Viewpoint

Resilience

March 2024

A system under pressure

An overview of long term risks to the UK food system

Economics from IGD

Building a resilient UK food system

Britain's farmers, processors, manufacturers, retailers, foodservice providers and restaurateurs play the most vital role of feeding the nation safe, high-quality, nutritious food.

With a presence in every community across the breadth of the country the food system is central to every one of our local economies.

In recent years, the UK food system has faced major supply chain disruption, as a result of numerous challenges including a pandemic and war in Europe.

The food system has met many of these challenges head-on, continuing to provide UK consumers with high-quality, safe and affordable food. Some challenges, however, have had significant impacts on both price and availability across the market.

As we look to the years ahead, the world finds itself in a more unstable place with risks such as climate change, cybersecurity and geopolitics coming to the fore, challenging the model of the current system.

This report sets out 10 key risks that are likely to put the UK food system under greater pressure in the years to come. Many of these challenges are interconnected and complex.

Mitigating these risks will require a vast range of actions resulting in many significant changes, between sectors and within specific businesses. All parts of the food system will have to play a role in building resilience; from large scale policy change to tactical operational decisions.

What's in it for you?

Dietary shift will be inevitable in order to maintain global food security. Accelerating the transition to healthy and sustainable diets is an opportunity to mitigate both risks to the food system, and to the UK economy by reducing the impact of diet related ill health on productivity and healthcare costs.

Indeed, the UK food system is central to some of our biggest national challenges. Only when we recognise the whole food system, from farm to fork can we appreciate how critical it is to a thriving UK, in an ever-challenging global landscape.

IGD aims to be the essential partner to a thriving food and consumer goods industry, committed to playing a central role in securing a healthy, sustainable and resilient food system.

The Aim:
About this report

Our experts track and monitor multiple sources of information. Combined with our knowledge of the industry and consumer insights, this shapes our "Viewpoint".

We provide this analysis as part of IGD's Social Impact activity, because we believe it supports businesses with better planning and decision-making, to the benefit of the consumers we serve and society as a whole.

We will continue to monitor closely the impact of global events, food inflation, government policy developments and other major themes, keeping you up to date on issues relevant to the food and consumer goods industry.

A system under pressure

10 Long term risks for the UK food system

Climate change

Securing a resilient UK food system will be harder than ever before due to the impacts of climate change. The consequences of extreme weather events on global food production could lead to a 20% increase in food prices globally by 2050.

Simultaneously, food production is a driver of climate change, responsible for 35% of the UK's emissions. Therefore government focus will inevitably turn to the food industry in the coming years as it seeks to meet its commitment to Net Zero by 2050.

Agricultural challenges

The UK is entering into a decade of land use change due to the roll out of the government's Environmental Land Management Scheme, delinking support payments from food production.

The government has committed to maintaining the current level of food self-sufficiency, of around 60%, however this masks significant exposure to shortages at a category level.

Disease

Climate change and the future intensification of farm production will increase the prevalence of pests and diseases impacting UK crops and livestock. Diseases such as avian flu are becoming embedded into production cycles due to climate change.

The UK's vulnerability to disease has increased since EU exit. The UK has lost access to the EU's monitoring systems. Time will tell whether new border measures provide the bio-secure border required.

Water

Parts of the UK and Europe regularly experience water stress, a challenge that will worsen due to climate change. Changing weather patterns and limited infrastructure spending has weakened the UK's resilience.

UK water quality is poor, only 14% of rivers are thought to be in good ecological health, in part due to the impact of agriculture. It is likely that the focus on water quality will move beyond sewage discharges to agriculture and other sources of pollution.

Biodiversity Loss

Global deforestation and the continued decline in pollinators are two examples of biodiversity loss driven in part by the impact of modern agriculture. However, biodiversity loss also has significant longer-term consequences for food production.

Various sustainability goals create tension for business levers, with biodiversity, Net-Zero, and self-sufficiency targets effectively creating competition for land and investment.

Labour and skills

The food industry is the largest private sector employer in the country and has been significantly impacted by labour shortages and skills gaps, reducing the ability of the system to perform at its full capacity. The UK's ageing population will worsen labour shortages in the years ahead.

The UK food system will need to focus on changing perceptions to help build a talent pipeline, investing in automation, and increasing pay.

The economics of the food system

Intense competition across the UK food system has long been effective in keeping food and drink prices affordable for consumers. However, the long-term viability of this business model is under threat, with pressure on profit margins building across the system driving historically low levels of investment.

Geopolitics

The world is in a period of growing geopolitical instability, increasing the likelihood of flashpoints.

Global trading routes for critical items are concentrated along specific trading corridors, driving risk into the system and creating potential for states to leverage their power.

Cyber-security

Many of the challenges faced by the food system will require investment in technological solutions. However, greater adoption of technology also increases cyber security risk.

Food businesses have already been the target of cyber attacks, and it unlikely this threat will abate in a more unstable world.

An opaque supply chain

The food system is a globalised and complex network of interdependent supply chains. Such complexity can often lead to obscurity, hampering progress, undermining assurance and masking issues within the supply chain.

In this issue

Meet our experts

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IGD has consulted with experts across industry and academia to support the production of this report

Climate change

The impacts of climate change

Climate change is arguably the greatest risk the global economic system faces. Human induced climate change is causing widespread impacts across the globe. Above 1.5°C point of warming, against pre-industrial levels would mean some of the impacts from climate change will be irreversible.

As the climate crisis progresses, extreme weather events such as heatwaves, droughts, storms and floods will become more frequent and intense. If temperature rise was to increase over 2 degrees, it could lead to 'severe food security risks' in the global food system.

Climate change will disrupt growing patterns within the UK, changing yields and increase the risk from pests and disease. Differing parts of the country will have differing experiences of extreme weather events.

The UK will not necessarily experience the very worst of the impacts of climate change, but it is not separate from the global food system. The UK is self-sufficient in 60% of its food. Globally, 10% of land suitable for major crops and livestock will be unsuitable by mid-century due to climate change.

Falling yields may increase global producer prices by 20% by 2050. Price change of this magnitude would be a distinct change from the historical norm. Global food producer prices have fallen in real terms over the past 70 years.

Climate change makes it harder for the government to ensure the resilience of the UK's food supply and consumers are likely to see more challenges in the years ahead. Extreme weather events and shifting growing conditions would lead to greater price volatility.

The impacts of climate change on an interconnected food system are vast. Many of the risks covered in this report are risks in and of themselves but are exacerbated by the changing climate.

Transition risk

The Paris agreement, aimed at limiting temperature increases to 1.5°C above pre-industrial levels is driving a rapid transition to net-zero across the global economy. The UK is one of the fastest transitioning economies, it's CO2 emissions per capita have fallen by 55% since 1990.

The food system is central to whether the UK hits its legally binding Net-Zero goal by 2050. It is estimated that the food system is responsible for 35% of the UK's emissions.

Up to this point, the primary focus of governments has been transitioning the energy system away from fossil fuels. It is likely that attention will turn to food next as the second largest polluter. This shift has already begun.

Businesses and entire sectors of the food industry have made ambitious Net-Zero commitments, however the system must re-double efforts to accelerate progress towards these commitments.

Significant dietary shifts are required to make progress to more sustainable diets. Certain protein sources, with the greatest environmental impact, could be most exposed to government intervention and changing consumer behaviour.

Significant shifts in demand, must be matched by shifts in supply patterns. A rapid transition between certain goods, without considering the supply chain could see businesses writing off assets or closing, alongside shortages of supply for consumers.

Businesses are now required to report their exposure to climate-related risks through the Taskforce on Climate-Related Financial Disclosures (TCFD). Significant exposure to climate-related risks may drive investor decisions, impacting business's ability to access capital.

IGD's role in building a resilient food system

IGD is supporting the industry to harmonise environmental labelling and have shared a summary of progress to date. IGD's work will inform DEFRA's planned consultation on eco-labelling in 2024.

Agricultural challenges

UK agriculture finds itself in the midst of a period of significant change. Long-term changes to land use, an ageing workforce and dietary shift will all influence the future of UK agricultural production.

Land use change and self-sufficiency

The UK is in a period of land use transition driven by a new agricultural subsidy regime post EU exit, as well as long-term changes to UK diets.

The Government's Environmental Land Management Scheme (ELMs), due to be implemented in full by 2027, is changing the economic model for farmers and land owners by de-linking subsidies from food production. This means some land will be taken out of production where actions such as rewilding or tree planting that are rewarded through Sustainable Farming Incentives (SFIs) result in greater value or lower risk.

Some producers, such as those in the livestock sector and tenant farmers, are disadvantaged by the current funding regime. This may drive additional production and intensification, to make up for the loss in subsidy payments.

In addition, environmental payments from outside the food system, such as offsets, can also offer opportunities for landowners to set aside land, taking it out of food production.

The full impact of the changing funding system on UK's agricultural capacity may not be understood for many years. Once productive capacity is lost it cannot quickly be recovered, and without a long-term

agri-food strategy business willingness to make long term investment decisions on land use (e.g. covering machinery or infrastructure) will be limited.

Climate change, as referenced in chapter 1, will drive changes in the growing conditions in the UK, which in turn will impact land use. Some current growing areas may become unusable or economically unviable, whilst opportunities in other geographies and for different species or varieties may emerge.

It will be a challenge for the UK to reach it's Net-Zero targets and biodiversity ambitions without a shift in how land is used, reducing how much is used for agriculture. Non-food related uses such as forestry and bio-fuels are now increasingly competing for land used by the food system.

The UK is self-sufficient in around 60% of all foods and 75% of indigenous food, a level government has committed to maintain. However, this masks significant exposure to shortages at a category level. The UK is self-sufficient in just over 50% of vegetables and 16% of fruit. Any reduction in the productive capacity of UK agriculture will adversely affect self-sufficiency and have a detrimental impact on availability.

If the UK becomes more reliant on international partners to feed its population the risks associated with extreme weather and geo-political change become more acute and may also result in lower welfare, quality and/or environmental standards.

As referenced in chapter 1, dietary shift is required to address both environmental impacts and diet-related ill health. This will mean the quantity of meat consumed per capita will continue to decline whilst consumption of plant-based protein sources will increase the intake of vegetables. Supporting livestock farmers through this transition whilst developing a resilient horticultural supply chain will be key.

Low carbon farming practices can balance the needs of the UK's future food supply and help the UK to reach its' Net-Zero targets and biodiversity ambitions. It is essential through this transition that any land taken out of production does not cause irreparable harm to the UK's food system over the long term.

Input challenges

Current agricultural practices are supported by a network of inputs, including energy, fertilisers and labour. These inputs are subject to volatile price changes and long-term demographic changes.

The UK food system is reliant on energy, it takes 5 calories of fuel energy, to create 1 calorie of food. Food security is inherently linked to energy security.

Currently, the UK has only one operational fertiliser plant, producing ammonium nitrate from imported ammonia, rather than UK gas. Agricultural producers are therefore reliant on global imports, often from outside the EU, exposed to geo-political instability, as explored in chapter 8 and regulatory change such as the Carbon Border Adjustment Mechanism.

Another input challenge relates to labour. While UK agriculture has increasingly focused on automation and robotics, it still relies on 462,000 workers across the UK, and thousands of seasonal workers each year.

The seasonal workers visa scheme has proven a challenge for certain parts of the food system over recent years. However, it will be essential that the seasonal workers visa scheme is working well to ensure there are no labour shortages at critical harvest periods.

Demographic challenges are likely to exacerbate the current labour shortages. 42% of farmers are over the age of 60, a situation likely to worsen as the population ages. To counter this change, it is essential that farms are supported to transition to greater automation.

To successfully automate processes, farm businesses are reliant on access to capital and finance. The level of finance is often relatively large when compared to the size of the business. Tenant farmers, in particular, shoulder the most risk in not having sufficient assets to borrow against. High interest rates and increasingly variable crop yields may deter banks from lending to farm businesses.

Disease

The Covid-19 pandemic demonstrated that disease has potential to inflict devastating, lasting, social and economic harm. The UK food system adapted during the pandemic, faced with a sudden shift in demand as volumes moved from the out of home sector into retail. This required huge effort, however, and it should not be assumed that the feat can be repeated.

Food system resilience is also threatened by diseases of plants, animals and fish as well as other biological threats such as pests and parasites. Many animal diseases either can transmit from their hosts into humans, or might have the potential to do so in future. In the last 30 years, 75% of new human diseases have emerged from animals.

System vulnerability

International trade plays a vital economic role for many countries dependent on export revenue. It also helps to ensure food security, value and choice for shoppers around the world. However, trade may also allow for international transmission of diseases and facilitate movement of pests – especially where traders evade surveillance.

Movement of plants and animals within the UK market may also promote the spread of infection. The rapid spread of Foot and Mouth disease in 2001 was partly attributed to movement of infected, but still asymptomatic animals.

Commercial agriculture sometimes favours specific plant or animal varieties, leading to a lack of genetic diversity. For example, there are over 1,000 known types of bananas, but commercial growers now focus almost exclusively on the Cavendish type.
The Cavendish is now proving vulnerable to new disease variants.

A lack of genetic diversity may increase vulnerability to disease or limit the ability of farmers to adapt to climate change. Genetic banking, of seeds, plant and animals, may help to preserve genetic diversity for the future, but it is not clear how banked samples could be used by the agricultural system at scale when needed.

Antibiotics are widely used in farming, to both treat and prevent diseases. Excessive use, however, may lead to the emergence of antibiotic-resistant diseases. This risks the health of both animal and humans, since resistant pathogens can be passed from animals to people through consumption.

Currently, development and approval of new antibiotics is fairly slow, meaning that dangerous infectious diseases can evolve faster than countermeasures.

The UK government operates various safeguarding systems and is able to respond to disease outbreaks. However, these systems require investment of resources and skills and there is some evidence of a shortage of vets in the UK, possibly reducing capability.
Vets are listed on the current Shortage Occupation List.

New potential risks

The global food system must produce more food in future to feed a growing population. This suggests that, globally, farm production must become more intensive, without significant dietary shift and this may increase vulnerability to diseases due to increased livestock densities.

Investment in technology and infrastructure reduce vulnerability to risk. For example, controlled environment agriculture such as indoor horticulture systems can be sealed against infection.

Climate change will create new complex and variable exposures to disease and insect pests – it has already been linked to the spread of avian flu, alongside the emergence of new and more dangerous strains.

If parts of the UK become hotter and drier, diseases like common scab and pink rot – which affect potatoes - may thrive. Whilst warmer and wetter conditions, will encourage diseases such as blight to be become more prevalent.

Insect populations are also likely to change. For example, diamondback moths, which attack brassicas, usually only found in the UK during warmer months, may now be able to over-winter in the UK; and warmer climates favour the survival of biting insects which spread many animal diseases such as Bluetongue.

The UK's exit from the European Union means it is no longer part of the EU's disease monitoring and control systems. Whilst this does not mean that the UK is entirely cut off from international support systems, it does potentially leave the UK more exposed to disease risk.

Over 2024 the UK is implementing new border measures. These will apply to imports from the EU and the rest of the world. The new approach is intended to be intelligence-led, with checks and controls implemented according to risk. However, the new system is untested for now.

Over the longer-term, any future changes to the trading relationship with the EU, will drive impacts on the UK's border and bio-security measures.

Water

The food system is a major user of water, both for irrigating crops and for processing products. Every product has a water footprint, which may vary according to method and location of production.

In every part of the world, water supply dictates the capacity to produce food and its quality. Due to climate change, precipitation is becoming increasingly variable in terms of where, when and the volume of rainfall.

Climate change impacts

The UK has a maritime temperate climate which brings mild winters, warm summers and high total rainfall. However, according to a 2021 assessment, most of Central, Southern and Eastern England suffers from serious water stress. Around 20% of European territory was also considered to be water stressed in 2021.

Climate change is shifting weather patterns around the world. In the UK, summers are projected to become warmer and drier, with winters being warmer and wetter. Summer rainfall is expected to decrease by around 15% by the 2050s in England.

Water supply can be dictated by infrastructure spending as much as the amount of rainfall itself. The ability to store water increases resilience through drought periods. The last large reservoir built in the UK was in 1991.

As discussed in chapter 1, climate change is increasing the intensity and frequency of extreme weather events such as winter storms and heatwaves. On average, between 2010 and 2019 UK winters were 12% wetter than in the period between 1961 and 1990.

The recent experience of Storm Babet, may be an indication of what may be likely to occur in future winters. Daily record rainfall across 13 areas left fields submerged, destroying crops from the current season and preventing drilling for the following season.

Water shortages are likely to be a problem in countries that the UK currently relies upon for imports. Spain is the largest provider of the UK's imported fresh fruit and vegetables. Spain is expected to experience a significant reduction in precipitation levels in the coming years.

Water shortages can reduce yields and result in availability issues. Exporting countries, during periods of drought, may reserve food for local consumption or prioritise water supply for households, impacting global supplies.

It is important to note that, whilst food production is a major user of water, it is not the only one. Farmers and food processors may be in competition with other users. Regulators may restrict water use by food businesses during drought periods to protect household supplies.

Water quality

In the UK, only 14% of rivers are currently thought to be in good ecological health. One major reason for this is agricultural pollution coming from slurry, fertilisers and pesticides.

So far, scrutiny of water quality issues has focused mainly on sewage discharges, but the focus could shift to agriculture and other sources of pollution.

This presents reputational risk to the food system as a whole and economic risks to any businesses implicated. Specific sectors, such as poultry and fish farming are likely to face the greatest scrutiny and stronger enforcement, in part due to their local environmental impact.

This shift in focus has begun through agricultural subsidies in both the UK and Europe:

- In the UK, the government's Enviornmental Land Management Scheme will provide subsidies for UK farmers for a range of activities, including specified actions designed to enhance water quality.
- European governments are currently making a co-ordinated effort to control fertiliser run-off, as specified by the Nitrates Directive. This may impact the future supply of exports.

Restrictions on the use of pesticides and control of fertiliser run off, will support water quality and biodiversity in rivers and lakes, but could impact yields. During significant outbreaks of pests and disease, the ability to use specific and targeted pesticides can be essential to protect food production.

Biodiversity loss

Biodiversity and nature is essential to support life on earth. It cleans our air and water, regulates the planet's atmosphere and improves our quality of life.

However, global biodiversity is under pressure. Since 1970, global wildlife populations have fallen by 69%. The food system is reliant on biodiversity, and widespread loss will impact the system's ability to produce food.

Global biodiversity collapse

A research paper in 2021 stated that "the global food system is the primary driver of biodiversity loss". The conversion of land and intensification of agriculture has reduced the quantity and quality of land available for nature and biodiversity. Agriculture is the primary threat for 86% of species at risk of extinction.

Global biodiversity contributes to a wealth of ecosystem services such as the pollination of crops, the regulation of the climate and the control of pests and diseases.

Agriculture is reliant upon nature for its success. Insects are pollinators of 80% of all plant species in Europe. The economic value of this process is estimated to be around 10% of global agricultural production.

Terrestrial insect populations are declining at a rate of around 10% per decade. Continued pollinator decline is estimated to reduce global fruit and vegetable production by 3-5%. In a system reliant on finite land, needing to feed a growing population, lost production raises serious challenges.

Each year, the value of these ecosystem services is diminished. Around 4 million hectares of forest is lost each year, with 60% of this attributed to agriculture for food production.

This not only destroys habitats but also releases large amounts of carbon dioxide into the atmosphere, challenging our ability to mitigate climate change.

Governments have made global commitments to support nature and biodiversity, and the food system will be required to support these goals.

Biodiversity in the UK

The UK is now one of the most nature-depleted countries on earth. Of the G7 countries, the UK has the lowest level of biodiversity remaining. Since 1970, the abundance of wildlife has fallen by 19%.

In response, the government launched a 25 year Environment Plan, aimed at restoring wildlife-rich habitats, increasing woodland and improving the approach to soil management.

The food system is being required to change its approach given that 70% of the UK's land is used for agriculture, as covered in chapter 2.

Healthy soils are essential for the UK's food production as well as supporting progress towards environmental and biodiversity targets. Soil degradation increases carbon emissions and the risk of flooding, costing the economy around £1.2bn a year.

Modern agriculture is the primary driver of poor soil health. The government's Environmental Land Management Scheme has a keen focus on soil health - two out of the first three Sustainable Farming Incentive Standards focus on this.

Much like other environmental challenges, monitoring soil health is a challenge. The government is expected to release a soil health map towards the end of the decade. The aim is that all soils in England will be managed sustainably by 2030.

Competing priorities

For biodiversity to improve, reducing the burden on land will be required, as discussed in detail in chapter 2. This is a goal that is central to the environment plans of both the UK and EU.

These goals can be achieved through four primary levers; shifting the dietary preferences of consumers, less intensive farming systems in some places, greater intensification in other areas, allowing land to be set aside for nature.

Competition between land being used for agriculture or nature could create risk to future food security.

The UK government has committed to maintaining the current level of food production. Meeting this target will be challenging and could limit the available land for nature.

Businesses and organisations across the food system have ambitious sustainability goals linked to supporting biodiversity and nature. The Soy Manifesto and Plastic Pact are driven by biodiversity and nature concerns.

These targets are at times competing with other sustainability goals. For example, in some circumstances, plastic may be the most carbon efficient packaging material, essential to making progress toward Net-Zero, but can be at odds with the commitments of the Plastic Pact in keeping plastic out of the natural environment.

Labour and skills

Labour shortages

Over recent years, the UK has experienced a very tight labour market. Vacancies still remain over 100,000 higher than pre-pandemic levels.

Almost no sector has been immune, but the food industry is the largest private sector employer in the country, employing over 4 million people and has arguably been the most impacted. Vacancy rates in UK food and drink manufacturing are significantly higher than the wider manufacturing sector and hospitality vacancies are 48% higher than pre-pandemic levels.

Labour shortages reduce the ability for businesses to perform at their full capacity, let alone grow. Lower production capacity limits the capability of businesses to fulfil customer demand and can lead to the emergence of acute food shortages.

There are several challenges driving labour shortages in the food system, the majority of which, without actions, are likely to worsen in the years ahead.

The food system suffers from negative perceptions, held both by a prospective labour force and in some parts of government. This is partly fuelled by the nature of some of the roles available, which can be physically demanding, in challenging environments and come with unsociable hours for relatively low levels of pay.

However, this is not the reality for millions of roles within the system. There is a lack of understanding and awareness of the depth and breadth of opportunities available across the food system. Leaders across the food system have often begun their career in roles that could be perceived negatively by prospective employees.

Negative perceptions are common across some parts of government, with many politicians and officials unaware of both the scale of the industry, the challenges it faces and opportunities that exist when working in partnership. This negative perception can feed through to policy making, having damaging outcomes for food availability and price.

Many roles in the food system are filled by migrant workers – they are present in all points of the supply chain, and across many levels of seniority. In fact, the food system would struggle to function without them. The current migration policy is challenging for the food system and does not support businesses to access the labour they require to feed the nation.

By its very nature the food system is present in every one of our local economies, and is impacted by regional inequalities. Local geographical barriers, such as poor public transport and expensive housing, are cited as a barrier for entry in rural areas. In more urban areas, competition for labour is fierce, with food businesses facing recruitment and retention challenges.

The UK's ageing workforce is resulting in increased sickness levels, as older workers confront the physical nature of many roles in the food system. Significant risk exposure exists in specific roles. For example, if all the current engineers that are able and/or eligible to take retirement did, there would be significant shortages in these highly skilled roles that are essential to the functioning of manufacturing sites.

This situation will worsen as the UK population ages, and the working age population shrinks, reducing the potential pool of workers available. The UK's flatlining productivity, further exacerbates this challenge. At the same time, the growing population will increase volumes, placing greater demands on the industry.

Acute labour shortages can be exacerbated by a lack of diversity within specific roles and parts of the system. Any discussion around securing future labour must widen the net of people that can thrive in the roles available in the food sector.

Skills gaps

There is a skills gap in the UK with workers often under-skilled for their roles. This issue is likely to be worsened by both the digital and net-zero transitions. By 2030, it is estimated that two-thirds of the UK workforce will be underskilled, a structural issue for the UK economy.

The food system is significantly affected, with skills gaps already prevalent, particularly across engineering, digital and technical teams. In addition, the Apprenticeship Levy has had a limited impact, with businesses frustrated that it has been unable to unlock training opportunities to support those in the industry to develop their skills.

Investing in skills is critical – the training, required to produce food safely, efficiently and with some of the highest welfare standards globally is significant. This level of skill and the time it takes to train colleagues is often underestimated and yet it impacts the advice young people are given about the food industry, and the availability of government funding for training.

A reliance on migrant labour increased the need to invest in specific training such as language skills, something that is currently not recognised by the funding regime.

Skills gaps are worsening productivity, exacerbating labour shortages. More than 4 in 5 managers across the UK have never received formal training, something that is brought into sharp reality, when more than 1 in 3 employees have left roles due to poor management or culture.

Labour shortages will drive a transition to greater automation across the food system as discussed in chapter 9. Producing food with greater automation may reduce shortages in some areas, supporting resilience, but will increase the requirement for engineering and digital roles – skills which are already in short supply.

The economic transition required for the UK to reach Net-Zero will require a re-skilling of the UK labour market, to fill those roles directly related to the transition. There is, however, a more subtle upskilling that is required; to effectively embed sustainability decision making across organisations.

IGD's role in building a resilient food system

The combined impact of labour shortages and skills gaps on the system is significant and they present some of the greatest risks in the short and medium term – risks that have the potential to significantly disrupt food supply for UK consumers.

Successfully changing widely held perceptions of the food system requires collaboration across industry, government and civil society over a long period of time. IGD is leading on an area of work with the Food and Drink Sector Council to solve workforce challenges across the whole agri-food sector.

Businesses can get involved in our free employability programmes. These provide young people with the opportunity to develop their skills for work and gain insight into the careers in the food and consumer goods industry.

IGD's free learning programmes support those already in industry to develop workplace skills throughout their careers.

Economics of the food system

Food and grocery retail is characterised by strong price competition, not only in the UK but also around the world. In Q4 2023, top drivers of store choice in the UK were location, closely followed by price.

Food and grocery products in the UK have tended to become relatively cheaper over the long term and recent surges of inflation have not fully-reversed this trend.

In 2022, on average, UK households allocated 12% of their budgets to food and drink, which compares with 31% in 1952. This is in-line with European countries such as France and Germany.

This is obviously beneficial for consumers. Despite the recent increases in food price inflation, food and drink is still relatively affordable for many in the UK. In contrast, some other essential goods and services, such as childcare and housing, are relatively expensive.

Global sourcing

About 40% of all UK food is imported. Imports allow the UK to benefit from lower production costs in other countries and provides access to goods that cannot be grown domestically. It also helps to spread risk. Self-sufficiency in food is not necessarily the same thing as food security, since local problems (e.g.: crop diseases) can impact production.

However, a high reliance on imports can create risks to resilience, with other countries likely to prioritise feeding their own population over serving the UK during periods of disruption/shortages.

Efficient supply chains

Supply chains have evolved to ensure minimal stockholding, relying on frequent and timely deliveries to maintain availability. This approach is seen as financially efficient, and it minimises the amount of valuable space allocated to storage. It can also ensure product freshness and quality.

Just-in-time delivery leaves little room to accommodate supply chain shocks or unexpected surges in demand. Many of these practices emphasise financial efficiency rather than resilience. This makes sense when food is plentiful, supply is dependable, and logistics are easy – the risk of system failure is fairly low.

Looking ahead, climate change, geo-political risks and other factors may change the balance of risk. A more volatile global economy may justify re-working systems to give greater weight to availability, stockholding and resilience.

Lack of investment

Another consequence of the focus on price is that food industry profit margins have tended to erode, especially since around 2008. This reduces resilience to economic pressure.

Erosion of profit over a long period may have made it harder for businesses to invest in areas such as productivity or sustainability, even though capital has been relatively cheap for over a decade.

This is critical as future challenges such as automation and climate change require significant investment. It is hard to find evidence that this is happening, despite government policy designed to support capital expenditure.

Concentrated production

Some food and consumer goods manufacturers have developed a model of production that uses a small number of very large factories, producing standardised products and serving multiple markets. The economies of scale that are available via this model justify the extra transport costs that may be incurred.

Concentration of production at a small number of sites can create single points of failure, if for example, transport is disrupted. Concentrated production also means that problems at one plant may rapidly affect a large area.

Investment markets and food

In a free-market system such as the UK, capital is able to move to wherever the best returns are available. This may include acquiring elements of the food and drink supply chain and other pieces of critical national infrastructure.

In 2020, about 19% of all business assets in the UK were foreign owned, primarily in financial services. There is currently no central record showing how much UK farmland is foreign-owned.

Compared with other countries the UK is fairly open to investors – including overseas investors – that wish to acquire farmland and food businesses. This does not necessarily mean that UK land will be used to serve overseas markets – many food commodities are hard to move – but it may mean that any profit made is sent overseas rather than being reinvested locally.

The same point might be made about factories and other industry assets. On the other hand, foreign ownership might also be beneficial if it leads to fresh investment or brings new ideas and technological advancements.

The risk of foreign ownership in critical national infrastructure depends on the strategic role that investors expect their food assets to play within their portfolio.

IGD's role in building a resilient food system

IGD Economics' forecasting of food inflation, alongside its analysis of the UK economic landcape and its impact on consumers, supports business leaders to better understand the trading environment and make better decisions.

Geo-politics

The geo-political situation has become more complex and risky in the 2020s, a trend that is likely to continue in the coming years.

For food businesses in Europe, the war in Ukraine is the most immediate threat, although the situation in the Red Sea area should be monitored and other risks may emerge.

The global food system is potentially at risk from political change. The lack of productive capacity and slack in the food system increases this vulnerability. This may encourage some countries to leverage the power in the globalised food system to achieve their goals, including reducing exports. The effort is most effective when food is scarce and expensive.

Globalisation and centralisation

The value of international agri-food trade has quadrupled in the 21st Century, as a result of long-standing trends such as economic development, historic trade liberalisation and urbanisation.

This growth has created significant benefits – for example, it spreads production risk and makes states and businesses less vulnerable to shocks. It has also allowed the development of new commercial structures, with complex supply chains stretching across national borders.

However, the scale of the modern food trading system does not make it invulnerable to shock events, whether natural or man-made.

Many nations are potentially exposed to such events. About two-thirds of countries are net importers of food, including the UK. Imports may not always be essential for survival, but disruption to trade will still impact availability and prices.

Many countries export at least some food but, for certain critical items, exports are concentrated, and global trade is dominated by a small number of very large exporters. In 2022, the USA and Brazil accounted for half of global exports of maize, whilst Brazil alone made-up half of soya bean exports.

Agricultural performance and political choices made in these countries determine food availability and, therefore, price on a global basis.

About 80% of global trade in goods is by sea. Much of this runs on a small number of routes and may encounter geographic bottlenecks, such as the Bosphorus Strait and the Red Sea. Accidents, bad weather, military and political events may disrupt sea freight, especially where they occur at a bottleneck location.

Recent events in the Red Sea area have shown the ability of both state and non-state groups to threaten sea freight at fairly low cost and for indefinite periods, projecting their influence around the world.

Global sea freight services are also fairly concentrated. For example, four operators account for 60% of container shipping capacity. This means that decisions taken by a small group of companies (e.g. choosing to avoid a particular route) can significantly influence transport costs and timescales for UK food businesses.

A changing world

The world is in transition, with countries such as China, India and Russia having greater influence following a long period of US dominance.

This may drive geo-political instability and also make it more difficult to find consensus on key issues such as climate change and human rights.

One current impact is the reversal of the previous trend towards trade liberalisation. Since 2009, protectionist measures have outnumbered liberalising measures every year, with protectionism surging from 2019.

A changing, more unstable world creates an environment where businesses may face reputational risk if they do business in nations that are deemed to be aggressors.

Geopolitical levers

Some nations have acquired productive resources in other countries such as China's Belt and Road initiative. Such measures give investing nations economic leverage around the world.

Economic leverage from concentrated exporters allows nations to control imports and export flows of certain goods. These may be to pursue political aims or to secure food availability for their own population.

The most obvious geo-political risk is reduced availability of certain staple foods and inputs, with sudden price changes as a consequence. Even the possibility of disruption may be enough to drive price movement.

Warfare is the ultimate expression of geo-political power, though it is not the most likely impact on the UK food system. Other activities may include cyber-attacks covered in chapter 9, espionage, intimidation, sabotage which can have a significant impact on the global food supply chain.

IGD's role in building a resilient food system

In the face of a more unstable and changing world, IGD's analysis of the global macro-economic and political landscape supports businesses leaders to make better strategic decisions.

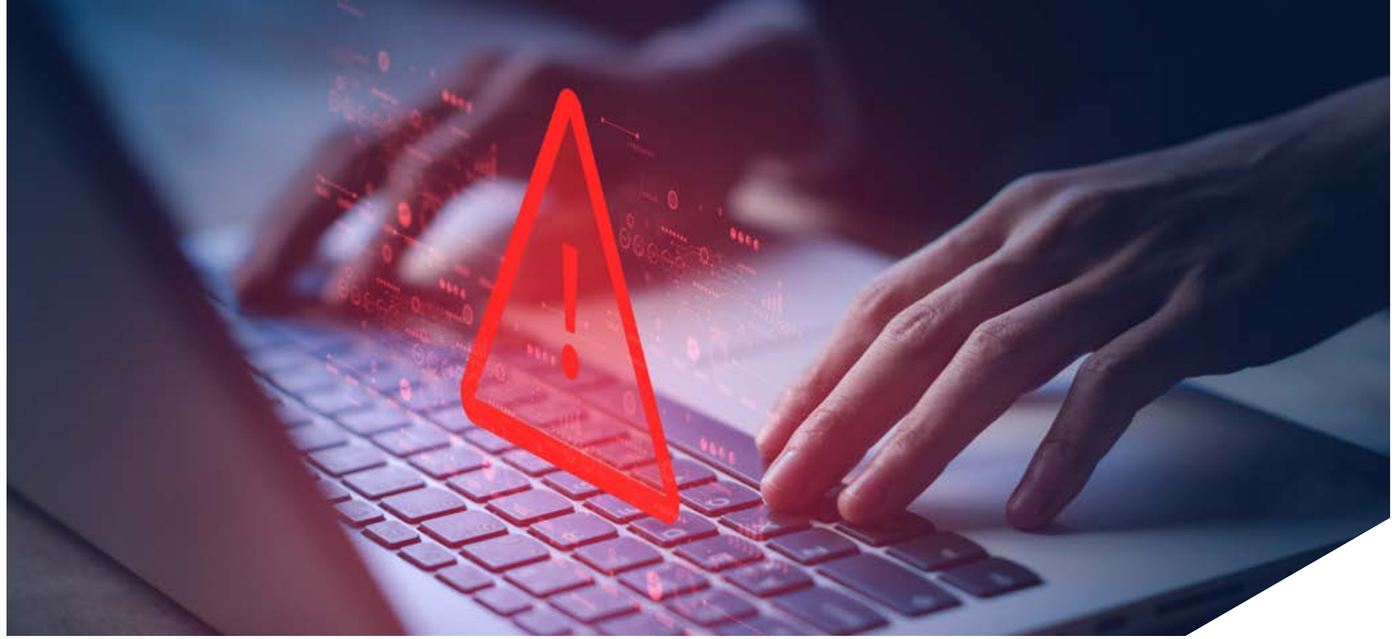
IGD's Economics programme delivers free analysis directly to business leaders, on the latest trends and priorities, helping organisations make sense of the external landscape.

Cyber security

Technology offers opportunities for the food system. Automation and advanced computing have potential to address known issues such as labour shortages and stagnating productivity.

However, technological advancements in the food system may also create new weaknesses and greater risk.

Some are a consequence of technological complexity and skills shortages across digital and engineering. Others are a result of deliberate activities such as cyber-attacks, made possible by technological change.



A changing environment

Cyber threats are not new – computer viruses have been in circulation since at least 1982 – but risks to the UK food system may be growing, due to rapid innovation and social change, leading to greater dependency on technology.

Some technological changes can also make attacks more powerful. Inexpensive, flexible artificial intelligence (AI) increases the capability of attackers. However, AI also allows those building cybersecurity to strengthen defences from cyber-attacks.

Technological change may also create new vulnerabilities. In the food supply chain, networked devices, remote computer access and cloud data storage all create new points of access and so increase exposure.

For example, in 2022, Ukrainian hackers were able to access and electronically disable networked farm machinery looted by Russian troops. Such an attack could presumably by repeated by others. Within the UK, KP Snacks has been hit by a digital attack which threatened business operations.

Social changes which increase vulnerability include a significant shift to home working, since home systems may be less protected than office systems.

Government and regulators have a part to play, but regulation may create risk in itself, if businesses cannot comply. In the EU, penalties for breaches of data protection rules could be up to €20bn or 4% of turnover.

Origin of threat

Many cyber-attacks are driven by criminals attempting financial gain at little personal risk or effort. Criminal methods include phishing and ransomware.

In the best case, these may cost businesses money, directly or indirectly. In the worst case, they may halt operations or lead to crippling data losses. Any of these may threaten food and grocery system resilience.

In 2021, global meat company JBS was hit by a ransomware attack which shut down operations in Australia, Canada and the USA. A ransom of US$11m was paid to restore systems.

Even if food and grocery businesses are not targeted directly by a hostile nation or criminals, they may be impacted by a spreading computer virus or by a shutdown of infrastructure. This could include attacks on payment systems, internet services, vehicle navigation and so on.

Despite rising geopolitical tension, in 2023, most UK businesses focused primarily on cybersecurity threats from criminals, with few concerned about attacks originated by nation states.

Governments will make use of all means to achieve their goals, including cyber operations, being anonymous, inexpensive and fairly low-risk.

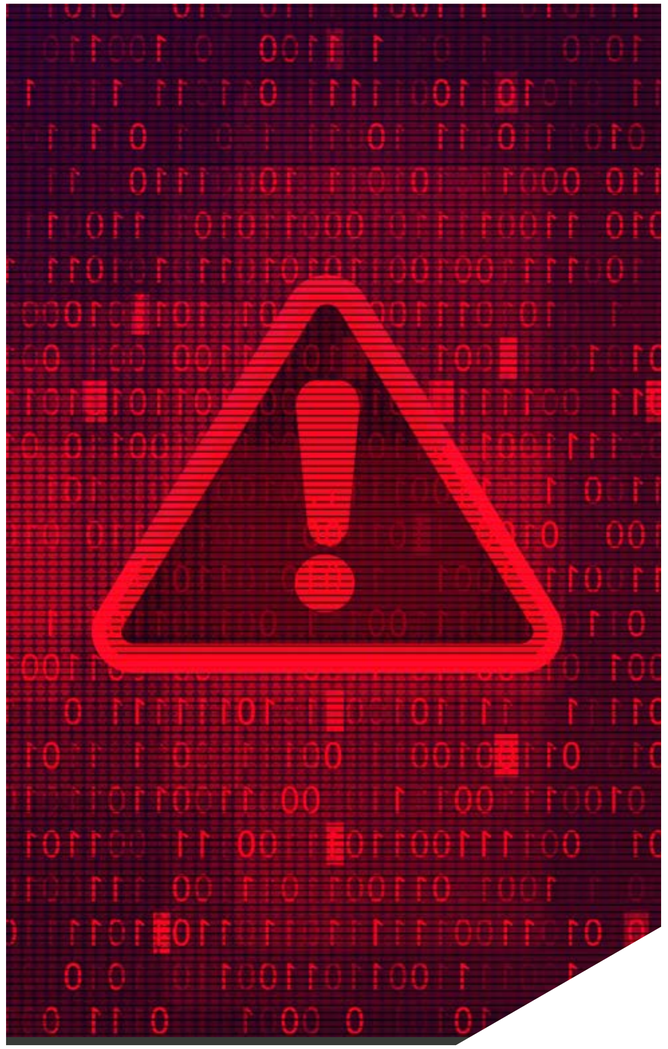
The current conflict in Ukraine was accompanied by a surge in cyber operations, beginning long before actual combat. These attacks have spread beyond Ukraine and future conflicts are expected to follow a similar model.

The Russia-affiliated Killnet group has targeted Western healthcare organisations with distributed denial of service attacks in response to Western support for Ukraine. If healthcare providers are considered as targets, it is unlikely the food system would be viewed differently.

Responding to the threat

Corporate defence against cyber-attacks is already well understood and being addressed by software countermeasures and increased staff awareness. However, actually executing this is costly and complex – many businesses report a lack of digital skills.

The fact that cyber-attacks may be used as an element of statecraft means that, ideally, business responses to cyber threats will fit within a wider national or international cyber strategy.



An opaque supply chain

The food system is a globalised and complex network of interdependent supply chains. Such complexity can often lead to obscurity, hampering progress against targets, undermining assurance and masking issues within the supply chain.

Availability of data

Some elements of the food and grocery supply chain benefit from abundant, accessible data and sophisticated reporting systems - for example, many business have good access to operational and commercial information on logistics, stockholding and sales performance.

However, other parts of the supply chain suffer from a lack of accessible data relating to business performance and broader impacts. This undermines progress, for example in addressing risks and minimising environmental impacts.

A growth in impact reporting, driven by investor requirements, is increasing both the demand for data and supply of data solutions.

However, a lack of agreement across the food system, regulators, auditors and assurance schemes, on what should be measured and reported, alongside inconsistency in the data itself is slowing progress. The proliferation of methodologies and tools is adding costs for businesses, with the burden felt most keenly by small businesses and agricultural producers.

It is essential to be able to measure progress against targets, to ensure that investment is prioritised toward the most impactful actions.

Government's Food Data Transparency Partnership is aiming to improve the availability and quality of food data across the supply chain.

The Eco working group is developing a consistent approach to measure and communicate emissions in the food system including:

- Standardising the methodology and data sources used for measuring and reporting Scope 3 greenhouse gas emissions of food and drink
- Establishing a mandatory methodology for food eco-labels

Simultaneously, the Health working group is developing recommendations for voluntary company level report of health metrics.

Building consistency and comparability across data sources in the food system is a huge task, but one that will be transformative in the ability of the system to measure and track progress.

Investors are increasingly making decisions based upon progress against sustainability and health targets. Frameworks such as Taskforce on Climate-related Financial Disclosures and Taskforce on Nature-related Financial Disclosures are embedding sustainability thinking into the investment landscape.

This landscape is predicated on the availability of high quality and accurate data. Businesses should expect data and information requirements to grow in the coming years.

Food authenticity

Long and complex food and drink supply chains create opportunities for fraud, which can take several forms, estimated to cost the economy up to £2 billion a year. Food fraud and crime create financial and reputational risks for businesses, may be harmful to consumers and undermine the food system as a whole.

Types of fraud can include:

- Adulteration or substitution of ingredients - This threat may be greatest when food prices are high or where supplies are limited, risks that drivers such as climate change or geopolitics make more likely – the horsemeat scandal of 2013 coincided with high prices for beef across Europe.
- Counterfeiting – This covers duplication of branded goods by unauthorised manufacturers, often lower in quality.

- Fake credentials – This could include claiming ethical attributes or other attributes which a product does not have, such as passing off conventional products as organic.
- Waste disposal fraud – This could include food which has being disposed of for safety reasons being diverted back into the supply chain.

Labour abuse risks

Labour abuses in supply chains, which may include unsafe working conditions, exploitation and modern slavery are a major risk for businesses of all kinds, but one which is hard to quantify.

Given the length and complexity of supply chains, which for many products stretches across borders, there is high potential for labour abuses across the food system.

Businesses can reduce risk by closely monitoring farms and factories operating both in the UK and in other countries with different regulatory regimes.

There is also a risk of labour abuse caused by the UK's reliance on migrant workers, particularly in the agriculture and fishing sectors.

Migrant workers are more likely to accept exploitative work conditions, due to the difficulty in changing jobs or fear that visas may be cancelled without the role.

News of labour abuses can be uncovered by parties outside the food system – such as interest groups, journalists, and government officials. This clearly raises a reputational risk for the businesses at the centre of any labour abuses, but it may also create a longer-term problem for the system.

Central to the future success of the food system is changing its perception across government and the wider population. Stories of human rights abuses undermine the whole reputation of the UK food system, eroding valuable, positive work happening elsewhere.

Next steps

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