FOOD SECURITY: THE ROLE FOR THE SCOTTISH GOVERNMENT IN ENSURING CONTINUITY OF FOOD SUPPLY TO AND WITHIN SCOTLAND AND ACCESS TO AFFORDABLE FOOD

Report from a Think Tank held on 3-4th March 2009

This document contains the views of the particular experts who participated in the Think Tank. It should not be assumed that their perspectives would necessarily be shared by others with the same areas of expertise, or that the views expressed reflect those of the Directorate or Scottish Ministers.
SECTION 1 Executive Summary

Background to Think Tank

The Scottish Government is committed to the delivery of a national food and drink policy. To support this, a think tank was organised by the Rural and Environment Research and Analysis Directorate (RERAD), Scottish Government on 3-4th March 2009. The discussions were around both external and internal factors influencing the continuity of food supplies. Eight academic experts took part in the think tank. Other participants included senior policy representatives from the relevant divisions of the Scottish Government, Welsh Assembly Government and the Northern Ireland Government. The think tank was chaired by Professor Maggie Gill, Chief Scientific Adviser and Director of RERAD and facilitated by staff from RERAD.

Participants’ views of key food security issues

When asked to state what they thought was the most important food security issue, participants put forward the following ideas. These reflect individual perspectives of participants.

- Commodity markets
- Self-sufficiency
- Genetically modified food
- Research and development
- Soil fertility
- Land use
- Fish sustainability
- Labour supply
- Climate change
- Food sovereignty
- Differences between short and long-term objectives
- Access to credit
- Supply chain resilience
- Public good nature of food
- Food affordability
- Household food security
- Nutritional quality of food
- Retail sector
- Education

Main Discussion on Factors Influencing Food Security

What is Food Security?

The term food security has a range of meanings. First of all, food security and self-sufficiency are different concepts and the terms should not be used interchangeably. Second, several definitions of food security exist and care should be taken when choosing which one to use. Third, all levels of food security – global, national, regional, community and household - should be considered. Fourth, there is also the time-dimension to consider as the issues and solutions will differ depending on whether short or longer term food security is being discussed.

External Factors and Scotland’s Food Security

Global forces such as population growth, climate change, resource depletion and commodity prices have a major impact on food security of individual countries including Scotland. To address these and other trends means moving towards more sustainable production and consumption. However, at the same time growing demand for food has to be met by increasing productivity. Water supply issues also
have to be considered – as a consequence of climate change there may be land lost to flooding as well as water distribution issues.

A key part of developing a more sustainable food system is considering how food systems will respond to climate change. Potential benefits of climate change have to be recognised. For example breeding of grass fed animals, crop and fruit and vegetable production could be expanded with agricultural production becoming more diverse. The uncertainty associated with climate change makes it more difficult to plan for, however some projections can be made based on scenarios available.

By sharing knowledge from its agricultural research, Scotland, alongside other developed countries, can assist countries adversely affected by climate change to adapt to new conditions. Maintaining capacity for food production above a certain threshold can provide a safety net, as lead times for some produce are very long, preventing markets from responding to changes in demand immediately. It is also important to have built up the knowledge base to back up future policy design.

Scottish Climate Change Bill commitment to reducing greenhouse gas emissions by 80% by 2050 means that some agricultural land may have to be used for forestry, thus presenting another challenge for food production.

Volatility in global commodity prices has a significant impact on Scottish producers and consumers. Public grain stocks can, in theory, protect from such volatility but in practice these models are very costly and can break down. There also are not any well known examples of successful implementation of such schemes.

The UK imports the majority of its food from the EU. It is also an important market for Scotland’s exports. In addition, EU legislation has an impact on producers and consumers of food in its member states. Whilst clear legislation allows better operation of markets, on some occasions, its unintended consequences could be detrimental to individual countries e.g. recent pesticide legislation may harm productivity of Scottish agriculture and affect overall UK output and hence domestically available supplies.

Internal Factors and Scotland’s Food Security

Scotland’s large proportion of land in Less Favoured Areas, its geographical positioning and demographics mean that some food security issues are different to those in the rest of the UK. High self-sufficiency should not be set as a goal as it would not improve food security. Scotland would be unable to meet the consumption requirements of its population as they are now, due to taste preferences, seasonality of some produce, reliance on England further down the supply chain, reliance on imports of inputs into agricultural production and variation of production levels in different commodities.

Whilst local food supply chains should be supported, it is important to avoid investing in unprofitable processing facilities. Questions also arise whether commodities such as barley and wheat should be used for the production of whisky, rather than food. Expansion of aquaculture is the only way to increase fish
production but there are dependencies on fish meal and oil and sustainable sources of these are not easily obtainable.

Interdependence of Energy Security and Food Security

As the agricultural labour force has shrunk gradually over time, the use of machinery has increased, making the sector very **energy dependent**. Currently, the biggest fossil fuel consumption in agriculture is in manufacture of fertilizers and cultivation of land. Grain drying also imposes high energy requirements in Scottish agriculture. Heavy reliance on energy is undesirable both due to the environmental considerations and because the supply of fossil fuels is limited.

To decrease the dependence of agriculture on fossil fuel energy without compromising yields, appropriate **technologies** must be developed, thus more research into renewable energy options is needed. This should not be limited to agriculture and the whole of the supply chain should be considered including consumption (e.g. consumer transport to shops and cooking). The main dependency areas should be identified and fossil fuel use limited to those processes where it is most essential, replacing them with **renewable energy** where possible. A range of options should be explored, including solar energy and waste-generated energy.

Given the dependency of food production, processing and distribution on fossil fuels, changes in **oil prices** have an impact on food supply chains. However greater precision is needed in quantifying the scale of this impact and the speed with which the food systems can respond to such energy price changes.

Resilience of the Food Supply Chains

There is a risk of food supply chains being disrupted by crises such as disease outbreaks and strikes and there are roles for government, the industry and the consumer to plan for and manage such **risks**.

Governments can undertake **risk planning** by assessing the probabilities of potential disruptions and estimating their associated costs but can also take on responsibilities as a regulator and an information provider and both to avert crises and lessen their effects. There are contingency plans in place such as that demonstrated by the UK and Scottish governments’ response to the Grangemouth refinery strike. However, governments’ efforts should be backed up by the industry’s contingency planning.

Households are the parties that ultimately bear the consequences of food supply chain disruption and it could be argued that they can manage the risks by **changing diet** through substitution. However, support from government and industry would still be needed to avoid panic buying exacerbating the situations. Also, some disruptions, e.g. transport strikes, may affect the supply of many types of foods, making substitution difficult without compromising the acceptable dietary requirements.

*Household Food Security*

Household **access** to food is important for household food security and both retail and transport provision play a part. Access issues could be different in **rural and**
urban areas. Some low income remote rural areas are especially vulnerable, due to low car ownership and difficulties in arranging internet order deliveries. Public transport provision is crucial in such areas, as is transport to and from mainland for island communities. Stores in locations with small catchment areas and those involving higher distribution costs are less attractive locations for retailers putting those areas at risk of low retail provision. Whist there is no clear evidence to suggest that “food deserts” are widespread in the UK, it is a potential risk that must be considered.

Food waste is a problem in Scotland and reducing it would diminish environmental concerns. More information on the gap between what is produced and what is consumed is needed to address this problem. Grow your own schemes are also a way of increasing household food security and also educating people about how food is grown. However, the number of allotments is limited and not everyone can participate in this activity.

More insight into affordability is needed and food prices should be examined across different geographical areas and incomes, as some variability has been detected by previous studies.

Suggestions for Policy Development

Participants were asked for general policy recommendations which in their view could potentially have positive effects on Scotland’s food security status. These reflect views of individual participants.

- Unpack its definitions of food security and be clear on what is meant by it
- Assess the impact of global challenges and the speed and timescale of change
- Invest in R&D into Scottish production and long-term trends
- Use evidence to plan for future agriculture
- Recognise the benefits to local economies
- Take into account land use irreversibility
- Recognise that some food security issues may be temporary in nature
- Match primary production with domestic demand to increase self-sufficiency
- Export commodities such as dairy and meat where there is capacity
- Build evidence on interdependence of food and energy
- Replace fossil fuel inputs by renewable energy (e.g. solar) where possible
- Increase energy efficiency for different production systems
- Strive for sustainable farming in terms of energy use, biodiversity and water
- Improve people’s confidence and trust in government
- Produce more by moving to more marginal land
- Focus on price as well as volume, maintaining affordability
- Plan for future water challenges
- Provide information to businesses and consumers
- Strengthen resilience by planning for short term breaks in food supply chains
- Increase and encourage investment in food producing businesses
- Take a consumer oriented approach
- Reduce food waste
- Work toward sustainable, healthy and economically efficient diet
SECTION 2 Background to Think Tank

2.1 Policy Context

The Scottish Government is committed to the delivery of a national food and drink policy. To this end, a leadership forum was created, bringing together a group of experts which oversees five themed workstreams.¹ A think tank was organised by the Rural and Environment Research and Analysis Directorate (RERAD) of the Scottish Government to take place on 3-4th March 2009. The purpose of the think tank was to look into the issues of food security in Scotland with the aim to feed into the work of Workstream 5 titled Access, Affordability and Security. The think tank focused on both the internal and external factors affecting food security in Scotland. To facilitate the discussion, a number of specific challenge questions were formulated, focusing on the global challenges affecting Scotland’s food security and how Scotland should respond to these and also on issues around domestic production, supply and access to food (see Annex D for challenge questions). Other highlighted areas for discussion were Scotland’s access to food markets, the interdependency of food and energy, the efficiency and resilience of food supply chains in the face of food security challenges and social and spatial inequalities in food access and affordability.

2.2 Think Tank Participants

In order to address the overarching theme of food security, it was identified that expertise was needed in the areas of Agriculture, Soil Science, Land Economy, Environment, Climate Change, Food Supply Chains, Agricultural Economics, Food Economics, Food Retail, Public Health and Nutrition. Expertise was sought from the whole of the UK, as it was considered that perspectives from the other parts of the UK would be useful in addition to those from Scotland. As a result, eight participants whose combined expertise covered the areas identified were invited to participate in the think tank.

Other workshop participants included senior policy representatives from the relevant divisions of the Scottish Government, Welsh Assembly Government and the Northern Ireland Government.

The think tank was chaired by Professor Maggie Gill, Chief Scientific Adviser and Director of Rural and Environment Research and Analysis Directorate (RERAD) and facilitated by staff from RERAD.

(See Annex E for the names, affiliations and brief biographies of the participants.)

2.3 Think Tank Programme

The think tank took place over an evening of the 3rd March and first part of 4th March. During the evening session, participants were welcomed by Professor Maggie Gill, Chief Scientific Adviser and Director of RERAD, who facilitated the discussion. David Thomson, Deputy Director for the Food and Drink Industry Division of the Scottish Government, provided an overview of the developing food and drink policy for Scotland and Kathy Johnston, Senior Economist in RERAD, gave a summary of the

¹ Further details are available on the Scottish Government website www.scotland.gov.uk/food
facts and figures relating to the Scottish food and drink industry. Participants were asked to provide their views on what they perceived to be the most important food security issues facing Scotland.

On the morning of 4th March, there were three short presentations by individual experts on i) global food security and its importance for Scotland, ii) an overview of Scotland’s productive capacity, and iii) household food security in Scotland: access and affordability. The participants were then divided into two groups, with one discussing the internal factors and the other the external factors affecting food security. During the plenary session which followed, a more general discussion was encouraged, stimulated by the challenge questions.

This report summarises the discussion that took place over the sessions on both days. The presentations by individual participants are given in the Annexes to the report. Shaded boxes throughout the text indicate additional background information on the references made by workshop participants during the discussions.

It should be noted that the views expressed are those of the particular experts who participated in the Think Tank. In addition, although participants were asked to address all the broad challenge questions, the specific points of discussion are likely to reflect the interests and experiences of the individuals. The ways in which small group discussions were facilitated may also have had a bearing on the issues covered.
SECTION 3 Participants’ views of key food security issues

Participants were asked to state what they thought was the most important food security issue and how it could be approached. The following ideas, which reflect individual perspectives, were put forward.

- **Commodity markets.** Their volatility is a problem and this could be partially offset by managing of strategic commodity stocks by governments.
- **Self-sufficiency.** The links between this and food security should be examined closer.
- **Genetically modified food.** Given the high number of livestock already being fed on GM feed, the impacts of accepting GM in both production and imports should be assessed.
- **Research and development.** New technology is the key to increasing production with fewer inputs.
- **Soil fertility.** This is important for yields and efficiency and should be improved.
- **Land use.** Fundamental decisions have to be made and conflicting policies mean there will be trade-offs, for example with the afforestation targets.
- **Fish sustainability.** This is part of food production and includes developing sustainable sources of feed.
- **Labour supply.** As this is one of the biggest barriers to increasing output, employment opportunities in the agricultural sector should be promoted. Younger people should be educated about agriculture by making it a more widely taught subject at universities. There should also be a mechanism for putting knowledge into practical activity.
- **Climate change.** Recognise potential benefits as well as costs. For Scotland it can increase its agricultural productive potential.
- **Food sovereignty.** Promote this idea by looking into local production and identifying what it is that we want to produce locally, where the Scottish advantage lies and how much food Scotland needs to feed itself.
- **Differences between short and long-term objectives.** Priorities differ with time and in short term, it is planning for potential shocks and crises that could disrupt supply chains, whilst in long term, the issues of food security converge with those of sustainability of food production and consumption.
- **Access to credit.** Ensure this is maintained for food producers and processors.
- **Supply chain resilience.** It must be established whether it is the individual businesses or governments who are responsible for planning for and managing risk.
- **Public good nature of food.** Whether food is a public good is questionable and further consideration is required of public good characteristics of food and capacity for food production.
- **Food affordability.** With food price inflation currently higher than wage inflation, economic and physical access to nutritious and affordable food on household, community and national level should be ensured.
- **Household food security.** Current evidence on this is not sufficient. Scotland should follow the US example in conducting surveys to find out what proportion of population cannot afford “acceptable” bundle of food and why
(See Box 1). In terms of access, ensure efficient operation of distributions systems.

- **Nutritional quality of food.** Given high obesity rates, it is access to nutritious food that is the problem, rather than access to food in general.
- **Retail sector.** This is the key lever to successful policy and should be worked with more closely.
- **Education.** Healthy food consumption is difficult to legislate and we should be looking into better education in the form of advice rather than forcing people to change. Consumer power is a greater force than citizen behaviour and change in perceptions and views is needed to change buying habits.

**Box 1 The US approach to measuring food security**

**Household Food Security**

The U.S. Department of Agriculture (USDA) monitors the extent and severity of food insecurity in U.S. households through an annual, nationally representative survey and has published statistical reports on household food security in the United States for each year since 1995.

USDA’s domestic food and nutrition assistance programs increase food security by providing low-income households access to food, a healthful diet, and nutrition education. Reliable monitoring of food security contributes to the effective operation of these programs.

Data for the food security reports come from an annual survey conducted by the U.S. Census Bureau as a supplement to the monthly Current Population Survey. The 2007 food security survey covered about 45,600 households and was a representative sample of the U.S. civilian population of 118 million households.

The food security status of the household is assessed based on the number of food-insecure conditions reported (such as being unable to afford balanced meals, cutting the size of meals because there was too little money for food, or being hungry because there was too little money for food).

*Household Food Security in the United States, 2007*


**Community Food Security**

Community food security concerns the underlying social, economic, and institutional factors within a community that affect the quantity and quality of available food and its affordability or price relative to the sufficiency of financial resources available to acquire it.

The purpose of **Community Food Security Assessment** toolkit is to provide a standardized set of measurement tools for assessing various indicators of community food security. It was developed by the USDA as a resource for community-based non-profit organizations and business groups, local government officials, private citizens, and community planners. The toolkit provides tips, guidelines, and data collection tools for conducting a food security assessment of communities.

*Community Food Security Assessment Toolkit, 2002, USDA*


**Thrifty Food Plan**

The U.S. Department of Agriculture’s (USDA) Thrifty Food Plan (TFP) serves as a national standard for a nutritious diet at a minimal cost. It represents a set of market baskets, each applicable to one of 15 age-gender groups. Each market basket contains a selection of foods in quantities that reflect current dietary recommendations, food composition data, food prices, and
actual consumption patterns. The TFP is one of four official USDA food plans (the others being the Low-Cost, the Moderate-Cost, and the Liberal Food Plans) and is maintained by USDA’s Center for Nutrition Policy and Promotion (CNPP). The TFP is used by the Federal Government to provide food and economic information to consumers purchasing food on a limited budget. It also serves as the basis for maximum food stamp allotments.

**Thrifty Food Plan, 2006, USDA**

**The Low-Cost, Moderate-Cost, and Liberal Food Plans**

These three plans, as well as the Thrifty Food Plan, are the four official USDA food plans maintained by CNPP. The market baskets of the Low-Cost, Moderate-Cost, and Liberal Food Plans specify the types and quantities of foods that people could purchase and prepare at home to obtain a nutritious diet at three cost levels.

**The Low-Cost, Moderate-Cost, and Liberal Food Plans, 2007, USDA**
SECTION 4 Report of the Main Discussion

4.1 What is Food Security?

The term food security has a range of meanings and unpacking the term is therefore important so that the full range of issues that food security encompasses is addressed.

First, there is the distinction between security and self-sufficiency which is not always recognised. The two terms are often used interchangeably, whilst in reality self-sufficiency does not imply food security and for a country to be food secure, self-sufficiency is not a prerequisite.

Second, there are various definitions of food security. The most widely used one is the definition by the FAO.

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

Rome Declaration on World Food Security and World Food Summit Plan of Action, Food and Agriculture Organisation of the United Nations, 1996

However, other definitions exist and thus inconsistencies arise. For example some do not include the term “nutrition”, despite it being an important aspect of food security.

Third, there are different levels of food security – global, national, regional, community and household. Each has different issues associated with it.

Fourth, there is also the time-dimension to consider as the issues and solutions will differ depending on whether short or longer term food security is being discussed. For example, disruptions to supplies and resilience in the supply chain are essentially short term issues, whereas climate change is a longer term one.

The discussion within this report is based on both external and internal factors associated with food security. It examines how food security in Scotland is affected by global forces. It then moves on to look at internal factors that play a part in continuity of the supply of food. Energy security and resilience of the food supply chain are crucial to food security anywhere and were considered in detail during the course of the discussion. Household security was then looked into by considering the issues of access to food in particular.

4.2 External Factors and Scotland's Food Security

The impact of global trends

The status of Scotland’s food security, just as of most countries, is heavily dependent on global forces that are outside the scope of internal policy-making. These include trends such as population growth, climate change, depletion of natural resources and
volatile commodity prices amongst others. These trends have a major impact on the way food is produced and consumed in Scotland.

It is widely accepted that change is needed in order to respond to current and anticipated trends and this must relate to food production and consumption as well as other components of food supply chains. Whilst primary production is a major part of the production process, it is important not to restrict the analysis to agriculture and the wider food supply chain therefore needs to be explored.

Food Futures, a report by Chatham House (see Annex A1) put forward four potential scenarios drawn from trends to generate debate and test food systems in the UK and the EU. Scenario 3, entitled “Into the New Era”, is the one that describes the food systems following a permanent transition to more sustainable production and consumption. Both consumers and producers, as well as governments, should start thinking in terms of change, for example changing their food preferences to be more in line of what can be produced sustainably.

*Increasing demand for food*

Global food consumption is growing faster than food production and improvements in productivity have to be made to keep pace with increasing demand. For a number of years commodity stocks have been depleted.

Demand for food in Scotland can also increase in the future, given the growth in population due to increased immigration, increased calorie consumption requirements and changes in population demographics. These trends pose a number of challenges for food and drink policy and are difficult to predict.

*Water supply pressures*

Water supply is essential for food production. At the moment immigration population flows are highest into the east coast of Scotland, the area of the most arable land and this could increase pressures on the availability of water in that area for agricultural purposes. Also, as the climate changes, the prediction is that the east coast will become dry and the west coast wet, further exacerbating water challenges in the east coast. Lack of irrigation is a major issue for agriculture. Perceptions of water change are that it will rain less frequently but heavier, leading to increased risk of flooding, which means that some land for food production could be lost.

*The climate change challenge*

Accepting the challenge of climate change is important not only in order to start preparing for responding to the challenges but also in order to recognise the opportunities it could bring to the Scottish agricultural sector. First of all, the new climate may favour conditions for breeding of grass fed animals, increasing Scotland’s productive capacity of quality meat as well as reducing our dependence on imported feed. Second, higher temperatures and possible changes in soil conditions could increase the potential for cropping in Scotland. Third, for the same reasons, growing of fruit and vegetables could be expanded on low land. Overall, Scottish agricultural land could be expected to become more diverse – this trend has
already been observed over the last two decades, as more crops are grown now than there were in the past. However, climate change is more likely to result in intensification of existing cultivation, rather than moving of production further to less favourable land.

There is uncertainty over the impact of climate change. The quality of climate change models and the reliability of their projections vary. Also, many models oversimplify climate change, for example by just looking at average temperatures but not taking into account extremes. Whilst overall the average climate in Scotland is likely to become warmer, the winters may get harsher and summers wetter and unpredictable extreme weather events may occur. This can have adverse implications for food production.

Whilst their accuracy may be questioned, a range of climate change scenarios is available from which a number of most plausible ones can be is selected. Further research needs to look into the implications of each and how those could be dealt with, in particular what agricultural systems would be most suitable for each scenario. There will also be key policy implications that would be desirable under all scenarios.

Climate change is expected to have a major effect on developing countries in terms of water and food shortages. Due to its small size, there is little that Scotland can contribute in terms of global water and food supplies. However, Scotland's advantage lies in its knowledge, which can be concentrated on crop research whilst maintaining the ethical approach to provide aid to countries adversely affected by climate change.

**Future food production**

When attempting to identify what food could be grown in the future, adapting to the new climate will play a key role but other trends should not be overlooked. For example, China and India are increasing their dairy production, which means their demand for animal feed is growing, pushing up its price. The increase in the price of feed will have implications for Scotland and such impacts should be planned for. Currently research and development in agriculture is mostly molecular based but there are not enough studies into agricultural systems that look into methods of farming and this is the area that should be explored further.

Food production can often raise questions of a moral nature. It can be argued that Scotland has a moral obligation to maximise its food production for the global market given that there is agricultural land available which could be used to produce food. It can also be argued that it is immoral to produce food for which there is no demand as the level of production should be decided by market forces. Yet market forces rather than morals determine what should be produced and where.

Whether intervention is needed to maintain food production capacity until the market responds depends on whether there is a threshold beyond which the production should not be allowed to fall. This is complicated by the fact that there is a lead time to production, for example trees for fruit production have to be planted 5-10 years in advance. Furthermore, the full costs and benefits of food production are not reflected in prices for food. Overall, it may therefore be sensible for governments to set a
threshold as a safety net and work towards maintaining capacity for food production at or above that level.

**Reductions in greenhouse gas emissions**

In the Climate Change (Scotland) Bill, the Scottish Government made a commitment to an overall 80% reduction in greenhouse gas emissions by 2050 (see Box 2) and agriculture and food production needs to play its part in achieving the emissions target.

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**Box 2 Scottish Climate Change Bill**

On December 5, 2008 the Scottish Government published the Climate Change (Scotland) Bill. Bringing forward a Bill is a key commitment for the Scottish Government and places Scotland at the forefront of global efforts to tackle climate change. The Bill will create a long-term framework that will:

- introduce a statutory target to **reduce Scotland’s greenhouse gas emissions by 80 per cent by 2050**
- establish an interim target of **50 per cent emissions reductions by 2030**;
- establish a framework of **annual targets**; and
- include **emissions from international aviation and international shipping**.

This framework will help build a sustainable future for Scotland. It will contribute to the country's sustainable economic growth by moving the public and private sectors towards a low carbon economy.

**The Scottish Government, 2008**


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Achieving the emissions target may imply that some agricultural land should be used for forestry rather than food production. The government of New Zealand has committed to ambitious afforestation projects on marginal agricultural land (commitment to a net increase in forest area of 250,000 hectares by 2020) to maintain production on the rest of the land. This is something that could be considered in Scotland.

**Global commodity prices**

The increase in grain prices in 2008 was due to a combination of global trends some of which could be irreversible. Rises in global commodity prices have fed through to the consumer in the form of higher food prices. Price stability is a challenge for producers because it makes it more risky for farmers to invest for the long term, although they can reduce their risk by entering into futures contracts for commodities.

Recent commodity price spikes have had some dramatic effects. In many cases these have been exacerbated by protectionist behaviour in some food exporting countries. Price volatility is especially high when commodity stocks are run down and current stocks are low in most commodities. Increases in stocks can iron out this volatility so one way to avoid price spikes in the future is to increase public stocks.
Having a public grain storage could mitigate potential future crises. However, the costs could be very high and a cost-benefit analysis would be required. The number of crisis occurrences that would make this option viable would need to form part of that analysis. In theory, strategic stocks would be effective in ensuring against crises and price volatility but there are no examples of where this has worked in practice. Also, if the producers were to keep the stock, there would be an incentive to hold on to it in times of shortages to push up price further.

The role of the EU

Being part of the European Union has important implications for Scotland. It provides the common market for Scottish produce as well supplying Scotland with its produce in the form of imports.

Where the imports of food and animal feed come from is important for food security. Currently the EU is the biggest importer of food into the UK and since EU countries are seen as stable trading partners, this guarantees the security of our supplies. In order to obtain a measure of how secure Scotland is in terms of the food it is able to source, stability of all trading partners should be assessed. Work can be done on the implications of restricting food supplies to those from within the EU to assess our reliance on less stable countries.

Some EU legislation can have the unintended consequence of affecting food production. An example of this is recent pesticide legislation (see Box 3). Changes in pesticide legislation can have a detrimental effect on yields in some countries, Scotland being one of them. First of all, legislation can shift power between different companies and result in concentration of market power. Second, having a smaller family of pesticides could reduce farmers’ ability to control certain plant diseases which could harm the productivity of the Scottish agriculture. It may also affect the output on the UK level and hence domestically available supplies. The precise impact of recent changes to EU legislation will not be known until they begin to be implemented.

Box 3 New Pesticide Legislation

A new European Union Regulation, set to enter into force later in 2009, replaces the 1991 Directive on market authorisation of pesticides, and thus restarts the assessment process for substances that are currently authorised. The new regulation tightens the environmental and health criteria for approval, introduces a ban on certain toxic chemicals and establishes the principle of compulsory mutual recognition of market authorisation inside three geographical zones (north, centre and south) of the EU.

During the negotiations on the new Regulation, concerns were expressed that it might deprive farming of current pesticide products which are important in particular climatic areas, including Scotland, without any demonstrable safety justification. In light of these concerns, the final version of the new legislation introduced a degree of flexibility, including provision for the reauthorisation procedure to take into account whether any alternative products exist.

The new procedures will be implemented as current products come up for reauthorisation. The full impact of the new legislation will therefore only be known as and when it is applied to these reauthorisation requests.
4.3 Internal factors and Scotland’s food security

Distinguishing features of Scotland’s food security

It is important to focus on how food security in Scotland differs from that of the rest of the UK. Several factors are likely to play a role. For example, agriculture in Scotland is different to that in the rest of the UK, due to the nature of Scotland’s land which has a greater proportion of land in Less Favoured Areas. Also, Scotland’s geographical positioning means the effects of climate change are likely to be different, with subsequently different impacts on future food production capabilities. In addition, there are likely to be differences on individual and community levels. For example, the remoteness of some areas in Scotland causes different food access and distribution issues, especially in the times of high fuel prices. All of these distinguishing features are important to consider for food security.

Scotland’s trade in food

The levels of Scotland’s food production vary across the commodities and some are not in line with domestic consumption preferences. For example the production levels of lamb exceed the current consumption requirements for the Scottish population.

Nevertheless, Scotland still imports a significant proportion of meat. One of the reasons for this is the lack of processing capacity in Scotland, with a high proportion of meat being transported to England for slaughter and preparation and then coming back to Scotland for final consumption. This demonstrates that some food supply chains are UK-wide rather than Scotland specific and indicates the reliance of food production on the rest of the UK.

Scotland’s dependency on imports of food from the rest of the UK and other countries is difficult to estimate. Whilst it is known that the food purchases from England are significant, a large part of produce originates outside of the UK but the exact proportions are unknown.

In addition, the livestock industry is dependent on imports of animal feed such as soya and maize, and this has been the case for two decades. The concept of self-sufficiency also refers to the inputs into production and more needs to be understood about sources of inputs into the production processes.

For these reasons, if Scotland was to cease all trade with the rest of the UK and overseas countries, it would be unable to meet the food consumption requirements of its population as they are now.

A long term aim of government could be to facilitate the operation of local food chains. However, self-sufficiency is a risky strategy and a mix of suppliers is needed to spread the risk. It would also be unwise to invest in local processing facilities if they were not profitable. Nevertheless, exporting intermediary produce can leave the chain more exposed to disruption. For example, if there is an animal disease outbreak elsewhere in the UK then measures to control the disease may affect Scottish producers.
Land use

Competition for land between biofuels and food is not an issue in Scotland because the volume of biofuel production in Scotland is not significant. However, land can be used for purposes other than food production and there are opportunities for forestry and on-farm energy recycling.

Some changes in land use can be irreversible and should be protected against. Whilst tree planting is not irreversible its effects depend on the nature of the soil. In Scotland, coniferous forest means soil turns acidic and it can take a long time for this to reverse. Feasible alternative uses of land should therefore be explored further.

Box 4 The Scottish Government Rural Land Use Study

The Scottish Government’s Rural Land Use Study is a cross-cutting programme of research taking place in 2009 and managed by the Rural and Environment Research and Analysis Directorate (RERAD). The overarching aim of the Study is to provide an integrated evidence-base on the potential contributions of Scotland’s rural land:

- to deliver on the Scottish Government’s purpose of sustainable economic growth;
- to address major policy challenges, such as climate change, food and energy security, and housing and infrastructure needs in response to changing demographics.

The Study consists of four main workstreams:

Project 1: Changing Land Use in Rural Scotland: Drivers and Decision-making
Project 2: Realising the Potential Contributions of Scotland’s Rural Land to Delivering Sustainable Economic Growth
Project 3: The Role of the Public Sector in Realising the Benefits of Scotland’s Rural Land
Project 4: Rural Land Use and Land Use Change Data in Scotland

Findings from the Study will be presented at a Rural Land Use Summit late in 2009.

Food Sectors

a) Whisky

A large proportion of barley and wheat is used for the production of whisky and there is a question of whether these scarce commodity resources should be used for production of food rather than alcoholic drink. However, whisky is a very high value product, which is beneficial for Scotland’s economy. If in the future, at the extreme, if food shortages are experienced, food production may have to take priority over production of other products.

b) Lamb

With regards to the declining sheep numbers from the hills, decoupling of subsidies from production means that it is difficult to address the issue. Good Agricultural and Environmental Condition (GAEC) (see Box 5) is one factor that may reduce grazing

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2 http://www.scotland.gov.uk/About/scotPerforms
in the hills. Furthermore, there is also the question over whether production of a good for which demand is limited should be encouraged.

**Box 5 Good Agricultural and Environmental Condition (GAEC)**

A condition of farmers Single Farm Payments is that they keep their land in Good Agricultural and Economic Condition. These measures were developed by the Scottish Government, based on a framework established in European legislation. They address the following issues:

- Soil erosion - protection of soil.
- Soil organic matter - maintenance of soil organic matter levels.
- Soil structure - maintenance of soil structure.
- Minimum level of maintenance - ensure a minimum level of maintenance and avoid the deterioration of habit

The following two requirements apply to all of the land subject to GAEC measures

- The land must be available for agricultural use or capable of returning to agricultural use at present or by any time during the next growing season.
- The land must be in a condition that an inspector/auditor could undertake normal control activity (e.g. measure the area and walk the land to identify features that should be excluded).

In terms of the decline in hill farming, the most relevant GAEC measure is number 10 on undergrazing which states: Avoid undergrazing at a level where the growth of scrub or coarse vegetation is detrimental to the environmental or agricultural interest in the field.

A report by the Scottish Agricultural College, Farming’s Retreat From the Hills (2008)\(^3\) argues that, whilst this measure aims to protect against undergrazing, it may actually have the potential to significantly reduce grazing in the hills. The expansion of gorse, bracken and woodland may have the potential to make land unavailable at the margins in the long term, but not make whole hills unavailable for grazing. Thus, hills are almost always ready to graze next season. Therefore, as long as the farm is not abandoned then GAEC is being upheld, with fewer stock. Farmers can retreat from some parts of the land more than others, for example along a boundary where a neighbour has destocked.

c) Fish

There is a need for more sustainable management of fish stocks, but this would have limited impact on increasing production. Instead, expanding aquaculture is the only way to increase fish production but in the long term there are issues over the dependence on fish meal and fish oil, as global stocks of both are already low. Alternative sources of oil and meal have to be developed, for example by harvesting algae.

Climate change and its effects on the temperature of the ocean will change the types of fish available in the seas around Scotland. However, the key issue is whether the ocean can sustain its current level of production.

Scotland’s domestic consumption of fish is stable. There has been an increase in consumption of salmon meals, mainly due to its increased use in processed and ready meals. As world demand for fish is increasing, the question remains whether

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\(^3\) [http://www.sac.ac.uk/mainrep/pdfs/retreatreport.pdf](http://www.sac.ac.uk/mainrep/pdfs/retreatreport.pdf)
Scotland should focus on exporting it, which would maximise the returns, or sell it domestically in order to maximise consumption at home. Given that the current price of fish is high, it is unlikely to have a big impact on Scotland’s food security.

4.4 Interdependence of Energy Security and Food Security

Fossil fuel use in agriculture

Over time agriculture has seen a shift from a labour intensive to a technology intensive industry, which has increased its dependency on energy inputs and meant that food production is currently heavily dependent on fossil fuels. As the supply of fossil fuels will eventually tighten, and as there is a growing need to address greenhouse gas emissions, fossil fuel use should be reduced by looking into developing appropriate technologies.

Identifying how energy is used in agriculture is important. In agriculture, most energy is taken up by manufacturing of nitrogen fertiliser, followed by grain drying, which is practiced widely in Scotland, and the cultivation operations, including tillage. Pesticides account for a smaller share of fossil fuel input. Energy dependency varies depending on the methods of farming. Whilst till farming uses more of the energy-intensive machinery, nitrogen fertilisers have the largest use in no-till farming. Renewable energy can substitute fossil fuels in many cases.

Research could usefully look into energy requirement for production of each commodity, e.g. a ton of each type of grain. This would allow comparisons to be made across commodities and assist in decision making in terms of which commodities should be grown in order to reduce our reliance on energy. Furthermore, the most energy dependent geographical areas of agriculture could be identified by designing and comparing maps of food production and energy consumption. This would highlight if energy intensity of agriculture is somehow correlated to the geographical location. Water use should also be considered. In many cases, water efficiency depends on fossil fuel usage.

Overall, given the reliance of food production on energy, food and energy security should be considered together.

Renewable energy options

Research into new technologies that could make agricultural systems less dependent on fossil fuel is needed. In looking for alternative sources of energy, a wide range of options should be explored. For example solar energy may be a feasible option, given the future climate projections for Scotland. Deriving energy from waste would help greatly in shifting agriculture’s reliance on non-renewable energy sources. Biomass, anaerobic digestion, more energy produced from own land and more efficient use of nutrient are all options that should be explored.

Oil prices

The volatility of oil prices affects the uptake of renewable energy, as when oil prices are low, businesses are discouraged from investing into alternative energy sources.
There is also a question over whether or not the food systems can adapt fast enough in response to the rise in oil prices. It would be useful to estimate, for example, the impact of oil crises on fertiliser production and use. The recent spikes in oil prices had a large impact on farmers’ wheat margins but it is the scale of such impacts that need to be measured with better accuracy.

**Energy use beyond farmgate**

The interdependence of food and energy goes beyond agriculture, since consumption of food is also dependent on energy. The parts of the food supply chains that are particularly energy dependent need to be identified. Beyond farm level, transportation and refrigeration and, at the household level, shopping and cooking behaviours need to be looked into further. Understanding the scale of the dependence will give a better idea of the effects that changes in energy supply can have on food production and consumption and consideration should be given to whether it is a simple or compound relationship.

**4.5 Resilience of the Food Supply Chains**

**Short term disruptions**

Food supply is reliant on the smooth operation of the supply chains. Events that cause disruptions can threaten to break down links in the chains and prevent food from reaching the end consumer. Fortunately, the effects of many of these events or trends can be mitigated. However, food supply can be disrupted by crisis type events, which are unpredictable and more difficult to plan for.

The consequences of short-term supply shocks can have different effects depending on their nature. A short term disruption in logistics for example, could have a large detrimental effect on many other sectors, whilst animal disease outbreaks would usually only have significant impact on one sector in the supply chain although other parts of the supply chain would also be affected.

The interaction of government, producers and retailers plays a key role in how these shocks can be best managed.

**The role of government**

a) **Risk mitigation and management**

Governments can prepare for crises in food supply by conducting risk assessments. This should involve deriving probabilities and frequencies of various potential short-term disruptions and potential costs associated with the damage they can cause. The time-scale is of great importance in planning. Food shortages can occur in a matter of weeks as consequence of a supply shock but it can take much longer for producers to respond due to the nature of the food production process. For example, the agricultural sector cannot respond immediately, given that it takes several months to grow a crop.
Planning is complicated by the fact that the continuity of food supplies has multiple facets and goes beyond food supply chains. Disruption to the supply of fuel is a vivid example. Strikes by workers at a Grangemouth based refinery plant in April 2008, showed the effects that the short-term disruption of energy supplies could have on the food supply chain, including livestock feed. Fuel shortages can have significant implications on what is delivered to the retailers’ shelves and people’s ability to get to the shops. The “just-in-time” models adopted by modern food businesses make them particularly vulnerable to such disruptions.

However, both UK and Scottish governments already has contingency plans in place for these scenarios. This was demonstrated by the response to the Grangemouth strike (for example, tankers came across from the Netherlands to deliver fuel to the North East region of Scotland, where there were shortages). There is also an emergency fuel plan which prioritises entitlements to fuel. Implementation of the plan is carried out at the UK level. When supply shortages last only a few days, there is likely to be stock in the system but information is needed on where it is and how to get it through the supply chain to the end customer.

In order to make food systems more resilient, actions have to be taken in advance, in anticipation of events happening.

b) Information provision

The role of government in providing information during the times of crisis is very important. Failure to provide sufficient information or provision of incorrect information can have major negative consequences. For example, during the BSE outbreak, media misrepresentation together with the UK government response to it undermined public trust and had an effect on sales of beef. Since consumer demand can shift significantly in response to events, misleading information can be very detrimental. The disconnection between the government and industry led to a loss of domestic markets during food scares as supermarkets switched to sourcing from outside the UK. Governments needs to play a supportive role in the times of crises by encouraging media statements by experts to get the message across.

c) Regulation

Tighter regulation is one way to prevent crises from occurring. It could help minimise the risk of food scares by ensuring companies do not take shortcuts in their production and quality control processes in an attempt to cut costs. This is especially relevant for products that suffer from high price volatility as there is more incentive to cost minimise when prices are low. The recent dioxin related scare in pig production suggests a need for better regulation.

The role of industry

In preventing and managing risk, government efforts have to be supplemented by industry actions. Businesses need to implement adequate continuity planning and it can be governments’ role to raise awareness of the necessity for these plans. These continuity plans need to include interfaces with consumers and suppliers and not just focus on the immediate effect to the business. Retailers have a key role to play in
food chain resilience. They can share information about changes in consumer demand and joint working with government can help inform the response to any event causing disruption in the food supply chain.

**Household risk management**

Households also have a role to play in food resilience. More information on household supplies and consumer behaviour in times of crisis is needed. For example, consumers can protect themselves against food shortages by changing their diet through substitution, for example, substituting bread for potatoes. Given the large number of alternatives available to consumers their buying patterns are flexible in the short-term.

In the case of food shortages, there is a role for industry and government in managing risk of food shortages in households. Some disruptions, e.g. transport strikes, may affect the supply of many types of foods, making diet substitution difficult. Panic buying causes the shortages in the first place and second, the poorest people would not have sufficient funds to stock up on food. Retailers and governments could be tasked with responsibilities that facilitate the management of risk by households. Retailers could take on the responsibility of access to food during crises. For example, they could introduce rationing to create fairer access which would also benefit them in terms of long term customer relations. Informal rationing by shops happens already, although this is partly to stop people reselling goods. The role of government could be to manage consumer expectations and provide information during the supply shortages.

**4.6 Household food security**

**Retail provision**

Issues of access can arise in both rural and urban areas but the challenges faced are different. Rural areas are often more vulnerable in terms of access to food. For example, internet grocery shopping in some areas can be problematic as companies may have difficulties in delivering to certain remote locations or charge more for delivery. Despite this, there is some evidence that suggests that rural areas are adapting to food access challenges. For example, people on the islands bulk buy produce such as dried and tinned goods on the mainland, but they are still largely reliant on local shops for fresh food. Rural areas may also be disadvantaged in terms of the quality of products available to them.

Despite recent price spikes, over the long term food prices have followed a downward trend, putting pressure on retailer margins. Stores in locations with small catchment areas and those involving higher distribution costs are less attractive locations for retailers. This puts such locations at risk of low retail provision. Whist the existence of so called “food deserts” is still debatable, and there is no clear evidence to suggest that those exist in the UK, governments needs to know how to manage any risk that might arise in terms of poor food access and support local producers and retailers.
**Transport provision**

In areas where local food stores are not available, people can be heavily reliant on the availability and affordability of fuel and transport. This is especially relevant in deprived areas, where both retail provision and car ownership can be very low. This causes problems as people become reliant on public transport and shopping can be too heavy to carry. People in rural areas, especially the elderly who do not have access to a car, often have to rely on friends and family to provide them with food or transport to shops. Access issues can be different across the islands. For example, deliveries to the Isle of Skye can come by road but in Barra people are dependent on deliveries by boat only.

More evidence is required on which groups are particularly vulnerable in terms of access to food and how many people this affects. The National Diet and Nutrition Survey (see Box 6) provides some information on this, but better breakdown is needed. There is capacity within official surveys for questions on this to be incorporated. There is also a need for information on the effect of recession on diet patterns.

**Box 6 National Diet and Nutrition Survey**

This survey provides a snapshot of the diet and nutrition status of the UK population. Its main aims are:

- to provide annual data about the nation's dietary intake and nutritional status
- to estimate the proportion of individuals with compromised nutritional status and to estimate the proportions attaining recommended intakes.

Between 1,000 and 1,500 people per year are interviewed for the survey. Participants are chosen at random from a list provided by the Post Office. Participants are adults and children aged over 18 months.

The main components of the survey are:

- general questions about eating habits, health, and lifestyle
- food and drink diary
- physical activity questionnaire
- basic measurements including height, weight and blood pressure
- urine and blood samples


**Food Waste**

Food waste in Scotland remains high. There are a number of barriers to reducing waste. For example, on the household level, there are issues about people’s ability to make use of what they waste due to a lack of cooking skills and changing eating patterns. Supermarket offers, such as Buy One Get One Free, encourage people to buy more food than they need, contributing to the increase in household waste. Regulation also plays part for producer waste, for example some parts of the carcass are now classed as risk material.

There is a lack of information about the differences between what people buy and what they consume. This used to be provided by the National Food Survey (see Box
7) but there is now no source of information for it and that is the gap that needs to be filled.

**Box 7 National Food Survey**

This survey examined domestic food consumption, expenditure and nutrition of households in Great Britain. It used a combination of interviews and food diaries. Around 8,000 households per year took part in the survey.

In 2001, the National Food Survey and the Family Expenditure Survey were replaced by a combined survey, the Expenditure and Food Survey, although DEFRA continues to sponsor the data on food. Around 6,500 households per year are interviewed and the data on food is gathered from diaries of expenditure by individuals.


**Grow your own**

Space for people to grow their own food could be provided in planning regulations in order to both make people aware of how food is produced and improve household food security. However, with great pressure on land for housing, the number of allotments is already limited. In addition, changes in lifestyle mean that for some people may find it difficult to engage in grow your own activities.

**Food Affordability**

Another way of reducing pressure on the system without the need for systematic change is by supporting the local food networks. However, local food can often be expensive and those most vulnerable to food security issues may be unable to benefit. A government food stamp scheme for fruit and vegetables could help those on lower incomes maintain a healthy diet. Community food initiatives can be a viable solution for some communities, but each initiative has to be considered individually as not all communities are the same and benefits could differ.

Food affordability is a large part of household food security and more insight is needed into food prices. There is research currently in progress looking at the price variability of food over a ten year period in different areas of Glasgow (see Box 8). The initial findings have shown great variability in changes, but with no clear explanations for it. The average price in poor areas has not increased as much as in rich areas. However, this can partly be attributed to the diversification and increases in choices available in richer areas. Further investigation into this area is required.

**Box 8 A Systematic Study of an Urban Foodscape: The Price and Availability of Food in Greater Glasgow**

S. Cummins and S. Macintyre

This report looked at the price and availability of food across different types of shops and areas with differing levels of deprivation within Greater Glasgow in order to discover if healthy food is more expensive and more difficult to obtain in poorer areas and so be a cause of poorer diet in these areas.

Contrary to previous research, the study found that shop type was the main predictor of food price and
availability. Multiple (i.e. mainstream supermarkets) and discount stores (such as Lidl and Aldi) had cheaper prices and greater availability and were more likely to be located in more deprived rather than more affluent areas. Although prices did not vary much according to area, when they did, they tended to be lower in poorer areas. However, these foods tended to be high-fat and high-sugar types which dietary guidelines suggest reducing consumption of.

The authors therefore identified a need for more systematic, large-scale, empirical studies on variations in food price and availability and the public health implications of these.


http://usj.sagepub.com/cgi/content/abstract/39/11/2115
SECTION 5 Suggestions for Policy Development

At the end of the think tank, participants were asked for general policy recommendations which in their view could potentially have positive effects on Scotland’s food security status. The following bullet points summarise individual participants’ views, therefore some conflict between statements can be observed.

- Unpack its definitions of food security and be clear on what is meant by it
- Assess the impact of global challenges and the speed and timescale of change
- Invest in R&D into Scottish production and long-term trends
- Use evidence to plan for future agriculture
- Recognise the benefits to local economies
- Take into account land use irreversibility
- Recognise that some food security issues may be temporary in nature
- Match primary production with domestic demand to increase self-sufficiency
- Export commodities such as dairy and meat where there is capacity
- Build evidence on interdependence of food and energy
- Replace fossil fuel inputs by renewable energy (e.g. solar) where possible
- Increase energy efficiency for different production systems
- Strive for sustainable farming in terms of energy use, biodiversity and water
- Improve people’s confidence and trust in government
- Produce more by moving to more marginal land
- Focus on price as well as volume, maintaining affordability
- Plan for future water challenges
- Provide information to businesses and consumers
- Strengthen resilience by planning for short term breaks in food supply chains
- Increase and encourage investment in food producing businesses
- Take a consumer oriented approach
- Reduce food waste
- Work toward sustainable, healthy and economically efficient diet
ANNEX A – Presentations

A1 Global food security and its importance for Scotland

A2 Overview of Scotland’s productive capacity

A3 Household food security in Scotland: access and affordability
ANNEX B - Further Reading

http://www.chathamhouse.org.uk/publications/papers/view/-/id/695/


http://journals.cambridge.org/action/displayAbstract?aid=4435540


http://www.food.gov.uk/science/research/researchinfo/devolvedadmins/scotlandresearch/scotlandresearch/ScotlandProjectList/s04005/

http://www.chathamhouse.org.uk/publications/papers/view/-/id/694/


Ingram, J.S.I., Gregory, P.J. and Izac, A.-M. (2008), *The role of agronomic research in climate change and food security policy*, Agriculture, Ecosystems and Environment 126, 4-12.

Traill, B, *Implications of a Nutrition Driven Food Policy for the Countryside*, University of Reading (Ongoing).
http://www.relu.ac.uk/research/projects/Traill.htm
ANNEX C - Glossary

BSE - Bovine Spongiform Encephalopathy

CNPP - Center for Nutrition Policy and Promotion

DEFRA – Department for Environment Food and Rural Affairs

EU – European Union

FAO – Food and Agriculture Organisation

GEAC – Good Agricultural and Environmental Condition

GM – Genetically Modified

RERAD – Rural and Environment Research and Analysis Directorate

TFP – Thrifty Food Plan

USDA – United Stated Department of Agriculture
ANNEX D - Challenge Questions

*Aimed to stimulate thinking on the issues around food security*

1. What could be the effect on Scotland of global forces such as world population growth, dietary transition, water and land scarcity and climate change? How should we approach the future global challenges in order to safeguard our food supply?

2. Can any of the future challenges be turned into opportunities for Scotland? How can Scotland make best use of any advantages it has?

3. What role will energy markets have in influencing the food security situation in the future globally and in Scotland in particular? Should we work towards energy security or reducing the dependence of food chain on energy inputs? How can this be achieved?

4. What are the advantages of home production as opposed to a diverse range of reliable suppliers? Would increased domestic production safeguard us from the volatility of global markets?

5. Is there an optimal level of self sufficiency or a minimum level of domestic supply in terms of critical mass? If desired, what level of self-sufficiency can be achieved realistically given Scotland’s productive capacity?

6. How can Scottish food supply chains be improved in terms of their resilience and efficiency? What role should the government play in identifying and addressing supply chains vulnerabilities? Where are these most likely to lie?

7. How does households’ access to food vary spatially and across different groups e.g. according to the social class? Is access to quality food restricted for those who are socially, physically and geographically disadvantaged and if so, how can these restrictions be removed?

8. How does food affordability compare across regions? What can be done to make healthy food more affordable for vulnerable groups (low income, elderly, single parents), especially if food prices remain high?
ANNEX E - Participant Profiles

**Academic experts:**

**Professor David Atkinson**
Chair of Scottish Churches Rural Group  
(Previously Vice Principal at SAC until 2004)
Interests/Research: agricultural, rural and food issues

**Kate Bailey**
Senior Research Associate - Food Process Innovation Unit  
Cardiff Business School, Cardiff University
Interests/Research: supply chain vulnerability, food supply networks and cross-chain collaboration

**Dr Steven Cummins**
Senior Lecturer at Department of Geography  
Queen Mary, University of London
Interests/Research: contextual and socio-environmental determinants of health, the design and evaluation of community social and policy interventions to improve population health, the consumer consequences of food retail restructuring and the public policy implications of geographical research.

**Professor Peter Gregory**
Director/Chief Executive  
Scottish Crop Research Institute
Interests/Research: Global environmental change and food security

**Professor David Marshall**
Professor of Marketing and Consumer Behaviour and Head of Marketing Group  
University of Edinburgh Business School
Interests/Research: Consumer behaviour and marketing with special interest in food industry, health issues and change, marketing to children

**Dr Alan Renwick**
Head of the Land Economy and Environment Research Group
Scottish Agricultural College
Interests/Research: policy evaluation, particularly involving commodity regimes and agri-environmental policy; economic analysis of crop production and the wider farm business, trade liberalisation, energy crops and future development of UK agriculture

**Professor Brian Revell**  
Dean for External Liaison  
Harper Adams University College  
Interests/Research: Agricultural economics

**Professor Bruce Traill**  
Professor of Food Economics  
University of Reading  
Interests/Research: food choice, diet and health

**Scottish Government – Policy:**

**David Thomson** - Deputy Director, Food and Drink Industry Division  
**David Barnes** – Deputy Director, Agriculture and Rural Development Division  
**Neil Ritchie** – Branch Head, Animal Health and Welfare Division

**Scottish Government - Rural and Environment Research and Analysis Directorate:**

**Maggie Gill** – Chief Scientific Adviser, RERAD  
**Ron Stagg** – Deputy Director, Research and Science Division, RERAD  
**Kathy Johnston** – Senior Economist, Rural and Environment Analytical Services, RERAD  
**Susan Gallacher** – Scientific Adviser, Research and Science Division, RERAD  
**Leila Akhoundova** – Assistant Economist, Rural and Environment Analytical Services, RERAD
Lynn Bruce – Intern, Social Research, Rural and Environment Analytical Services, RERAD

Other devolved administrations:

Dorian Davies - Senior Rural Development Adviser, Department for Rural Affairs & Heritage, Welsh Assembly Government

Sinclair Mayne - Scientific Adviser, Department of Agriculture and Rural Development of Northern Ireland