

# **UK FOOD SECURITY – AN ANALYSIS**

## **ALDER M.D. APRIL 2024**

### **SUMMARY**

Food security is one of the thirteen sectors listed in the government 'Critical National Infrastructure' document<sup>22</sup>. The government's food strategy (GFS) published in June 2022<sup>9</sup> states the government will aim to maintain food production in the UK at current levels, around 60% of the food we consume, and obtain the rest from importation from a diverse range of sources.

This paper examines the potential for maintaining the 60% level of production, particularly considering key factors such as loss of productive agricultural land, crop yields and livestock productivity, UK population growth and labour availability. An analysis of these factors suggests the 60% will be difficult to achieve and the UK could become more reliant on food importation.

Food importation is analysed in more detail and in particular the vulnerability of supply from the sources identified. The paper concludes that importation of food will become increasingly difficult due to a number of factors, but primarily the effect of climate change on global food production.

As a result of the analysis in the paper a number of conclusions and recommendations are made.

### **DEFINITION OF FOOD SECURITY**

The National Food Strategy<sup>21</sup> states that securing the nation's food supply has been a central role of all states since history began. The strategy states that the precise meaning of 'food security' is disputed and refers to one study identifying 200 definitions of the term.

Food security and food self-sufficiency needs to be distinguished. Self-sufficiency is the ability of a nation to produce all the food it needs from its own resources, whilst food security is being able to feed a population from national production and food imports at a reasonable cost.

The Food Security report (House of Commons Committee Report)<sup>13</sup> bases their definition on the five aspects set out in the Agricultural Act 2020;

- global food availability, which describes supply and demand issues, trends and risk on a global scale, and how they may affect UK food supply;
- UK food supply which looks at the UK's main sources of food at home and overseas;
- supply chain resilience, which outlines the physical, economic and human infrastructure that underlies the food supply chain, and that chain's vulnerabilities;
- household-level food security, which deals with issues of affordability and access to food; and
- food safety and consumer confidence, which details food crime and safety issues.

## THE LEVEL OF UK FOOD PRODUCTION

The GFS states that overall for the foods that we can produce in the UK we produce around 70% of what we consume. When considering the broader measure of food consumed (including foods that cannot be grown in the UK), the self-sufficiency figure falls to 60%.

In February 2024 the Prime Minister wrote 'Food security is a vital part of our national security. We must be more agile and responsive to at least maintain domestic food production at current levels, roughly 60% of the food we consume'.<sup>26</sup>

Some UK food is exported and so the actual self-sufficiency figure falls to 54%, described by the UKFSA (United Kingdom Food Strategy Report) as the actual consumption figure.

An analysis of the UK food supply (UKFSR) shows that 28% of domestic consumption comes from the EU and 18% from the rest of the world. Forty two countries are responsible for 90% of imported supply and twenty seven for 80% of the total. There is therefore a diversity of supply, which produces a reasonable level of security at the current time. There are however risks associated with some products where only one or two countries are associated with supply. The importation of Soya provides an interesting example, 50% of UK imports come from Brazil with significant environmental impacts on rainforest removal, 47% of imports come from North America. A change of import policy would have an impact either way.

A consideration of what foods are home grown and what foods are imported is relevant in understanding the detail of food importation.

**TABLE 1**  
**CROPS, UK PRODUCTION AND IMPORTS**<sup>6/7</sup>

<b>CROP</b>	<b>HOME PRODUCTION %</b>	<b>IMPORT %</b>
Oats/Barley	100	-
Wheat	90	10 (mainly milling)
Sugar Beet	60	40
Potatoes	70	30
Oilseeds	80	20
Vegetables	50	50
Fruit	16	84

**TABLE 2**  
**LIVESTOCK (EGGS & SEAFOOD) UK PRODUCTION AND IMPORTS**<sup>6/7</sup>

<b>PRODUCT</b>	<b>HOME PRODUCTION %</b>	<b>IMPORT %</b>
Beef/Veal	65	35
Pig meat	40	60

Sheep meat	70	30
Poultry meat	83	17
Eggs* <sup>1</sup>	91	9
Seafood* <sup>2</sup>	15	85
Fruit	16	84

\*<sup>1</sup> UK Egg Industry data

\*<sup>2</sup> Seafish News 2024

**TABLE 3**  
**UK FOOD IMPORTS BY VALUE AND COUNTRY OF DISPATCH** <sup>6/7</sup>

COUNTRY	£BILLION
Netherlands	5.3
Germany	4.5
Irish Republic	4.4
France	4.4
Spain	3.6
Italy	3.1
Belgium	2.5
Poland	2.0
USA	1.3

The tables 1-3 indicate how the UK achieves food security. They show the main food imports and where they came from. The information is not fully comprehensive, ignoring some staple foods such as rice where the main suppliers are India and Pakistan.

### **CLIMATE CHANGE AND GLOBAL FOOD SUPPLY**

Food production might be affected by climate change and this was noted in the government's 2022 risk strategy<sup>22</sup>. However, global food production and yield have increased significantly over the past sixty years in spite of global warming. There is also strong evidence for increasing plant growth globally because of CO<sub>2</sub> fertilisation from increasing CO<sub>2</sub> levels.

A report from the University of Minnesota<sup>10</sup> in conjunction with other universities has stated that the world's top 10 crops (barley, cassava, maize, oil-palm, rapeseed, rice, sorghum, sugar cane, wheat) supply 88% of all calories produced on crop land. They state that yields have long been projected to decrease and that new research now shows that climate change has already affected production of these key energy sources. The average reduction is 1% and the impact is greatest in Europe, Southern Africa and Australia. A UN report in 2019 stated that 10% of the world's population was undernourished and

'climate change will accelerate the rate of severe food shortages<sup>30</sup>.' The reports quoted must also be seen in the light of a growing world population. A report from the European Environment Agency also in 2019<sup>12</sup> said 'Crops and livestock production is projected to decrease and may even have to be abandoned in Europe's southern and Mediterranean regions..... Any benefit would be outweighed by the increase in extreme events negatively affecting the sector.'

Food production issues can be specifically related to countries where the UK imports its food from. Spain is vulnerable as two thirds of the country could be severely affected by increasing desertification and accelerated soil erosion. The UK imports 27% of its fruit and 25% of its vegetables from Spain. The Netherlands is the largest exporter of food to the UK. In that country the government has recognised that climate change could affect agriculture and has developed an action programme to combat this (Government of the Netherlands 2023). There are considerable vulnerabilities to food production in other countries that export to the UK.

Many African countries will also be severely affected. For example, 98% of Kenya's agricultural activity is rain-fed and highly susceptible to changes in extreme weather. Kenya is a major supplier of food to the UK, notably for crops such as green beans.

## **UK AGRICULTURE AND CLIMATE CHANGE**

Climate change might have a significant impact on food production in the UK, particularly severe weather conditions affecting crop yields. However, as confirmed by the IPCC, in spite of global warming, so far evidence for increasing frequency or intensity of extreme weather such as flooding, drought and storms across the world is very weak or non-existent.

Data from the Met Office<sup>20</sup> confirms recent weather extremes. Some examples of these extremes are 2018, one of the hottest years on record, and 2019 one of the wettest. In 2020 wheat yields were down 40% on the previous year because of weather conditions. Then 28 January 2024 saw the hottest January day ever recorded this has been followed by high rainfall between February and April limiting the ability to plant Spring crops. Vegetables have been particularly affected. In November 2023 the Fresh Produce Journal<sup>29</sup> reported the lowest potato harvest ever reported and referred to shortages of brassicas such as broccoli and cauliflowers and also root vegetables such as carrots. The journal referred to a House of Lords report that stated the UK imported £2.7 billion of vegetables in 2022, a 15% increase from 2021<sup>17</sup>.

In the food security section of the NFS the report suggests the known unknowns are the most dangerous uncertainties to be faced. The example given relates to the Gulf stream. If this slows because of melting glaciers then temperature and rainfall would drop dramatically reducing crop yields.

## **FACTORS AFFECTING FUTURE UK FOOD PRODUCTION**

### **A. Land Use for Food Production**

The total land area of the UK is 24.9 million hectares. The utilised agricultural area (UAA) is 17 million hectares, or 70% of the total UK area. The cropable area is 6.0 million hectares or 36% of the UAA. The area of arable crops has decreased by 1.1% from 2022 to 2023 down to 4.4 million hectares. In 2023 the area under horticultural crops decreased by 5.4%. The UAA peaked at around 18 million hectares in 2005 and the running average has shown a decline since then.<sup>6/7</sup>

A Defra policy brief (SP1104) predicted a significant loss of valuable land (BMV Best and Most Versatile) as a result of climate change.

The CPRE in a report<sup>3</sup> in 2022 relating to England stated that 14000 acres of farmland had been lost to developers in a ten year period, stating this equated to 250000 tonnes of vegetables. The report also highlighted the likely growth in land loss.

A study by the UK Centre of Ecology and Hydrology<sup>30</sup> suggested a loss of 2 million acres of grassland (833, 338 hectares) between 1990 and 2015 as well as a large loss of arable land and a study by the University of Cambridge 2014<sup>2</sup> suggested a land shortfall to farming of 2 million hectares by 2030. Loss of productive land is compounded by a number of other issues such as rewilding and environmental schemes (ELMS – Environmental Land Management Scheme). Increased areas of woodland whilst generally on non-productive land will also have an impact.

Land being used for energy purposes is another significant issue impacting on food security. There are two areas of impact; first land being used for bioenergy crops and second, the rapid expansion of solar farms on valuable farm land. In 2021 bioenergy crops accounted for 121000 hectares of land<sup>5</sup>. The Committee on Climate Change in proposing policies for a net zero UK by 2050<sup>11</sup> suggest an additional 23000 hectares each year for the next ten years. Solar farms currently occupy around 30000 hectares<sup>24</sup> based on an analysis of BEIS data. The government has suggested a target of 70 GW from solar energy and if this was all based on farmland then 84000 hectares would be required. It is therefore probable that up to 500000 hectares of land could be used in one form or another for energy production. This represents around 8% of the cropable area of the UK.

An analysis of land use is complex but there can be no doubt that the area of land for food production is diminishing at a significant rate.

## **B UK Population Growth**

The Office for National Statistics (ONS)<sup>25</sup> gives the current UK population as 68million. It states that between 2021 and 2026 the population will increase by 9.9% to 73.7 million. The assumption is that net migration will be 315000/annum. However, Home Office data for 2023 states that for that year net migration was around 700000<sup>18</sup>.

Home based food production would therefore need to increase by an equivalent percentage to population growth to maintain home based food production at current levels. Since this would appear to be a difficult target to achieve, the likelihood is that food imports will have to increase to feed the growing population.

## **C UK Crop Yield**

An analysis of UK crop yields taken from Defra statistics suggests that between 2000 and 2020<sup>4/6</sup> yields of major UK crops remained relatively consistent. Table 4 below provides yield data for the three years 2020 to 2022.

**TABLE 4  
YIELDS OF MAJOR UK CROPS t/ha**

<b>CROP</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
Wheat	7.0	7.8	8.6
Barley	5.9	6.1	6.7
Oats	4.9	5.6	5.8
Oilseed rape	2.7	3.2	3.7

Sugar Beet	57	81	69
Protein crops	3.1	3.2	3.8
Potatoes	46	46	42

**TABLE 5  
UK – AREAS OF FRUIT AND VEGETABLES HECTARES<sup>6</sup>**

<b>CROP</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
Outdoor fruit area (thousand hectares)	34	33	32
Fresh vegetables (thousand hectares)	119	113	107

In 2023 wheat yields were down 5.1%, barley 6%, oats 13%, oilseed rape 17%<sup>7</sup>. Overall these figures suggest that average crop yields have shown significant fluctuation but in essence have remained relatively constant over a period of more than 20 years.

Data for livestock shows a similar relatively static situation with a slight reduction in home based sheep production.

The figures presented clearly show that any loss of productive land will not be compensated by higher yields.

#### **D UK labour availability for food production**

A House of Commons Committee report<sup>16</sup> in the session 2021-22 considered labour shortages in the food and farming sector. It quotes a Grant Thornton report<sup>15/19</sup> a 12.5% structural vacancy in the industry which it describes as a ‘chronic labour shortage’. The report concludes that there is ‘no doubt about the seriousness of the issue facing the food and farming sector caused by labour shortages. These include food security.....’.

Labour availability is without doubt another factor that will limit home based food production.

#### **CONCLUSIONS**

Many of the areas in this report are covered in the Food Security report. This report is now dated and it is unfortunate that an updated report will not be available until December 2024.

There are a number of factors that affect domestic food production and global food supply. Managing extreme weather conditions must be central to UK food security policies. There are significant issues with global supply chains and this emphasizes the importance of home based food production.

A number of areas have been identified that will affect domestic food production and the level of self-sufficiency. The first is the land used for food production. If 8% of the UK croplable area is lost to food production then the overall food self-sufficiency will decline. It is not possible to accurately quantify land lost to housing, industry and infrastructure, or productive land being converted to woodland or rewilding. In addition, the impact of the ELM scheme remains unknown. However, given the known facts, it may not be unreasonable to assume a trajectory of up to a 20% and loss over the next 15-20 years. The second factor to consider is population growth. ONS data suggests that 10% more food

would need to be produced in the UK to maintain the current level of self-sufficiency. The third factor is crop yields and livestock production levels which at best are static and will therefore not make up for shortfalls in home food production.

All the above factors are compounded by labour shortages and other factors such as lack of resilience in supply chains.

The UK currently produces 75% of its temperate food. The analysis in this paper suggests this could drop to 60% or below. Total food imports could increase to over 50% of UK food requirements. This paper quotes the actual self-sufficiency figure for UK agriculture, taking into account exports, as 54%. This could drop the overall self-sufficiency to 45% if current trends continue.

It would therefore seem clear that the stated government intention of maintaining levels of UK food production at current levels will not be achieved.

The result of this scenario is that the UK will have to import significantly more food. This paper demonstrates how difficult this might be, primarily because of the impact of climate change on the countries the UK imports food from. Food availability on world markets will remain possible, but as shortages appear so prices will increase.

## **RECOMMENDATIONS**

### **i. Develop an improved land classification system.**

The use of land rests at the heart of food production and therefore a suitable system for classifying land types and capability is of critical importance. The current system is called the Agricultural Land Classification (ALC) and splits land into six grades (1, 2, 3a, 3b, 4 and 5).<sup>23</sup> The grades 1, 2 and 3a are defined as the best land and are called the best and most versatile land (BMV). This land has a degree of protection from development under the National Planning Policy Framework (NPPF). This system has a number of limitations, not least in that land grades 3b and 4 can be very productive and the metrics used for classification can be open to considerable interpretation.

Defra funded Cranfield University to look at a system for classifying soils and a system called Soilscales<sup>27</sup> was produced. This system gives a lot more detail on the suitability of soil for different purposes but would be difficult to apply to planning guidance.

The NFS proposes a three compartment model for land use that would allow for the creation of a Rural Land Use Framework (RLUF). The three categories are agroecological farms, conventional high yields farms and land freed for nature. The NFS suggests using ALC grades combined with yields taken from June returns.

The recommendation is that a more fit for purpose ALC is devised. If this is not accepted then the NFS proposal should be adopted. If the use of BMV is continued then this should include grade 3b and 4 land.

### **ii. Protecting valuable farmland and developing a land use framework.**

Maintaining or increasing valuable agricultural land must be a vital part of a food security plan that maintains or increases domestic food production.

Producing a national land use plan has been a long established proposal. In 1978 the author of this report made such a proposal as part of a Churchill Fellowship proposal<sup>1</sup>. The NFS proposed such a plan with a national land use plan at its heart. It is understood that such a plan may be produced at the end of 2024. The House of Lords produced a report<sup>17</sup> into land use framework and stated that this should not be over prescriptive; an approach which appears to be supported by the House of Commons FSR. The recommendation is that a National Land Use plan must be produced. The plan must be prescriptive. The plan must protect BMV land. BMV land must be redefined so that

it includes all productive farmland. The plan must be adopted by new NPPF guidelines which must be definitive and not open to wide interpretation. The aim of this recommendation is to maintain or increase the area of UK agricultural land and halve the present decline. Land use has many forms and this recommendation would still enable some land to be used for rewilding and environmental schemes. Woodland expansion would be possible, generally on lower grade land. Solar farms would not be allowed on agricultural land and the area of bioenergy crops would be reduced or maintained at existing levels. If this policy leads to an energy shortfall then nuclear generation is an option as a viable low carbon source without consuming land.

iii. **The agricultural labour force.**

The House of Commons Committee report notes that access to people is really holding growth back and is a threat to food security. An independent review into labour shortage (Shropshire review)<sup>19</sup> has made a number of recommendations.

The recommendation is that the Shropshire review is accepted and, in particular, the proposal to invest more in the domestic workforce along with the extension of the visa scheme with more visas and some of an extended nature. In addition, the recommendation to widen the eligibility criteria for the skilled worker route is supported.

iv. **Agriculture research.**

It is recommended that government should invest more in research and development. In particular, it should follow the example of the Netherlands and develop an action programme to counter the effects of climate change.

Research into long-term sustainable solutions should be increased and techniques such as regenerative farming must be developed. The role of soils in carbon capture and storage and the development of sustainable land management practices are critical issues. (The World Economic Forum – WEF<sup>32</sup> notes that increasing the carbon stocks by just 1% would capture more carbon than total annual global emissions from burning fossil fuels – a fact not often monitored by climate scientists).

Further development of genetic modification (GM) in plants could counter the static crop yields covered earlier in this paper.

v. **Fiscal policies for UK farming.**

Government support for farming has moved away from EU direct payments towards Environmental Land Management (ELM) with three strands; the sustainable Farming Incentive (SFI), a local nature recovery scheme, and a landscape recovery. However if the UK wishes to maintain home production of the main food items it imports such as vegetables and fruit, then direct payments made either under the guise of the guaranteed price that was a part of the agricultural support system under the 1947 Agricultural Act might be appropriate, or its EU replacement the Target price.

vi. **Summary of recommendations.**

Government reports all recognise the importance of food security and the risks involved. The resilience of the UK food system is frequently stressed. The significant loss of valuable farmland is generally not emphasised as well as the inadequate way that land quality is measured. Research as a key component of protecting security of food supply is rarely covered. Unless it is recognised that loss of productive land and inadequate fiscal policies are the most significant factors affecting domestic food production, and that food importation cannot be guaranteed, then the UK will face a real food crisis with associated food poverty as food prices rise.

Review draft

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#### **ABBREVIATIONS**

ALC	Agriculture Land Classification
BMV	Best and Most Versatile
CAP	Common Agricultural Policy
CPRE	Council for the Protection of Rural England
DEFRA	Department of Environment Food and Rural Affairs
GFS	Government Food Strategy
GM	Genetically Modified
ELM(S)	Environmental Land Management Scheme
EU	European Union
FSR	Food Security Report
GFS	Government Food Strategy
NFS	National Food Strategy