues against.

1. *Controversial:* issues characterised by different views on the scope and limitations of research. Specifically, such issues related to different perceptions of:
   - who benefits from the research
   - potential risks, particularly related to health and environmental impacts
   - Uncertainties around the research: whether claimed benefits would materialise or unforeseen consequences arise.

[2] The framing of issues by the GFS programme has been interpreted through a review of publications (in particular the GFS Strategic Plan 2011-2016) together with information provided on the website.

GM food was the exemplar of a controversial research issue, and should form a substantive element of the discussion. However, controversy was also central to many other issues – from behavioural interventions on diet to concerns around how to tackle population growth.

2. *Who profits:* issues relating to trade, the price of foods, the power of companies, and potential conflicts between corporate and public interests. This issue fundamentally related to ideas of fairness, inequities in the current system and impacts on developing nations. The roles and responsibilities of business in this context were very important.

3. *Demand and supply:* issues which bring to the fore the connectivity and relationship between finding more efficient ways to produce more food and our consumption. The use of GM and other novel technologies to produce foods is a live issue in this context. If biotechnologies are used to increase yields, thought also needs to be given to whether consumers are willing to eat such foods. The role of other food production processes needs to be seen in this context.

4. *Trade-offs:* issues involving perceived choices or trade-offs around food security. Much of the focus here related to maintaining the UK food supply at the expense of other countries. What constitutes a sustainable diet was particularly important in this context.

5. *Big picture not just details*: For many aspects of food security, participants were interested in how the research will affect change, rather than the detail of research in itself. The purposes of research and the wider governance of this were critical for people. There was a range of discussion around this, from how researching the economics of food could really make a difference to distribution, given the powerful market forces shaping production, to the ownership and control of technologies, rather than a focus on their application.

6. *Disruptive:* issues that involve changes to norms and aesthetics. This 'shock of the new' emerged across many discussions, from the personal implications of adopting a less consumptive lifestyle, to changes which impact on people's views of naturalness (such as GM). The relationship between landscape, the countryside and technology was also highlighted in this regard – particularly in relation to systems of production that distanced people from farming – not least the use of robots.

7. *Individual and collective rights:* these issues were at the heart of many of the dilemmas around food security and involved trade-offs between individual rights to eat a wide range of foods, to a collective responsibility to ensure such choices are not to the detriment of others. What does social justice look like in this context?

8. *Legitimacy.* Related to the above, the right of governments to intervene in what may be perceived as personal choice was very important. More broadly, whether governments should take decisions perceived as putting the interests of other countries above their own is also very contentious, particularly under times of economic uncertainty.

9. *Personally relevant:* issues which are likely to directly impact on people in the UK and where they can see a link between their own behaviours and outcomes. In this context, demand led issues, particularly relating to diet and waste, were very important for people.

10. *Awareness raising and behaviour change:* debate that raises the public profile of global food security to help galvanize people to take action.

## 5.2 Framings of global food security

Building on the above, there were a number of areas of difference between public framings around global food security, and the focus of the GFS programme.

On the whole, these were not major substantive differences, but rather differences in emphasis across various themes – summarised in the table below.

**Table 2. Differences in public and institutional framing of GFS**

| Issue | GFS programme framing | Public framing |
|---|---|---|
| ***Supply and demand*** | Greater focus on food supply/production side; no explicit focus on demand within thematic priorities, though emerges within *Sustainable diets* theme | More explicit focus on demand, particularly in terms of reducing western consumption of resource intensive diets such as meat and diary. |
| ***Global food*** | Clear international focus to research themes, focusing on globalised food production and supply | Parochial framings around food dominated. Global food issues often framed in relation to domestic choices |
| ***Economics*** | Focused on analysis of markets and market failure, particularly in relation to regressive policies/ externalities | Explicitly highlighted themes of power and responsibility of big business |
| ***Resource efficiency*** | Core thematic priority within GFS, particularly focused around water energy and nutrient inputs | Challenging area for participants to engage with (seen as abstract); the main hook around resource efficiency is tackling waste (seen as a major priority and quick win) |
| ***Food technologies*** | Broad and substantive focus, cutting across all four research themes. Wider issues (from researcher discussion in the sessions) associated with measurable risks | Almost exclusively focused on GM. Wider issues risk and safety, but also broader issues around motivations, winners and loses. |
| ***Research and outcomes*** | Focused on research and the development of knowledge to help address the challenges around GFS | Focused on outcomes and policy reforms (rather than just research). Key focus on power and governance in shaping food |

Each of these issues is important to account for in the design of the dialogue, as they represent different perceptions of the significance of global food security.

■ Global food

This is one of the most important framing issues - with participants focusing debate on domestic issues, relative to the GFS international outlook. Whilst people are able to engage in a dialogue around global issues, thought needs to be given to common frames of reference and anchoring points. In this context, looking at the global consequences of local choices, or looking comparatively about how systemic changes to the food system (such as price and trade reform) impacts on UK consumers and also those for instance in developing nations will be critical.

■ Supply and demand

Within the thematic priorities of GFS, there is a very clear and explicit focus on supply side issues – not least increasing yields through approaches such as genetic improvement. Tied to this, the relative size of BBSRC as a funder within the programme inevitably moves the centre of gravity in debates on research to supply side issues, due to the potential of biotechnologies and the biological sciences in this area. However, for participants, demand was seen as very significant (particularly in terms of consumption and waste). Undoubtedly part of this was the agency participants felt they had to affect demand. But more importantly, demand issues got to the heart of many participants concerns around food security. Specifically, they were symbolic of a culture over dependent on consumption and driven by strong forces outside of their control. Conversely, a lack of demand by poor in developing countries creates market failures and further reinforces the hunger-poverty link. Ultimately, within a dialogue, issues of supply and demand need to be looked at in tandem: it is not an 'either or' approach. There was a strong sense that attempts to overcome food scarcity through innovation alone, were likely to fail.

Finally, there may also be a need for GFS to more explicitly focus on demand within thematic priority of sustainable food production and supply. Currently, demand is not explicitly highlighted, though emerges within the sustainable diets theme.

■ Food technologies

Food technologies were very quickly associated with GM foods throughout the dialogue. While it would be impossible to hold a debate on the future of food without covering these issues, food biotechnologies should neither dominate the overall GFS agenda, nor be focused on to the exclusion oftechnical innovations that may offer solutions to food security.

To deal with this, the dialogue must not make implicit assumptions around the trajectories of food technologies that end up closing down debate. Specifically, the dialogue should start with the problem that needs to be addressed - food security - rather than presupposing particular solutions or presenting the issues as a choice between one technology and system against another. When discussing technologies, public framings focus as

much on ownership and control, as they do on technical safety.

■ Economics

With regard to the economics of food production – the key differences in framing was between a technical focus on the systems and processes that shape food trade (by the GFS), to one which centred on the power, ethics and the behaviours of those in involved in those systems (by the public). In particular, participants were concerned with how private and public interests played out in relation to food. The profit motive was key – with the lack of power of the poor in developing countries leading to market failures or exploitation. Governance in this context will be a particularly important area both to debate and research.

■ Resource efficiency

Other than food waste, resource efficiency was a particularly hard issue for people to engage with - being perceived as relatively abstract. Given its centrality to debates on food security, thought needs to be given around how to overcome this. One option could be to discuss resource efficiency not as a topic in itself, but as part of a wider discussion of particular approaches to food and farming. In this way, it can become part of the facts and figures that people draw on in coming to a view on food. An obvious example of this relates to issues around eating a diet high in meat. Focusing on the implications of farming livestock, rather than the water and energy inputs in the abstract, can provide a useful hook into these discussions. In this way, resources could be approached in the dialogue in the same way as other 'factual' data – such as trends around population growth.

■ Research and outcomes

While the GFS programme is focused on the development of knowledge, participants wanted to know what actions were going to be taken to address food security. There is a potential gap between research and outcomes - as mentioned earlier some of the challenges facing food security are so complex and the interests involved so powerful, participants found it hard to understand how research can make a substantive impact. Where possible within the dialogue, clear links need to be given between research activity and change. In exploring this, the global governance of food must be an essential part of the process. In particular, participants were very keen on funding research activity where there was clarity around impacts (such as food waste). Research that may be valuable in aiding understanding but had limited practical application (either directly or due to a lack of political will) was less of a priority.

## 5.3 Topics that may be suitable for deeper dialogue and exploration

As noted earlier, the dialogue must be framed around the question of how to tackle food security - rather than presupposing particular solutions. Whilst the scoping study is not exhaustive, there were a number of topics that emerged both throughout the study, which warrant deeper dialogue and exploration. Specifically, 5 themes emerged.

**1. The sustainability of consumer choices**

- Do consumers have a right to a choice of foods?
- How can this be reconciled with poverty reduction and environmental sustainability in developing countries?
- What constitutes a sustainable and balanced diet?
- What are the resource impacts and wider implications of the 'de-seasonalisation' of foods such as fresh fruits, vegetables and salads?
- What are the environmental and social impacts of different ways of sourcing ingredients?
- How can food, environmental and economic resilience be developed in tandem?

**2. Demand for foods**

- What is driving rates of consumption of food in developing and developed nations?
- What should be done about this?
- What are the responsibilities of supermarkets/food industry in encouraging consumption of foods?
- Are behavioural interventions legitimate and necessary to lessen demand for certain foods (e.g. food high in fat, food high in resource inputs).

**3. The role of technologies in relation to supply and demand**

- Who benefits from the use of new technologies?
- What are impacts on poor and wealthier farmers/ consumers/ societies?
- Is 'sustainable intensification' the right approach to address GFS?
- What is the role of less intensive farming in this context?
- How can we minimize the resource inputs in the production of meat and dairy?

**4. Global trade and food distribution**

- What is fair in terms of global food trade?
- Who profits from food production and what are the implications of trade reforms to address this?
- What are the causes of and remedies for mal-distribution and what are the implications for UK consumers of addressing this?
- What are the sources of food price volatility and implications of trying to diminish or manage volatility?

**5. The governance of food**

- Who should own and control the means of production around food?
- What does trustworthy governance of food look like?
- How can we link up research with action?

Finally, raising awareness was seen as a key part of a dialogue programme – suggesting that the future project would need a coordinated communications campaign running alongside it. This was not because people necessarily thought that communications would impact on behaviour, but rather that raising the issue helped to legitimise it - making global food security personally relevant for people, and potentially helping to pave the way to put policy options (potentially seen as regressive or unpopular) on the table.

Overall, the Global Food Security programme provides a unique opportunity to progress public debate on food research

and wider food policy. There is now opportunity to explore the issues surrounding global food security holistically, and in this context consider the public interest in addressing these challenges.

# 7. Appendix

Documents reviewed as part of the scoping study.


1. Agrimonde (2009). Scenarios and challenges for feeding the world in 2050. Summary report.
2. Cabinet Office (2008). Food Matters. Towards a Strategy for the 21st Century.
3. Defra (2011). Food Statistics Pocketbook.
4. Foresight (2011). The Future of Food and Farming: Challenges and choices for global sustainability. Final project report.
5. Foresight WP8:
6. Foresight (2011). Project on Global Food and Farming Futures. WP8: Agri-food systems governance: an analytical framework.
7. Foresight (2011). Project on Global Food and Farming Futures. Synthesis Report C1: Trends in food demand and production.
8. Foresight (2011). Project on Global Food and Farming Futures. Synthesis Report C2: Changing pressures on food production systems.
9. Foresight (2011). Project on Global Food and Farming Futures Synthesis Report C3: State of play and trends: governance and globalisation.
10. Foresight (2011). Project on Global Food and Farming Futures. Synthesis Report C4: Food system scenarios and modelling.
11. GDAE (2012). Resolving the Food Crisis. Assessing Global Policy Reforms Since 2007.
12. Global Food Security Programme (2011). Strategic Plan 2011-2016.
13. Royal Society (2009). Reaping the benefits. Science and the sustainable intensification of global agriculture.
14. War on Want (2011). Food Sovereignty. Reclaiming the global food system.
15. 3D (2005). Planting the Rights Seed: A human rights perspective on agriculture trade and the WTO.

## Global Food Security Programme

Global Food Security is a multi-agency programme bringing together the research interests of the Research Councils, Executive Agencies and Government Departments.

Through Global Food Security the partners are working together to support research to meet the challenge of providing the world's growing population with a sustainable, and secure supply of safe, nutritious and affordable high quality food from less land and with lower inputs.

Partner and sponsor organisations are:

- Research Councils UK comprising:
    - Biotechnology and Biological Sciences Research Council
    - Economic and Social Research Council
    - Engineering and Physical Sciences Research Council
    - Medical Research Council
    - Natural Environment Research Council
- Department for Business, Innovation and Skills
- Department for Environment, Food and Rural Affairs
- Department for International Development
- Food Standards Agency
- Government Office for Science
- Scottish Government
- Technology Strategy Board
- Welsh Government

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