The impact of labour shortages on UK food availability and safety

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Impact of labour shortages: Executive Summary

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Executive Summary

This research used a food systems approach to examine the impact of labour supply shortages on key aspects of the food system. It provides insight into the consequences of labour shortages as reported in 2021, the complex processes that combined to create the shortages and the resultant impact on the Food Standards Agency's (FSA) ability to effectively do its job. The research also explored consumers' perceptions of food availability and food safety.

Three key questions guided our research:

- how do labour shortages impact on food availability and safety, now and in the future?
- how do labour shortages impact the FSA's ability to execute their protocol, now and in the future?
- what are consumers' perceptions of food safety and how does this relate to potential food risks arising due to labour shortages?

To answer these questions, we needed to identify the key labour shortages across the food sector (food production, processing, and logistics) and the risks arising from those labour shortages in the wider food system. A summary of those risks as they relate to the FSA is presented below:

Role	Related risks to the FSA
Butchers	Food chain information verification risks at ante-mortem inspections, Food safety risks (biological, physical, chemical, allergenic and cross-contamination), Food adulteration, substitution and misrepresentation risks, Potential safety, provenance and traceability risks, Potential increase in product misrepresentation and document fraud risks, Potential risk of unlawful processing, and diversion of food meant for disposal into the chain.
HGV	Potential safety risks due to microbiological growth arising from delayed transport of meat that has not been chilled, or has only been partially chilled and food withdrawal and recall risks from safety and quality hazards.
Packers and Pickers	Availability, assortment and price inflation risks (eggs bread, fruit and vegetables), Potential long-term food security risks, Potential food fraud, recall and withdrawal risks, Higher provenance and traceability risks associated with harmonising national regulatory standards with new regional trade and bi-lateral food safety requirements for imports from new locations.
MHIs	Biosecurity risks, potential increase in public health, food safety, animal health and welfare monitoring risks.
OVs	Potential increase in the risk of food documentation fraud, animal welfare breaches, and public health reassurance to consumers and Impeded knowledge transfer of subjective scoring criteria for risk-based inspections from retiring workforce.

Role	Related risks to the FSA
Retail, food services and warehouses operatives	Food availability risks, long-term food security risks

Related research: Local Authority Capacity and Capability Research

Impact of labour shortages: Understanding labour shortages in food systems: an overview

The remit of the FSA is to ensure that consumers can trust in food, ensuring that:

- food is safe
- food is what it says it is
- food is healthier and more sustainable

The FSA is responsible for ensuring that consumers can trust the food that they eat. Its role therefore covers many elements of food, including safety, fraud, price and availability. The agency works with other departments across government, including the Department of Health and Social Care, the Department for Environment, Food and Rural Affairs (Defra), local authorities and others to deliver these outcomes, often adding value rather than assuming a lead role.

We take a holistic perspective to examine the impact of labour shortages on the food system, the risks that have emerged because of these shortages, and the implications for the FSA and, by extension, consumers. Many of the challenges that have resulted in labour shortages in the food system are interconnected and need to be understood as a complex web of interdependent issues, reflecting the fact that food is a unique commodity that transcends nutrition, economics and food security.

Labour shortages in the UK are underpinned by a combination of drivers, including environmental (COVID-19); market (unattractive work for domestic workers and recruitment of migrant workers in some food chain nodes); political (UK's exit from the EU (Brexit)); socio-cultural (training, apprenticeships, and education); and demographics (ageing population and population density). They span the food supply chain and include HGV drivers, warehouse workers, butchers, abattoir workers, veterinarians and, increasingly, staff at Border Control Points (BCPs). It is therefore not sufficient to consider labour shortages in the food system without placing them more broadly within society. Failure to do this means that policy interventions will have limited impact and will not succeed in levering support from across government.

This report is set in a context of record levels of flux. Brexit, the ongoing COVID-19 pandemic, geo-political unrest connected to the Russian invasion of Ukraine, rapidly increasing energy prices, rising inflation, and the climate crisis form the backdrop for shortages of key food industry commodities, such as carbon dioxide, raw materials for fertilisers and staples like wheat. In the 12 months to August 2022, prices rose by 9.9% on average. Consumer price inflation peaked at 11.1% in October 2022, this being the highest annual inflation rate since 1981, it has since

dropped slightly to 10.4% in February 2023 (ONS 2023).

We provide an extensive analysis of labour shortages in the food supply chain and the risks associated with these shortages. We take a systems approach to our analysis, recognising the breadth of issues that impact on labour shortages and the interconnections between the different parts of food systems. We draw from grey literature, including submissions made to the EFRA Select Committee on labour shortages in the food system (2020 and 2021)1; our own ESRC funded project, 'Feeding the nation: seasonal migrant workers and food security' (feedingthenation.leeds.ac.uk); our own analysis of the UK Labour Force Survey (LFS) (quarterly data from the first quarter of 2016 to the latest available quarter corresponding to the third quarter of 2021); and interviews with FSA staff.

For this research, we view labour shortages as occurring in instances where the numbers of workers with a given skillset required to run the operations in an industry, sector, or specific node of a supply chain exceeds the number of skilled people available to work or willing to take up employment at the current level of remuneration for the skillset. Independent advisory groups such as the Migration Advisory Committee (henceforth MAC) have established a methodology to better understand labour shortages. We follow MAC's four sets of indicators, which together provide a 'top down' assessment of shortage:

a) Employer-based indicators – ability of employers to recruit and rising vacancy rates, typically reported from surveys and is limited by what employers choose to report.

b) Price-based indicators – where there are labour shortages, wages should rise, thus raising supply. From this we can deduce that rising wages provide an indication of shortage.

c) Volume-based indicators – increases in employment or in average hours worked may indicate rising demand as the existing workforce is utilised more, pointing to a shortage. Equally, low unemployment in a sector may indicate shortage.

d) Indicators of imbalance – direct focus on vacancy levels within an occupation. High vacancy/unemployment ratios and increases in average vacancy duration indicate that employers are finding it more difficult to fill vacancies.

1.1 Types of labour shortages in food systems

From the evidence reviewed, we identified three broad types of labour shortages that affect the UK food system and pose potential risks for the FSA (see appendix A2 for further details):

i) Weak seasonal labour shortages, resulting from the inability to recruit enough seasonal workers who are willing, able and qualified to fill the vacancies created by the sudden disruptions to labour demand and supply dynamics.

ii) Incentive-driven labour shortages, underpinned by long-standing industry and regulatory constraints, which affect the ability to recruit and retain new labour to augment an aging and experienced labour force due to non-competitive working conditions, incentives, wages and overall attractiveness (EFRA). This form of labour shortage in the industry is characterised by a high rate of voluntary redundancy, job switching, and retirement along with a low rate of attracting, recruiting, training and retaining new employees at current work incentives (wages, ease of migration, welfare and working conditions) ?(Office for National Statistics, 2021a)?.

iii) Skills underutilisation-driven labour shortages, which arise when there is a viable pool of labour supply in the economy, but it remains underutilised due to structural (for example, technology or regulatory changes), regional (for example, location or infrastructure-driven), or frictional unemployment (for example, COVID-19, furlough policies, Brexit). Underutilisation shortages are largely due to the inability to access and match the skills, training and certification requirements of

the existing labour pool to the skills and training required to carry out such roles.

Impact of labour shortages: Labour shortages in UK food systems

2.1 Evolution of key occupations in the food supply chain in the UK

The analysis we have carried out looking at the evolution of key occupations in the food supply chain in the UK has shown that labour shortages are now a main feature for some occupations, this is affecting the stability of the food supply chain overall. This section contains figures showing the evolution of key occupations in the food supply chain (farm workers, butchers and meat processors, horticultural trades, and drivers of large and heavy vehicles). For all of these, a similar pattern emerges around nine months before the EU Withdrawal Agreement came into effect in January 2020, there was a significant drop in the number of workers occupied in these professions. The first quarter of 2020 is also the time of the first COVID-19 lockdown and the beginning of the pandemic which had a significant impact on the labour market. This makes it very difficult to disentangle the impact that both Brexit and the COVID-19 pandemic has had on the downward evolution of these key occupations across the food supply chain in the UK. However, what our work shows is that all of these professions, as of the last quarter of 2021, occupy a lower share of workers than they used to before the first quarter of 2020.

In our view these labour shortages across key occupations in the food supply chain are due to a combination of labour shortage types. Firstly, weak seasonal labour shortages, especially in all occupations included in this report that have relied heavily on seasonal migrant workers, including the agricultural sector. Secondly, incentive driven labour shortages, especially for butchers, meat processors and HGV drivers, all of which are often low pay occupations. The lack of incentives to attract and retain these workers is particularly relevant for all of those in these occupations facing a new regulatory framework to come and work in the UK as migrant workers after Brexit.

2.2 Current state of labour shortages in UK food systems

The UK food system's labour supply comprises a mix of local and migrant workers, though many sectors are heavily reliant on migrant seasonal labour for flexibility and competitiveness (footnote 1) in key farmgate and processing operations as well as inspections (footnote 2). Work within food systems is often classed as unskilled or lower skilled (footnote 3), but most of these occupations require tacit procedural knowledge that is acquired over time.

Systemic shocks such as Brexit and the COVID-19 pandemic have affected the dynamics of labour demand and supply in the UK food industry. Since the last quarter of 2021, the number of workers aged 55 and over going into voluntary redundancy and early retirement has doubled compared with previous years (Office for National Statistics, 2021b). This includes a significant proportion of workers in the agri-food sector, including HGV drivers, Meat Hygiene Inspectors (MHIs), Official Veterinarians (OVs) and butchers (EFRA).

The number of vacancies in the food sector increased sharply since the economy reopened in late 2020 following the lifting of lockdowns, although current unemployment levels have remained lower than five years prior to the pandemic (Office for National Statistics, 2021b). Recent ONS surveys show that vacancies are difficult to fill in the food system and, despite migrant policy interventions, the labour shortages across the industry persisted into the first quarter of 2022

(Office for National Statistics, 2022a). Unfilled vacancies remain a major cause of concern in the food and drink sector. In 2022 the vacancy rate per 100 employees increased to 6.3% in Q2, up from 5.2% in Q1 (Food and Drink Federation, 2022). These vacancies were reported across a wide range of roles and skills including for highly skilled workers (for example, engineers, R&D scientists and HR), technical specialists (for example, butchers, laboratory technicians) and production operatives (for example, drivers, packers, seasonal workers and machine operatives) (ibid). However, these data are based on forecasts from 2019-20 shortage trends and there are very few comprehensive qualitative studies on the distribution of labour shortages to complement existing quantitative data such as that from the ONS. This report is the first to combine primary qualitative insights with quantitative data to assess the impact of wider labour shortages on the FSA's remit. A future 'Independent Review into Labour Shortages in the Food Supply Chain' (due in 2023) has been commissioned by Defra which will examine shortages across the wider food system including production, manufacturing, retail and logistics.

In the UK farming is not seen as a desirable career choice, often classed as poorly paid, low skilled work which lacks career prospects (McDonalds 2022, Royal Association of British Dairy Farmers (RABDF) EFRA submission 2021). Other features making it unattractive include its rural locations, long, often unsociable hours and its physical nature, which means that many can and do find more agreeable work elsewhere for the same wage (Food & Drink Federation (FDF), 2021; Centre for Rural Policy Research EFRA submission, 2021). For example, the RABDF reports difficulties in recruiting staff on dairy farms (RABDF EFRA submission, 2021), and a recent YouGov poll found that less than 5% of UK citizens surveyed would consider working on a dairy farm (Food & Drink Federation, 2021). COVID-19 and the EU exit have exacerbated this issue, according to the National Pig Association (EFRA submission). Similarly, the Pick for Britain Campaign, launched in 2020 in response to the COVID-19 pandemic and targeting primarily the fruit and vegetable sector, did not attract UK workers to the sector in any meaningful way. One of the biggest recruiters told the BBC that of the approximately 30,000 applications they had from Britons, only 4% took up jobs and around 1% stayed past the initial six weeks. In 2017 the FDF found that within food and drink manufacturing 30.8% of roles were classed as low skilled, requiring little or no experience, 36.7% were classed as semi-skilled, requiring some experience and training and 32.5% were skilled or high-skilled, requiring a degree or experience. There have been some attempts to address this within the sector, e.g., the National Pig Association developed a Continuous Professional Development scheme, the Pig Industry Professional Register, to enable people working in the industry to demonstrate competence and to document training when moving from one employer to another. However, other evidence suggests that farm businesses are unwilling or unable to invest in training, with most respondents to the Centre for Rural Policy Research's (Exeter University) 2020 South West Farm Survey (N=1117) agreeing that learning took place on the job (Centre for Rural Policy Research EFRA submission, p. 6). In their submission to EFRA, among the list of recommendations made to policymakers, the Centre for Rural Policy Research also advocated the establishment of a cross sector working group to identify ways of encouraging gender and ethnic diversity in the industry.

Following a global trend, migrant labour is often used to fill key agri-food sector roles in the Global North. Defra's in-house review of the seasonal worker pilot (conducted with the Home Office) indicated that the immigration system has the capacity to effectively supply sufficient seasonal workers (footnote 4). However, it is unclear if the demand for seasonal workers will remain at current levels – due to rising wage rates in workers' home countries; uncertainty relating to the growth/reduction in horticulture sector; and global geopolitical factors.

The interplay of these factors has resulted in labour shortages across key sectors in the UK food system. We summarise key data for each sector below.

2.3 Meat sector

The UK meat processing sector employs around 97,000 people directly and supports 50,000 farmers in the supply chain, with skilled butchers making up 40% of the workforce (British Meat Processors Association (BMPA), 2022). Our focus is largely on processors, rather than farmers. Like many western economies such as the USA (see for instance Broadway, 2007; Sinclair, 1906), the meat processing sector in the UK is characterised by a reliance on low wage workers, often positions that are filled by migrants. Being part of the EU for 40 years brought with it free movement of workers and resulted in 62% of the meat sector's workforce being sourced from outside the UK (BMPA, 2022). Because of free movement, this was a relatively unstructured process and so work visas were not necessary. The aforementioned challenges faced in recruiting domestic labour into the UK agri-food sector also play a role here. Whilst rates of EU workers employed in the sector are now reducing, there is still a heavy reliance on migrant labour (largely from the EU), and these workers are fundamental to the successful functioning of the meat supply chain.

The BMPA's own survey data from late 2021 indicates that their members are short of just over 15% of the workforce they would like to have, up from 10% in the same survey conducted in June 2021, many of those vacancies are in butchery roles (BMPA EFRA submission, 2021). Key challenges for meat wholesalers are related to recruitment and retention, rising wages, increased overheads and increasing costs related to compliance and raw materials (Addy, 2022a, FDF 2022). The meat sector has shrunk since 2019 (FDF 2022). Our own analysis of the Labour Force Survey identifies specific shortages in staff working within the meat sector including veterinarians, butchers and meat processors, illustrated in Figure 1 and Figure 2 below:

Figure 1: Evolution of occupations: Veterinarians

Figure 2: Evolution of occupations: Butchers and meat processors

Notably, the BMPA indicates that the recent increase in worker losses has come mainly in the skilled worker category i.e., veterinarians and skilled and semi-skilled butchers. These skilled workers are essential to the running of meat processing plants and dictate how many animals can be processed. However, butchers are among the hardest employees to recruit and can take up to three years to train fully. Our research (interviews) also indicates there are challenges in recruiting veterinary staff from within the UK, with many UK-trained vets preferring to work with “small and furry” animals, rather than in meat processing. Historically, this has meant that many veterinarians have come from Europe, however, post-Brexit immigration changes means that increasingly, veterinarians are being recruited from non-EU countries, which is increasing the administrative burden of recruitment into those roles.

Beyond these general challenges which affect the meat industry as a whole, there are a number of sub-sector specific labour shortage challenges, which we detail below.

2.4 Pigs and Poultry

The National Pig Association reported 10,000 job vacancies across all pig processing roles, including vacancy rates in pork processing plants of 10-15% on average (submission to EFRA 2021). Cranswick, one of the largest meat processing companies in the UK, specialising in pig and poultry demonstrates the range of vacancies in these sectors, reproduced in Table 1 (Cranswick submission EFRA 2021):

Table 1 Vacancies for key roles in a major pig and poultry business in 2021 (Cranswick/Wayland Farms Ltd)

Job Role	Number of Vacancies

General Operative	830
Skilled Operative	55
Engineers	6
Administrators	3
Butchers	53
Abattoir staff	14
Cleaning	36
Quality Assurance	9
Warehouse	7
Management	33
New product development	1
Stock People	10
Total	1057

Approximately 60% of pork eaten in the UK is imported and processed for retail within UK factories. Pork processing plants are estimated to have vacancy rates of 10-15% and there are approximately 10,000 vacancies across all roles in the processing sector (National Pig Association, EFRA submission 2021; Goddard 2022).

The temporary visa scheme (extended to the end of March 2022) for 800 pork butchers resulted in take up by only 100 individuals (Rowsell, 2022). Other measures to support the pig sector are a Private Storage Aid scheme and a Slaughter Incentive Payment Scheme (although these schemes are noted to be highly restrictive (Riley, 2022)). The government is working with the Agricultural and Horticulture Development Board to identify new export markets for pork, particularly lightly processed pork.

The poultry industry directly employs 40,000 people in the UK, contributing £5.4 billion GVA to the UK economy (British Poultry Council, EFRA 2021). As mentioned earlier, like many food systems in western economies, there is a reliance on migrant labour to fill labour intensive positions. Before the beginning of 2021, 60% of the workforce were EU nationals and with Brexit and a new immigration scheme which does not favour low wage workers, there has been an impact on the workforce as the sector struggled to recruit from the UK-based workforce. The temporary visa

scheme had mixed results and as of March 2022, businesses reported a vacancy rate of 16% (6,000) of their total workforce, most in processing and operations (McDougal, 2022). The industry cites this downturn in labour supply as the main challenge facing the sector (Kaul, 2021; McDougal, 2021; Riley, 2021), although rising production costs – feed inflation, packaging, energy costs, wage inflation and equipment are also putting strain on the industry (Addy, 2022b). As a result of this, the British Poultry Council reports that many members cut back on production by 5-10% (The Poultry Site 2021).

Our own analysis of the LFS, presented in Figure 3, demonstrates the falling labour supply:

Figure 3: Evolution of occupations: Fishmongers and poultry dressers

While the industry has concrete plans to invest in supply chain resilience, including investing in technologies that align with the FSA's objectives and that could reduce the demand for labour (for example, farm management packages, waste reduction and green energy adoption, technology for veterinary diagnostics and egg handling solutions (Berkhout, 2021; Brockotter, 2022)), it has indicated that temporary and seasonal workers are needed in the near term to plug the gap before benefits from these investments can be realised.

Interestingly, further pressure is being placed on labour needs by the ongoing drive to improve animal welfare in the sector. Although almost 90% of Britain's poultry flock is indoor reared to Red Tractor standards (Maxwell, 2022), there are targets to improve standards further, including lowering dead on arrival birds, reducing time from farm to slaughter to four hours, and regulations that would restrict the transportation of birds at certain temperatures unless trucks are thermo-regulated (Eustice, 2002). This will increase costs for the industry, with potential implications for food safety and availability (see section 3) and will increase demand for veterinarians (Maxwell, 2022). This example illustrates how important it is to take a whole systems approach to fully understand the ripple effect of one change within the food system on labour shortages – here enhancing animal welfare will require more veterinarians, which are already in short supply.

2.5 Fruit and Vegetables

The fruit and vegetable sector struggles to recruit, a trend observed more broadly in agriculture. The shortages are most acute in seasonal work due to its seasonality, low earnings and the location of farms. UK farming reflects similar challenges across the Global North where migrants often fill seasonal work roles (Martin 2021). Difficulties to recruit labour in UK farming are caused by low population density, an aged population, low unemployment in rural communities, long distances, and a lack of transport links from nearby cities and semi-urban towns to farms. Workers in the sector look after the crops, replant, harvest, and work in the packhouse – washing, inspecting the produce, packing and labelling. To remain competitive many UK farms have invested in their own packhouses, with fresh fruit and vegetables leaving directly for the supermarket with no intermediary involved. Other farms use their packhouses for imports thus increasing their market position on certain crops. Temporary and seasonal work such as harvesting, when a significant number of workers are needed, is particularly difficult to recruit locally. The challenging access to labour in farming has become more acute over the last five years as observed in Figure 4 and Figure 5 below.

Figure 4 Evolution of occupations: horticultural trades

Figure 5 Evolution of occupations: Farm workers

Since the Second World War, the fruit and vegetable sector has relied heavily on migrant labour, and this has continued until recently via a special immigration scheme known as the Seasonal Agricultural Workers Scheme or SAWS. Acting upon recommendation from MAC, the scheme was suspended in 2013. After this date the seasonal workers in agriculture were recruited via freedom of movement and EU workers quickly become the dominant workforce. A Seasonal Workers Pilot under the Temporary Visas T5 route was introduced in 2019. The visa requires farmers to be authorised by the Gangmaster and Labour Abuse Authority and only a select number of recruitment agencies known as 'operators' that are certified by Defra can bring in migrant workers. The 'operators' rather than the farmers are the formal employers of the migrants and so visas are strictly linked with the operators.

The reintroduction of Seasonal Worker visas started in 2019 when 2500 visas were made available. In 2020 it was extended to 10,000 and in 2021 increased to 30,000. In December 2021 Defra and the Home Office confirmed the Seasonal Worker visa for another three consecutive years, with the numbers of visas offered beginning to decrease from 2023 as more automation solutions are expected to be implemented (Defra 2021). Whilst the visa route provides for half of the labour demand, half of the workforce is predominantly made up of EU workers with settled status and a small number of British workers (Barbulescu, Vargas-Silva and Robertson 2021). The government expects that automation will reduce demand for migrant workers. However, Defra's own review of automation in horticulture (Defra 2022a) reveals significant barriers among horticulture growers and those developing the automation. They include the ability to raise sufficient capital to purchase equipment and growers' concerns about the capacity of the policy environment for example, the Seasonal Workers Pilot to bridge the transition towards automation. Further challenges are caused by fragmentation along the development pipeline and developers not fully understanding users' needs.

The demand for seasonal workers in agriculture is disputed, with the industry suggesting a demand of more than 75,000 workers (NFU, 2017) whilst the ONS indicates 64,000 (ONS, 2018). The Seasonal Worker visa scheme does not proactively support long term relations between workers and agencies: return workers have higher productivity than novice workers who on many

occasions have no prior experience in agriculture (Barbulescu, Vargas-Silva and Robertson, 2021; McAreavey, 2019). The Horticulture Trade Association reports decreased levels of productivity and increased costs amongst its members (submission to EFRA, 2021), ultimately resulting in increased costs for consumers. Freedom of movement allowed direct employment and thus farmers had workers they trusted and that returned to work in the summer over many years, this resulted in better relations between employers and employees (McAreavey, 2019). For example, one producer, G's Fresh, reported a reduction in return rates from its normal rate of 75% in 2020 to 46% in 2021 post EU exit. The cause for low return rates is that recruitment has now shifted from EU to non-EU countries, with Ukraine having provided over two thirds of the seasonal workers on visas since 2019 (Home Office, Migration Quarterly Statistics). Furthermore, if a migrant wishes to return they will return to the same pool as first-time applicants.

A survey of farmers and farm managers in the UK (N=53) evaluating labour shortages in 2021 found that in the fruit and vegetable sector, 46% of UK farmers had a shortfall above 10% (Barbulescu, Vargas-Silva and Robertson, 2021). Compared with pre-pandemic and pre-UK exit from the EU, 76% of farmers said it was 'more difficult' to recruit seasonal workers to staff picking and packing teams in 2021 than in 2019. To adapt to these changes, farmers increased their efforts to recruit British workers and UK domiciled migrant workers. However, 79% of farmers said the number of domestic workers in 2021 was 'about the same' as or 'less' than in 2019 (Barbulescu, Vargas-Silva and Robertson, 2021). Large producers such as The Fresh Produce Consortium similarly noted that roles are harder to fill, often requiring several different agencies to attempt to fill temporary positions alongside greater staff turnover (EFRA submission, 2021). In their EFRA submission (2021), the British Growers, representing edible horticulture, said it was more difficult to recruit seasonal workers in 2021 compared to 2020, with overall lower numbers. While all mentioned the effort to bring in local workers, 59% of respondents reported to have recruited 'about the same' number of British seasonal workers as in 2019 (EFRA, 2021). There is a geographical effect and shortages in Scotland were more acute than in other UK nations. Northern Ireland and Wales are both less at risk with respect to seasonal workers because horticulture there is a minority sector (although they remain heavily reliant on EU workers with settled status).

An industry report by the NFU, the British Growers Association, British Summer Fruits and British Apples and Pears (Fresh Plaza 2020), noted that costs associated with labour during the COVID-19 pandemic including training, accommodation, transport logistics and operations increased labour costs in horticulture by 15% in 2020.

Overall, the fruit and vegetable sector faces several risks associated with the following:

access to labour in rural communities is challenging given the lower population density, relatively low unemployment rates and an ageing workforce;
lack of access to suitable immigration routes for low-skilled migrants (the current immigration system is designed for high-skill migrants and includes higher immigration fees);

- lack of available technological solutions such as automated harvesting;
- higher fertiliser and energy costs; the war in Ukraine;
- stagnant food prices;
- rising inflation;
- longer supply chains for sourcing imports;
- restructuring of agricultural policy in the UK.

In the short-term, food imports and emergency visa schemes provide relief. In the medium and long term there are food security risks as longer supply chains have more exposure to external risks. In the medium term, automation is likely to mediate these risks, with more benefits of automation concentrated in pack house transformation and the transportation of fresh fruit and vegetables. Looking after the crop and picking are more difficult to automate, as technological

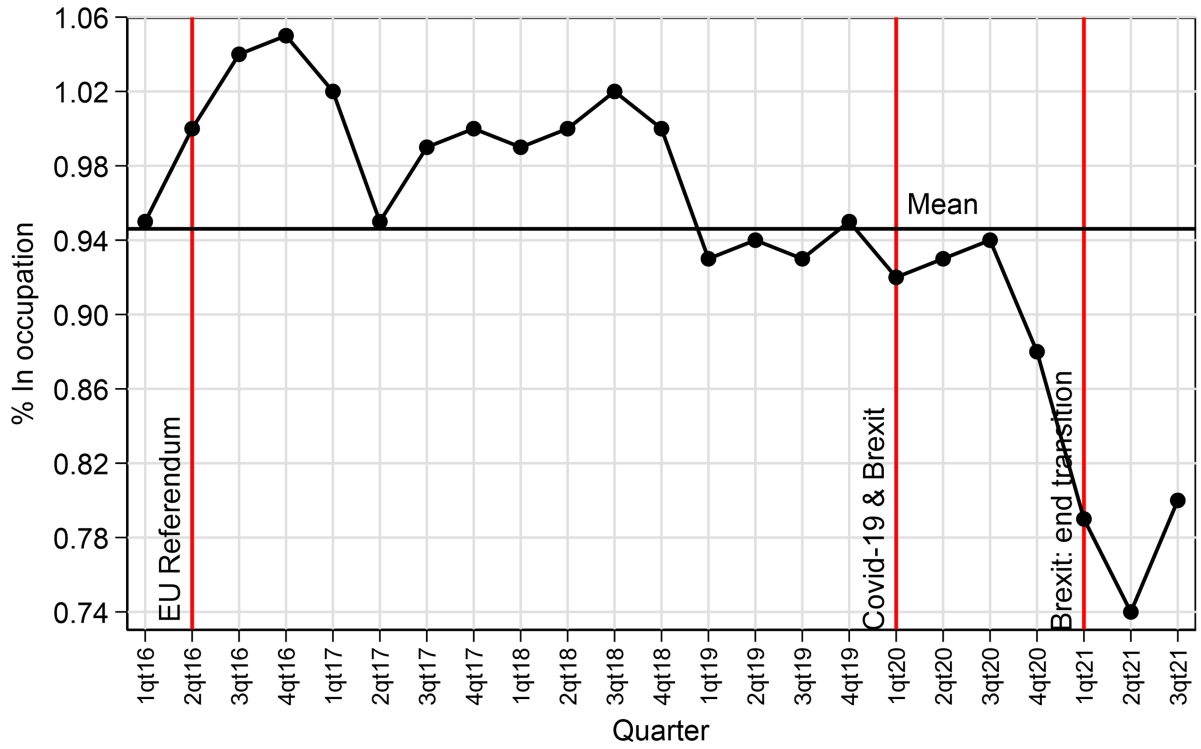
solutions need to be developed for each crop.

hese risks translate to different food safety and availability risks which are explored in section 3.

2.6 Heavy Goods Vehicles (HGVs)/Large Goods Vehicles (LGVs)

Shortages of HGV and LGV drivers in the UK food supply chain were highlighted as early as 2016 by the UK government Transport Select Committee (UK Parliament, 2016). Logistics UK note that before the pandemic, there was already an industry shortfall of 76,000 drivers (footnote 5) (Holmes, 2021). However, these shortages did not receive sustained focus from policymakers until driver shortages started compromising the food supply chain (see section 3) in mid-to-late 2021. According to Logistics UK (2022), the workforce is currently 15.6% smaller than it was pre-pandemic. Data from the Office of National Statistics (ONS, 2021a) shows a decrease of approximately 30,000 drivers between 2019/20 and 2020/21 alone – this is about 10% of the workforce. Our own calculations from the Labour Force survey, presented in Figure 6 below, illustrate the decline in those employed in the sector from 2016.

Figure 6 Evolution of occupations: Heavy goods vehicle drivers (HGV)



Source: Quarterly UK-LFS 2016-2021. Own calculations (weighted data).

In the literature, there are multiple reasons cited for the current shortage. Firstly, there are approximately 15-19,000 fewer EU drivers working in the UK haulage industry due to a combination of increased immigration restrictions post-Brexit and pandemic-related restrictions to movement (Full Fact, 2021; O'Carroll, 2021).

The pandemic also resulted in fewer people passing HGV driving tests compared to the previous year, due to fewer tests being offered (Driver and Vehicle Standards Agency, 2021; Full Fact, 2021). The Secretary of State for Transport in 2021 (Grant Shapps) stated that nearly 40,000

fewer tests were offered 2020-2021 (O'Carroll, 2021).

Furthermore, the Food & Drink Federation's (FDF) 2021 report on prices in the food and drink manufacturing sector notes that the introduction of IR35 (footnote 6) in spring 2021 is commonly cited as a main reason for driver shortages (Food & Drink Federation, 2021). This has impacted HGV drivers because it prevents individuals from operating as a 'limited company' when they are essentially employees. Agencies have thus had to employ them as staff, paying NI and offering pensions. To keep incomes at the same level as they were pre-implementation of IR35, costs are, therefore, now approximately 25% higher (Driver Require). Average HGV driver pay surged by nearly 12% in the 12 months to the 1st of January 2022, while advertised salaries increased by 21% in the year to Q4 2021. The FDF report that agency staff are withdrawing their services as they cannot sustain an increase of £5-6 per hour (FDF submission EFRA, 2021). One of the impacts of the shortage is circularity as drivers move between companies to secure higher wages, it has been described as a 'merry-go-round' (Defra oral evidence 09.11.21). Lots of labour has gravitated towards supermarkets as they pay premium wages within the sector, reinforcing trends of centralisation.

Finally, of longer-term concern, HGV drivers have a significantly older age profile than the general population, with an average age of 51 years, and there is a dearth of younger people training into the profession. Driver Require analysis of Q4 dynamics of the LFS shows how the numbers of drivers in the under 30 age brackets had decreased by 28%, down from 18,000 to 13,000 between 2019 and 2021. However, there was a 22% increase in drivers aged 30-45 from 69,000 to 84,000. The over 45 age group revealed a drop in drivers of 5% which is estimated to be retirement amongst the over 65 age group.

2.7 Retail and hospitality

According to the British Retail Consortium (BRC) EFRA submission, although labour shortages in the UK supply chain have been a concern for some time, they became more acute following the lifting of COVID-19 restrictions in mid-2021. The BRC highlights that, for retailers, the most acute and pressing shortage is that of qualified HGV drivers.

In hospitality, vacancies were 50% higher in 2021 than they were pre-pandemic, and many restaurants and food providers had to reduce the number of hours they were open due to staff shortages (footnote 7). These staffing shortages were due to various issues, including students not moving into cities due to COVID-19 and therefore not being in the right place at the right time; a hiatus in training, with catering colleges having to close during the pandemic; and staff illnesses.

2.8 Framework for assessing labour shortages risks to the FSA

Labour shortages present food system risks, with different probabilities of occurrence, levels of vulnerability and subjective perceptions and behaviours of stakeholders (Louis & Pagell, 2019; see also Figure 10 in Appendix A3). To improve the FSA's ability to assess, treat and monitor potential labour shortage risks in the food system, our study focused on defining and categorising the probabilities, vulnerabilities, and risk behaviours of food actors to inform the FSA's prioritisation of labour shortage interventions (Lacombe et al., 2021). We reviewed and compiled a range of risk classification criteria and sub-criteria to facilitate the FSA's categorisation of the potential impacts of several types of food system labour shortages on the delivery of FSA official controls (see Appendix A3).

Food chains comprise a complex array of participants carrying out overlapping and labour-intensive operations including growing (farmers), harvesting (pickers), processing (operators),

packaging (packers), transporting (logistics), holding (warehousing), and retailing. Since food chain stakeholders lack unified risk management frameworks, we sought to understand how different labour shortages predispose the FSA to risk probabilities such as:

i. Safety hazards from the unintentional or accidental contamination of food (either chemical or microbial) due to the mismanagement of production and handling operations at critical control points.
ii. Food threats and vulnerabilities resulting from unintentional behavioural/ideological and intentional adulteration or contamination (threats) or economically motivated and intentional adulteration or contamination of food (vulnerabilities).
iii. Food quality compromised via intentional or unintentional manipulation for economic reasons, including food mislabelling.

We used two broad risk identification criteria from the supply chain management literature to categorise the risk impact of different forms of labour shortages on the FSA's official mandate in the food system:

1) The first criterion assesses the risk locality of labour shortages or the location in the food system where a given type of labour shortage (weak seasonal, incentive-driven, or skills underutilisation) might impact the FSA's mandate (Christopher & Peck, 2004). A labour shortage risk locality is considered as:

a. internal if the shortage directly affects the FSA internal processes (oversight and inspection activities) or controls (rules, systems, and procedures).
b. external to the FSA but internal to the food network if the shortage impacts either the supply side (upstream-farmgate) or the demand side (downstream-customers) of the FSA's official mandate.
c. external to the network if the shortage emanates from the broader institutional or policy environment where the FSA executes its official mandates.

2) The second criterion pertains to the quantification of the impact of different forms of labour shortage on the FSA's mandate. Risk quantification is concerned with assessing the probability and consequences of negative events, measuring them in a suitable and acceptable way. Using this criterion, the impact of labour shortages in the food system could be quantified as perceived or foreseen (Sjöberg, 1980):

a. Perceived risks are the assumptions regarding the consequence or seriousness of the penalties of labour shortages, and the subjective feeling about how unfavourable such risk consequence would be if they materialised (Wong & Jensen, 2020)
b. Foreseen labour shortage risks are those that can be forecast and measured using quantitative historical data (Sjöberg, 1980).

1. 11% of workers in dairy, 60% in poultry and nearly 70% in red and white meat are seasonal migrant workers from central and eastern Europe. See page 68, European Union Committee 20th Report of Session 2016–17 - UK Parliament.11% of workers in dairy, 60% in poultry and nearly 70% in red and white meat are seasonal migrant workers from central and eastern Europe. See page 68, European Union Committee 20th Report of Session 2016–17 - UK Parliament.

2. 95% of veterinarians working in British abattoirs are migrant workers. e.g., see Parliament Live.

3. Within food and drink manufacturing, 30.8% of roles were classed as low skilled requiring little or no experience, 36.7% were classed as semi-skilled requiring some experience and training and 32.5% were skilled or high-skilled and required a degree or experience (Grant Thornton, 2017).

4. Although it should also be noted that the evaluation also states: “whilst many of the compliance visits to growers and farms were positive, some identified welfare issues, demonstrating there is clear room for improvement in this objective” (UK Home Office and Defra, 2021).

5. We note that different sources estimate this figure differently; this is an approximation.

6. Off-payroll working rules mean that workers, who would have been employees if they were providing their services directly to the client, pay broadly the same income tax and National Insurance contributions as employees. See Understanding off-payroll working (IR35) - GOV.UK (www.gov.uk).

7. Data in this section from UK Hospitality EFRA oral evidence 09.11.21

Impact of labour shortage: risks on UK food availability and safety

3.1 Internal food network risks (external to the FSA but internal to the food network)

Here we identify food risks arising from labour shortages that are internal to the food network, including those relating to transport and logistics. As we noted earlier, a food systems approach recognises the interconnections between various parts of the food system. Thus, for instance, declining animal welfare arising from butcher shortages can create greater demand for veterinarians, this turn may result in a reduction in production and processing. We identify risks to food availability and safety that arise directly from the meat and dairy and fruit and vegetable sectors, as well as those related to consumer preferences and perceptions, and to the FSA’s regulatory functions.

Food availability risks

Meat and dairy

The backlog in the pork supply chain has resulted in the reduced availability of certain products in supermarkets and increased costs of other products (Driver, 2021; White, 2021; White, 2022), both present potential threats to food security, particularly for lower-income households. Labour shortages are compounding other pressures that meat producers are facing, with some meat producers reducing production or exiting the industry entirely. This will result in reduced domestic production and increased imports, a trend that is projected to increase in the future (Maxwell,

2022; Driver, 2022b; Shuttleworth, 2022). This has arisen because of a combination of factors including labour shortages and significantly increased costs of production (associated with geopolitics and energy prices). For example:

In January 2022, fresh and frozen beef imports were 11% above the five-year average, and export volumes were 17% below the five-year average (Shuttleworth, 2022).

In 2021, the pig breeding herd in England fell by 17,000 to 385,000 – the first time since 2014 it has been below the 400,000 mark. This was as a result of a 7% year-on-year decline in the number of sows (for example, female breeding herd) from 317,000 in 2020 to 295,000 in January 2022. The figures show that the number of 'other sows' has increased, suggesting that some producers are holding back on breeding (EFRA, 2021/22). Some producers are shrinking their herds or switching to raising others' animals under contract due to the shortages of butchers and associated difficulties with sending carcasses to abattoirs (Evans, 2021). There is evidence of carcasses being processed in the EU (Ireland) where plants are approved for local supply with the potential for an increase in product misrepresentation and document fraud risk (McSweeney and Young, 2021a). There are also reports of producers exiting the sector. The Chief Executive of the National Pig Association claims that at least 40 of approximately 2,000 UK pig farmers registered with the Red Tractor assurance scheme quit the industry in 2021, as compared to five or six in a normal year (National Pig Association EFRA submission, 2021). Similar challenges have been reported in both the beef sector (Addy, 2022a) and the poultry sector (Addy, 2022b). The evidence suggests that these challenges are directly related to labour shortages, a position held by the British Meat Processors Association (Evans, 2021).

Also in 2021, poultry producers are reported to have cut weekly chicken output by 5-10%, the annual turkey supply dropped by 10%, and seasonal bird production by 20% (McDougal, 2021). In a globalised market, it is not necessarily the case that decreased domestic production will present a risk to food availability. Currently, most of the UK's food imports come mainly from suppliers who are very stable economically and politically (mostly, EU member states). New trade deals signed with Japan, Australia and New Zealand aim to reinforce this (Hubbard, 2020). Thus, it can be argued that, even if less food is produced in the UK and more is imported from elsewhere, the threat of compromised food availability (footnote 1) remains low. However, many experts maintain that factors such as geo-political instability and climate change make global supply chains increasingly volatile, and that it is foolhardy to let domestic industries decline significantly (Garnett et al., 2020; Hasnain et al., 2020; Lang, 2020). The ongoing conflict in Ukraine is a stark reminder of the impact conflict elsewhere can have on the UK's food supply chain.

More broadly, labour shortages in the supply chain are significantly compounding financial difficulties already faced by UK meat producers, for whom production costs – for example, energy, fertilisers, feed – have been rising more generally. For example, the backlog in pig slaughter reportedly resulted in some processors applying 50% discounts on overweight animals, severely cutting farmer profits at a time when feed, bedding and other housing costs are skyrocketing (Riley, 2022). On top of this, the changing trade environment resulting from the UK's exit from the EU is adding further strain to the industry, with challenges to producer viability coming in the form of competition from less-expensive imports and increased 'red tape' at the border, which is making exporting more difficult. Together, these challenges are making it difficult for many meat producers to remain in the industry, while others are being forced to cut back production.

Fruit and vegetables

The labour shortages experienced in 2020 and 2021 had multiple impacts. Firstly, UK fruit and vegetable production was lower than in previous years (House of Commons, 2022) as farmers adapted to new levels of labour availability. Whilst imports offer short term relief to lower UK

production, these foods arrive to UK consumers on longer supply chains that have more exposure to local and global factors. In terms of food availability there is more risk of narrowing food choice with fewer varieties available and missing items on the shelves. The latter arising mainly for soft fruit and salads with their short shelf life and required labour intensity. Furthermore, due to rising energy prices, vegetables and salads that are grown in controlled environments, such as tomatoes in glasshouses, are also at risk. Some UK producers have indicated that they have started moving their production abroad (G's Fresh submission to EFRA, 2021; Barbulescu, Vargas-Silva and Robertson, 2022). Over the medium term, UK production is expected to continue to shrink significantly, due to a lack of a steady seasonal labour pipeline, stagnant food prices and a lack of succession planning, thus making it more challenging to produce fruits and vegetables domestically (Barbulescu, Vargas-Silva and Robertson, 2022).

In terms of food availability, the most at-risk fruit and vegetable foods are berries, salads, and greens. These foods are labour intensive and require a large number of workers for picking, require delicate packing and have a short shelf life in supermarkets. In the future producers may specialise production to avoid losses, for example farming strawberries only and terminating the production of raspberries and blueberries. Consumer data in Table 2 confirms that shoppers are most concerned with the availability of fresh vegetables (43.83% in February 2022) and fresh fruits (41.90% in February 2022).

The Independent Review of food that produced the National Food Strategy (the Dimbleby report), stressed the need for healthier diets, and nutritious and environmentally friendly systems in the UK, echoing the FSA's strategy of promoting healthier and more sustainable diets. Research has found that fruit and vegetable rich diets mitigate food insecurity, mitigate climate change (IPCC, 2022), improve health (FAO, 2020), protect national supply chains from external shocks (FAO 2020), reduce the financial risks associated with meat production (FAIRR, 2022; WWF, 2020), and reduce the risks of future pandemics (UNEP and ILRI, 2020). If the UK's production of fruit and vegetables shrinks, rather than rises to meet demand, imports will become vital.

Consumers

Perceptions of food supply issues seem to be very fluid and strongly related to the media. Coverage of the pandemic significantly changed buying behaviours, which in turn increased pressure on actors in the food system to meet consumers' alternative shopping and changing consumption patterns. The onset of the lockdown led to panic purchasing and stockpiling behaviours, which disrupted just-in-time production and processing cycles, leading to stock-out and price inflation.

We found that consumers have concerns about the impacts of food supply chain labour shortages on food availability, even though these are not extremely high and have remained relatively stable in the period from November 2021 to February 2022. Using two cross-sections (November 2021 and February 2022) of consumer survey data commissioned by the FSA and applying postestimation methods on the results of a multivariate regression analysis, Figure 7 below shows how consumers' concerns about food availability are affected by their views on the likely impact that labour shortages may have across key elements of the food supply chain (footnote 2).

Figure 7 Estimated probabilities of consumers' concerns with food availability as concerns with labour shortages across the food supply chain change.

Figure 7 examines the relations between food availability and levels of concern about labour shortages that have an impact on production, packaging, and supermarket/retailing activities. This analysis suggests that consumers tend to be less concerned with food availability if they are less concerned with any of these other issues (for example, on production, packaging, and supermarket/retailing activities) across the food supply chain. The analysis shows relatively low occurrences of consumers being highly concerned with food availability.

In Table 2 below we show for all food items available in the pooled cross-sectional dataset we have created the self-reported consumer concerns about their availability in November 2021 and February 2022. Not surprisingly, consumers were more concerned about the availability of fresh food items in both surveys. In November 2021, out of the 25 items analysed, the first five about which consumers were more concerned about their availability were: fresh vegetables, fresh fruit, fresh milk, raw chicken, and eggs. In February 2022, the first five items that consumers were more concerned about their availability were: fresh vegetables, fresh fruit, fresh milk, eggs, and raw chicken. The same five items were identified in both surveys, albeit with a slight variation in the ranking.

Finally, it is worth mentioning that the estimated impact of labour shortages in the food supply chain on consumers' attitudes towards food safety and food availability shown in Figure 7 and Figure 8 are stable in the period between November 2021 and February 2022. However, when the two consumer surveys were carried out, our detailed analysis (not shown here) of the pooled cross-sectional dataset created for the analysis indicates that there has been a significant worsening of consumers' perceptions during this period in all relevant cost of living dimensions included in the survey. This is particularly the case around fuel supply and energy costs, and the cost of food and drinks. Increasing consumer concerns around the so-called cost-of-living crisis is likely to add to their concerns around the impact of labour shortages on food safety and availability. Already there is evidence of families and households with lower incomes buying fewer

fresh vegetables due to price increases (Sandercock, 2022).

Table 2. What food are you most concerned about being unavailable? (Column percentages)

Product	November 2021	February 2022
Fresh milk	36.39	40.42
Cheese	20.18	21.40
Yoghurts	10.86	13.37
Eggs	25.54	30.31
Raw chicken	30.28	27.49
Raw beef	15.9	10.85
Raw lamb	9.63	6.09
Raw pork	7.65	5.94
Sausages	11.77	9.51
Bacon	9.94	8.32
Tinned goods	18.81	15.60
Carbonated soft drinks	11.77	8.47
Non-carbonated soft drinks	5.05	4.61
Carbonated alcoholic drinks	8.26	5.20
Non-carbonated alcoholic drinks	3.36	3.57
Fresh fish	14.53	13.52
Frozen fish	9.48	6.24

Product	November 2021	February 2022
Ready meals	10.40	7.88
Fresh fruit	39.60	41.90
Fresh vegetables	45.26	43.83
Yeast	4.59	2.67
A 'free-from' product	7.65	9.06
Baby food	6.27	5.20
Baby formula milk	5.20	5.79
Honey	5.20	6.24

Source: Pool cross-sectional FSA Consumer Survey November 2021 to February 2022.

Food Safety risks

Meat (including pigs and poultry) and dairy

The meat processing sector – inclusive of pig, poultry, beef and sheep meats – is a labour-intensive industry that requires manual dexterity; not all of its processes can be replaced by automation. The labour shortage pressures highlighted earlier have several implications for food safety, which, here, we take to include issues pertaining to both human health and animal welfare.

Labour shortages in the meat processing industry (specifically, shortages of abattoir workers and veterinarians), have reduced slaughter rates, which in the short term, has resulted in periods of less meat entering the food supply chain. A reduction in the number of animals taken from farms to slaughter presents animal welfare challenges on farms as well as reducing food production. Specifically, within the pig sector, shortages of butchers resulted in a backlog that rose to approximately 200,000 animals in 2021, leading to the culling of thousands of healthy pigs (Defra 2020). With overcrowding there is an associated risk that ill or maimed animals will not be identified; other welfare issues include farmer wellbeing, with a longer-term risk of farmers exiting the industry and placing more pressure at BCPs due to increased imports.

While declining domestic production is not inherently a food safety risk, there are potential risks worth highlighting here. Firstly, an increase in meat imports may have implications for the way the FSA operates. For example, it will likely be necessary to devote greater resources to border checks. Furthermore, most imported meat is processed and packed in retail form after it enters the UK. Brexit-related import changes are creating some challenges and delays at border control

points, and according to the BMPA, such delays have the potential to make it increasingly difficult to maintain shelf-life at the level required by retailers (BMPA EFRA submission, 2021). With potential delays at border control points, meat will be in transit for longer, bringing with it food safety risks.

Some organisations, including the NFU and Sustain are also raising concerns about the fact that meat produced in non-EU countries in particular may be subject to less stringent welfare standards than are currently in place in the UK. There is evidence of large scale abattoirs and processing plants in Ireland servicing its export-driven meat industry, with much of this meat ending up in the UK (McSweeney and Young, 2021b). Given that meat produced abroad is outside of the FSA's inspection remit until the point it enters the UK, we argue that this brings an increased risk of food hygiene breaches and food crime incidents (food traceability and control).

Although there is currently limited data to support this assertion, and moreover, it is true that third-country producers are required to rear meat (and other food) to standards set in the UK should it wish to import to this country. The fact that the FSA does not have direct control over this element of the food chain therefore raises challenges with how it retains oversight.

Fruit and vegetables

Regarding food safety, labour shortages have meant that the available workers have worked longer hours, with inexperienced workers inspecting fresh produce. Furthermore, the shortage of HGV drivers in 2021 had a significant impact on both food availability and food safety as fresh produce needed to be moved quickly and was being deposited for longer on farms that lacked appropriate storage facilities.

In the medium and long term, digitising food inspection and introducing more technology to inspect fruit and vegetables could significantly reduce the risks associated with food safety.

Consumers

We created a pooled cross-sectional dataset from two recent consumers surveys commissioned by the FSA. We used this to investigate consumers' concerns about food safety, according to their level of concern about the impacts of labour shortages across key elements of the food supply chain. The key results from a multivariate regression analysis are presented in Figure 8 using postestimation methods (footnote 3).

Figure 8 shows that there is a clear relationship between consumers' concerns about labour shortages affecting production, processing, packaging, and supermarket / retailing and their levels of concern with food safety. Specifically, as their levels of concern with all these elements of the food supply chain reduce, so does their concern with regards to food safety. For all the dimensions of the food supply chain analysed, estimated consumers' concerns with food safety are mainly fairly concerned or not very concerned. Yet with regards to processing, packaging and supermarket/retailing there is a high level of consumer concern about the impact of labour shortages on food safety in these elements of the food supply chain.

Figure 8. Estimated probabilities of consumers' concerns with food safety as concerns with labour shortages across the food supply chain change.

Regulation and governance

Some controls are delivered by local government on behalf of the FSA. In this way regulatory areas are outsourced to local government, although food businesses are still legally responsible for providing safe food. Interviewees in our study noted that vast amounts of resources, capabilities and data relevant for the FSA mandate in abattoirs are controlled by different agencies. For instance, meat inspections are still characterised by multiple inspections including mandatory FSA inspections; retailers' inspections and certifications; audits by designated local authorities; and voluntary certifications. Such duplication of efforts is resource intensive and costly for all agencies involved. Although it can provide redundant inspection capacity in times of shortages, there needs to be deliberate contingency planning in place for inter-agency expertise and resource sharing to manage staffing shortfalls and improve resource efficiencies.

Austerity has resulted in local government funding reductions and a reduction in monitoring and enforcement visits by environmental health teams (Smethhurst, 2021; UNISON, 2019). Much of this is reactive rather than proactive, suggesting a risk in identifying issues early on. Some of the findings from Unison's research (which was based on over 750 responses from environmental health officers) include:

- 39% of respondents have no time to regularly inspect food business operators.
- 26% of respondents have seen more food businesses like takeaways, failing their inspections.

Transport, retail and hospitality

The shortage of HGV/LGV drivers impacts on the food chain, the most notable pinch point being moving stock to and from distribution hubs and onto retail shelves, which has had a knock-on impact on shelf-life. This has led to less choice in the supermarkets for consumers. Shortages also meant that food businesses were not always able to get the goods that they needed (ONS 2021). It has led to an increase in wages, but also in supply chain costs and ultimately food prices (British Retail Consortium (BRC) EFRA submission). Consequently, the retail supply chain is more volatile.

In hospitality, many restaurants and food providers have had to reduce the number of hours when they are open due to staff shortages (footnote 4). Labour shortages arose due to various factors including students not being in the right place at the right time due to them exiting cities and there being hiatuses in training (catering colleges were closed). Vacancies are nearly 50% higher than pre-COVID. Revenues are suppressed by about 15% to 20% in the hospitality sector simply because of labour shortages in the sector, including in the supply chain. Approximately 20% of products in deliveries are not being fulfilled. Since Christmas, predicted cost-price inflation is coming through the supply chain.

3.2 Internal risks to the FSA

A risk is internal to the FSA if it directly affects FSA internal processes (oversight and inspection activities) or controls (rules, systems, and procedures). We identified key risk areas that affect the FSA's ability to carry out its remit. These are largely focused on FSA staff who are working in the red meat sector and relate to the following three categories:

- recruitment
- staff retention and development
- knowledge management

Recruitment risks

We focused on those related to recruitment of Meat Hygiene Inspectors (MHIs) and Official Veterinarians (OVs). MHIs are recruited using the civil service recruitment approach as well as using a Service Delivery Partner. The civil service approach does not necessarily screen candidates for the full range of skills that are needed for the role. Clearer communication is needed in relation to duties, responsibilities and time/resource requirements, work environment characteristics, workplace culture and employee value propositions and progression pathways.

OVs for all Official Controls in abattoirs are recruited using a Service Delivery Partner that recruits nearly exclusively from overseas (at around 95%) (footnote 5). The dependence on a single recruitment vendor creates internal challenges as those recruited through that vendor are employed within the private sector, while those recruited directly into the FSA are civil servants. Interviewees noted that there are untapped opportunities for mutual long-term planning around recruitment, training needs assessment and retention strategies to improve the synergy and operational efficiency of the FSA and contracted MHIs and OVs.

Staff retention

High levels of attrition within MHIs were perceived by FSA staff to be reduced with the introduction of diversity in roles and by balancing labour intensive and technical tasks. There are excellent opportunities for moving on from the FSA into the wider civil service, but this means that many move out of the MHI role into a more desk-based position. Such a pathway can be due to a deliberate strategy of using the FSA as a 'stepping stone' into the civil service or it can be due to a lack of understanding of the role from the outset.

Knowledge management

There is a significant level of tacit knowledge among staff working in abattoirs. Given the ageing workforce among MHIs, it is not clear how that knowledge will be transferred to newer recruits. Although retirement is currently the key contributor to knowledge loss, other factors, such as MHI job mobility, recruitment ease and attrition were flagged as continuing contributors to the loss of critical organisational knowledge in the FSA.

Interviewees in our study acknowledged the role of technologies in the delivery of a successful Operational Transformation Programme (OTP) but noted a key problem with the knowledge retention approach proposed by the OTP: despite the availability of technologies and policies that could streamline future inspection processes by assigning more responsibilities to FBOs, the knowledge requirement for effectively carrying out the FSA mandate by OVs and MHIs is context-specific and incorporates elements of culture, experience and interpretation. This implies that for the FSA to generate useful knowledge repositories for operational transformation, strategies must be put in place to store the context in which policy and procedural knowledge (know-how, know-who, know-what and know-where) are generated.

3.3 Risks external to the food network

Migration risks

Post-Brexit immigration policy privileges highly skilled migration which does not entirely reflect the demand for labour in food systems. While key shortages are also observed in high skilled occupations such as veterinarians and butchers, the shortages analysed in this report concentrate in low and medium skilled occupations and thus those with limited access to visas. The exception is the Seasonal Worker visa which traditionally has been used as a sector-based visa for agriculture but was extended in 2021 to address emergency shortages in HGV, poultry workers and butchers. For high-skilled occupations such as veterinarians and butchers the main challenges are the language test, particularly for butchers, and the immigration accreditation and recognition of qualifications for veterinarians (footnote 6).

For seasonal workers, returnees need to reapply without recognition of previous experience with consequences for producer cost, productivity and knock-on impacts for consumers.

Domiciled EU workers are another risk. Over 40% of EU workers have pre-settled status and would need to reapply in five years to consolidate their status in the UK. Since COVID-19 many EU workers returned to their countries of origin, contributing to the labour shortages examined here.

Other risks relating to migration are unequal treatment in the workplace (McAreavey, 2017, 2021; Lever and Milbourne, 2017), human trafficking and modern slavery (Craig et al., 2007).

For all immigration routes, clarity of different schemes would be beneficial, this includes dissemination of information on the visa types, application procedures and processes with employers and recruitment agencies (footnote 7).

Consumers and household food security

‘Food security is a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Based on this definition, four food security dimensions can be identified: food availability, economic and physical access to food, food utilization and stability over time’ (FAO, 2006; World Bank n.d.). The four dimensions clearly map on to at least

some of the remit of the FSA and therefore show the relevance of food security to this report. It has already been noted that there is a direct correlation between the shortage of labour in food systems, resulting in among other things, rising prices which jeopardise food security.

Poverty and access to food: Overall, the UK is characterised by poor dietary health and increasing food poverty – consumers eat the most processed food in Europe and food bank distribution has been on the rise since 2010 (Power et al. 2020). Data reveals an increase in scurvy since 2010. Hospital admissions with a primary or secondary diagnosis of scurvy increased from 82 individuals in 2010-11 to 171 in 2020-21. Meanwhile similar figures for malnutrition over the same period increased from 4657 to 10,109 (footnote 8).

Food insecurity is not about a lack of food, it is about having insufficient income to buy food (Bramley et al. 2021). As well as food security relating to a fundamental lack of income, its meaning has evolved during the pandemic because of a lack of supply of food in the shops and/or individuals having to self-isolate and therefore being unable to go to the shops. In 2020/21 6% of people in the UK were in food poverty, including 9% of children. In April 2022 15.5% of all UK households were food insecure, i.e., ate less or went a day without eating because they couldn't access or afford food (Francis-Devine et al. 2022). With inflation predicted to remain high, the proportion of consumers facing food poverty is likely to rise further:

'Within our forecast, which mainly because of big increases in gas prices has overall CPI inflation getting as high as 5% in the second quarter of next year, we expect food price inflation to rise to around the same rate at around the same point.' (Dr Ben Broadbent, Deputy Governor, Bank of England, Bank of England EFRA oral evidence 09.11.21)

Meanwhile, reliance on food banks has risen dramatically since the pandemic; in the twelve months to March 2021, the Trussell Trust (footnote 9) distributed 2.5m food bank parcels, representing an increase of 33% in one year:

'Our latest report reveals the extreme poverty faced by people at food banks going into the pandemic, with just £248 a month on average to survive on after housing costs. That money needs to cover energy and water costs, council tax, food, and other essentials' (footnote 10).

Other research has shown how susceptibility to food insecurity has worsened for the economically vulnerable under COVID-19 conditions (Lambie-Mumford et al. 2020).

Geography of household food security: The geographies of household food security is notable. It is estimated that in 2019/20 the Trussell Trust distributed one emergency food parcel in the North East for every 27 people living in the region, compared with an England-wide figure of one for every 38 people – these figures are still likely underestimations as they do not cover all emergency food aid provision (Bailey 2021). These studies were conducted pre-pandemic and subsequent research has shown an increase in vulnerabilities, not least cost-price inflation.

For those families where a greater proportion of income is spent on food, they will want to be able to make their money to go further in terms of the food that they purchase (National Food Crime Unit, 2020). Relatedly there is a risk that food consumption is determined largely by income and education as the UK food system becomes 'two-tiered'. This means that food choices are more limited for those on lower incomes as compared to those on higher incomes (Azizi Fard et al., 2021).

Shifting consumption patterns: Consumers are shifting their food consumption patterns, due largely to concerns with the environment, health and animal welfare. There has been a corresponding rise in flexitarian, vegan and vegetarian diets, resulting in the substitution of meat for non-meat protein or meat alternatives and an overall reduction in meat consumption (IBIS World, 2021; Stewart et al., 2021).Between 2014 and 2019, sales of meat-free foods increased by 40% in the UK (Tso et al., 2021). This has implications for the FSA in terms of its inspection remit

and the skills and knowledge required for inspecting ‘new’ foodstuffs including identifying fraud and adulteration risks in non-meat protein.

National Food Strategy: The recommendation of Dimbleby’s national food strategy report of a ‘Community Eatwell’ programme would enable GPs to prescribe fruit and vegetables to less affluent families, paid for by tax. There is also an opportunity through the Levelling Up agenda to consider funnelling some of the funds into actions that would address some of the challenges of household food insecurity.

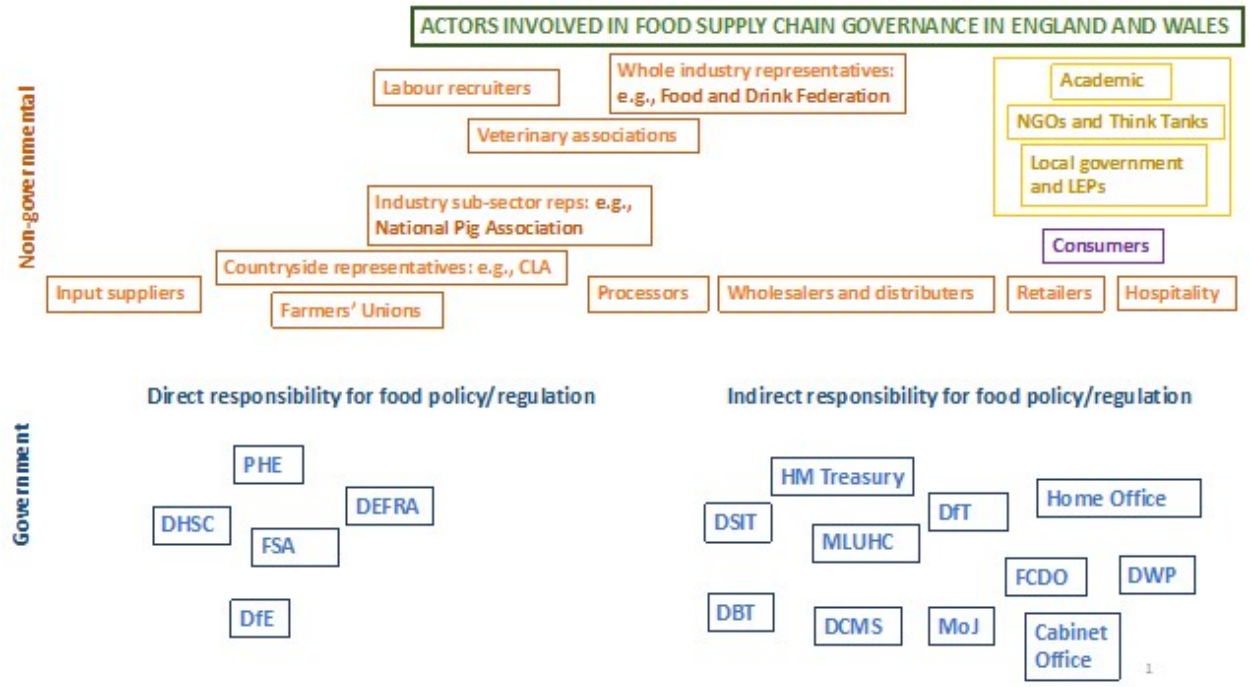
Wider UK food-system risks

Governance

The policymaking environment in the UK is complex and fragmented, particularly as it relates to food systems governance. Figure 9 depicts the complexity of the different bodies involved in the food supply chain. Governing this complexity to guard against shortages in labour is equally complex.

Like elsewhere in the EU in the mid-late 20th century, UK agri-environmental policymaking was centralised, with agri-food policy developed mainly by a closed network of farm ministries and farm groups (farmers’ unions in particular) (Smith, 1990; Wales et al., 2006). But in the 1990s, the Bovine Spongiform Encephalopathy (BSE) crisis, changes in the Common Agricultural Policy (CAP), a change in government and a move towards devolution provided grounds for a “radical shift in divisions of government responsibility” (Wales et al., 2006, p. 189). An ‘arms-length’ mode of governance emerged, and UK agri-environmental policymaking became de-centralised and diversified. Since then, regulation of the UK food system has become the remit of multiple government departments, agencies and non-departmental public bodies. Previous research provides a breakdown of the responsibilities of key actors in England which is reproduced in Figure 9 below. This underscores the challenge in developing coherent policy that ensures adequate labour within food systems.

Figure 9. Actors involved in food supply chain governance in England and Wales



Source: Adapted by the authors from Freeguard (2016) and Parsons (2020, 2021) and analysis of wider literature.

There are risks associated with the current policymaking structure in the UK that affect labour supply. Parsons (2021) identifies the following that are relevant to the FSA's remit and labour shortages:

i. A fragmented food supply chain policy due to responsibilities sitting with different government departments. In some cases, this fragmented approach can cause 'policy disconnects', which can result in the development of ineffective policies and hamper policymakers' abilities to tackle complex and systemic problems, such the shortage of seasonal labour which, as described earlier, is present in the food system. It impacts on agriculture, which is governed by Defra, but the immigration system falls under the Home Office.

ii. 'High quality' domestic food production standards are found to be incoherent with trade policies that permit potentially 'lower standard' food from elsewhere, and trade policies do not connect with health objectives related to food safety or nutrition.

iii. The persistence of poor rural digital connectivity undermines the government's objective to better utilise technologies that could potentially overcome some labour shortages, such as relating to agri-tech for producers and wider technological solutions within FBOs.

1. That is, at a country level. We return to the issue of household-level food insecurity in the section Consumers and household food security.

2. For Figure 7 on concerns about food availability we employ the same postestimation method as in Figure 8 for concerns on food safety.

3. The postestimation analysis shown in Figure 7 focuses on the elements of the food supply chain that had a significant impact on consumers' concerns about food availability in the multivariate analysis. Estimated probabilities for food availability concerns correspond to a representative consumer using the mode values for the explanatory variables used in the multivariate regression.

4. Data in this paragraph from UK Hospitality EFRA oral evidence 09.11.21.

5. FSA 22-06-18 - Veterinary Resourcing Update | Food Standards Agency

6. In 2021 the Council of the Royal College of Veterinary Surgeons introduced more flexibility into the English language requirements for overseas-qualified veterinary surgeons wishing to join the RCVS Register, see RCVS Council amends English-language requirements for overseas-qualified vets.

7. For example, confirmation of hourly rates for those on the Seasonal Worker Scheme was given by government on 6 April 2022, only three weeks before they came into force. This causes a lot of confusion and frustration for producers recruiting through the scheme. See Seasonal Worker Scheme – essential information for growers – NFUonline.

8. Admissions for scurvy, rickets and malnutrition - NHS Digital

9. Trussell Trust: End of Year Stats 2020 / 2021

10. Trussell Trust: State of Hunger

Impact of labour shortages: Summary of casual determinants of labour shortages in UK food systems

4.1 Butchers

System causal factors:

- immigration policies in response to COVID-19 and EU exit.
- strict qualification requirements for butchers through the CoC (Certificate of Competence) and WATOK (Welfare of Animals at the Time of Killing) requirements (footnote 1).
- wages, working conditions, incentives, and workers welfare.
- low attraction of local labour pool due to image factors (rural based, outdoors and involves physical work at unsociable hours).
- complex sponsor registration system and immigration charges for direct recruitment by processors (footnote 2).

Impact:

- slaughter backlogs leading to potential animal welfare concerns and batch traceability issues due to overstocking of farms.
- supply uncertainties increases vulnerability to fraud and illegal production at unapproved premises (accounts for over 43% of fraud in beef and rising) (footnote 3).
- parallel supply chains of illegitimate producers, processers and traders, and shortages in local authority staff capacity (footnote 4).
- processing carcasses destined for domestic consumption in the EU (Ireland) where plants are approved for local supply.

Type of labour shortage:

Pre-lockdown:

- incentive driven labour shortage.

Post lockdown:

- weak labour shortage.

Related risks to the FSA:

- food chain information verification risks at ante-mortem inspections (footnote 5).

- food safety risks (biological, physical, chemical, allergenic and cross-contamination) (footnote 6).
- food adulteration, substitution and misrepresentation risks (footnote 7).
- potential safety, provenance and traceability risks (footnote 8).
- potential increase in product misrepresentation and document fraud risks (footnote 9).
- potential risk of unlawful processing, and the diversion of food meant for disposal into the chain.

Locality:

- external to the FSA but internal to the food network (Defra, FSA, local authorities, Department for Business and Trade).

Quantification: Foreseen.

4.2 Heavy Good Vehicles

System causal factors:

- HGV driver testing backlogs.
- bureaucracy in HGV licencing procedures.
- policies on compulsory ongoing training for existing and returning drivers.
- ageing workforce and a lack of diversity.
- reluctance to hire newly trained drivers.
- cost of HGV training.
- dependence on overseas labour.
- welfare, compensation and amenities.
- increased job mobility.
- fewer owner-operators.
- aging workforce.
- increased online shopping and home deliveries following lockdown resulting in increased demand for drivers.

Impact:

- dual delays in cold chain and fresh fruit and vegetable delivery lead times from abattoirs or processors to supermarkets, and from supermarket warehouses to the final customers (footnote 10).
- more incidents of improper holding practices for food products awaiting shipment or inspection, including unattended products, delayed holding of perishable products, shipping of products while in quarantine.

Type of labour shortage:

Pre-lockdown:

- incentive-driven shortage.

Post-lockdown:

- skills underutilisation shortage.

Related risks to the FSA:

- potential safety risks due to microbiological growth, and contamination due to delayed transport of meat that has not been fully chilled, partially chilled carcases or meat intended

for further processing (footnote 11).

- food withdrawal and recall risks from safety, and quality hazards (footnote 12).

Locality:

- external to the network.

Quantification: Foreseen.

4.3 Packers and Pickers

System causal factors:

- decreasing numbers of seasonal workers from the EU.
  wages, working conditions, incentives, and workers' welfare.
  low rate of returnees with UK-settled or pre-settled status.
  increased competition from countries such as Germany and the Netherlands.
  new wave of workers on visa scheme that are far less experienced than returnees who dominated labour pool prior to EU exit, COVID-19 and Ukraine.
  challenges in recruiting local workers.
  slow tender process for licensed operators to who recruit workers and arrange permits.
  broader UK labour crisis increased labour mobility to trucking to hospitality.

Impact:

- short to mid-term reduction in production of food products including fruit and vegetables.
  year-on-year rise in imports of fruit and vegetables with domestic production having decreased by 48% between 1987 and 2013.
  international trade has increased the diversity of available fruit and vegetable supply.
  changing supply chains of producers due to inflexible retail price contracts to cover the cost of labour shortfalls (footnote 13).
  divestment from food production (footnote 14).

Type of labour shortage:

Pre-lockdown:

- incentive-driven shortage.

Post-lockdown:

- weak labour shortage.

Related risks to the FSA:

- availability, assortment and price inflation risks (eggs bread, fruit and vegetables) (footnote 15)
- potential long-term food security risks
- potential food fraud, recall and withdrawal risks (footnote 16)
- higher provenance and traceability risks associated with harmonizing national regulatory standards with new regional trade and bi-lateral food safety requirements for imports from new locations.

Locality:

- external to the FSA but internal to the food network (Defra, FSA, local authorities, Department for Business and Trade).

Quantification: Foreseen.

4.4 Meat Hygiene Inspectors

System causal factors:

- recruitment process complexity.
  low post-recruitment retention rate.
  aging workforce and retirement rate.
  dependence on overseas labour.
  high Internal job migration of inspectors.
  high ratio of contracted versus FSA inspectors.
  high turnover rate of contracted inspectors.
  decade gap in recruitment and training of internal FSA inspectors.
  image factors.

Impact:

- potential loss of inspection expertise, knowledge of abattoir risk profile, and niche capabilities due to high retirement rate and high attrition rate of contract staff
- potential loss of FSA in-house MHI training and upskilling capacity.

Type of labour shortage:

Pre-lockdown:

- skill underutilisation

Post-lockdown:

- weak labour shortage.

Related risks to the FSA:

- biosecurity risks (footnote 17)
- potential increase in public health, food safety and animal health and welfare monitoring risks (footnote 18).

Locality:

- external to the FSA but internal to the food network

Quantification: Perceived.

4.5 Official Veterinarians

System causal factors:

- 95% of OVs registered to work in UK abattoirs each year qualified elsewhere in the EEA and there has been a significant downturn in registrations due to COVID-19 restrictions in 2020 (footnote 19).
  RCVS training and English language requirements.
  balancing labour requirement for statutory disease control work (such as TB testing) with

increasing requirements for post EU exit export health certifications.
retained Export Health Certificate (EHC) clauses in the EU listing for audits that are unnecessary for animal health resulting in stretched veterinary capacity (for example, requirement for 40-day standstill in last holding before slaughter for bovine and sheep, audit of negative bovine Tuberculosis test, and systematic trichinella testing of pigs) (footnote 20).
aging workforce.
dependence on overseas labour.
OVs working in abattoirs are employed by a single Service Delivery Partner.

Impact:

- insufficient contingencies to manage additional pressures to inspect live animal movement and international food trade.
  reliance on limited state veterinary capacity as contingency for OV shortages could strain research and testing capacity for animal health and animal welfare monitoring (footnote 21).
  delays in full import inspections for other food categories (footnote 22).

Type of labour shortage:

Pre-lockdown:

- incentive-driven shortage.

Post-lockdown:

- weak labour shortage.

Related risks to the FSA:

- potential increase in the risk of food documentation fraud, animal welfare breaches, and public health reassurance to consumers (footnote 23).
  impeded knowledge transfer of subjective scoring criteria for risk-based inspections from retiring workforce.

Locality:

- external to the FSA but internal to the food network

Quantification: Perceived.

4.6 Retail, food services and warehouse operatives

System causal factors:

- reliance on EU labour for temporary warehouse, retail and food service staffing during peak trading periods.
- high number of part-time workers as a proportion of total employment in retail.
- increased demand for warehouse staff following boom in online shopping (footnote 24).
- increased rate of job migration of retail operatives as many were without jobs through multiple lockdowns.
- multi-skilled sector but perceived as low skilled (footnote 25).

Impact:

- changes in retail and food service business models post-lockdown.

- changes in consumer preferences.
- unanticipated peaks in demand increasing need for temporary workers and higher need for job security reducing applicant pool.
- returnees from furlough required re-skilling to re-join same or other sectors (footnote 26).

Type of labour shortage:

Pre-lockdown:

- incentive-driven shortage.

Post-lockdown:

- skills underutilisation shortage.

Related risks to the FSA:

- food availability risks
- long-term food security risks

Locality:

- external to the FSA but internal to the food network

Quantification: Perceived.

1. GOV.UK: Get a certificate of competence or licence to slaughter or kill animals
2. UK Parliament: Labour shortages in the food and farming sector
3. FSA Food Crime Assessment
4. Birmingham Live: Food safety at risk in Birmingham due to staff shortage
5. Euronews: A year since Brexit: How bad are the UK's labour shortages now?, Reuters: British pig farmers fear ruin as butcher shortage creates slaughter backlog
6. BBC: Staff shortages see UK meat carcasses sent to EU for butchering
7. The Guardian: Meat carcasses sent to EU for butchering amid UK worker shortage
8. Andover Advertiser: 2.4 tonnes of meat removed from car wash in Ludgershall, Falmouth Packet: 2.4 tonnes of meat removed from car wash in Ludgershall
9. The Guardian: The invisible migrant workers propping up Ireland’s €4bn meat industry
10. Which?: Should we be worried about food shortages?

11. BBC: Hauliers want priority for perishable goods at Dover

12. Which?: Should we be worried about food shortages?

13. The Poultry Site: UK farmers warn of egg shortages, The Independent: UK tomato and cucumber farmers shut down production over energy crisis and labour shortages

14. Manchester Evening News: Shoppers warned of egg shortages in supermarkets amid 'mass exodus' of farmers

15. Food Manufacture: Food industry warns on availability as supply chain strained

16. Food Navigator: ‘This is the time fraudsters kick in’: Food fraud warnings as sunflower oil runs dry

17. The Telegraph: Vet shortage threatens food safety ahead of new Brexit border controls

18. Food Manufacture: Government U-turn on border strategy: Industry reaction

19. The Royal College of Veterinary Surgeons: The Royal College of Veterinary Surgeons, FSA: 22-06-18 - Veterinary Resourcing Update

20. British Veterinary Association briefing

21. UK Parliament: Oral evidence: The work of DEFRA, HC 261

22. Financial Times: UK explores fourth delay to imposing checks on EU imports

23. Farmers Guardian: Welsh vets responsible for TB testing face move to ports to deal with Brexit issues

24. Fresh Produce Journal: Warehouse shortages add to food sector woes

25. Food and Drink Federation: Establishing the labour availability issues of the UK food and drink sector

26. Reuters: UK employers face worst shortage of job candidates on record - REC, Public Health England: Impact of COVID-19 pandemic on grocery shopping behaviours

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Impact of labour shortages: Appendices

A1 Methodology

This research took a food systems approach to examine the impact of labour supply shortages on key aspects of the food system. It provides insight into the consequences of labour shortages as reported in 2021, the complex processes that combined to create the shortages and the resultant impact on the FSA's ability to effectively do its job. The research also explored consumers perceptions of food availability and food safety.

Two work packages were used to carry out key tasks within the project, with the research team working across packages, ensuring an integrated approach overall. **Quantitative data analysis, literature review, key informant interviews, secondary analysis and systems modelling** were used to define proxies for measuring labour shortages, map and scrutinise current conditions, assess risks across the UK meat sector, agriculture (especially horticulture) and to model future requirements. Ethical approval was granted by Newcastle University.

Research Questions:

Three key questions guided our research:

1. How do labour shortages impact on food availability and safety, now and in the future?
2. How do labour shortages impact the FSA's ability to execute their protocol, now and in the future?
3. What are consumers' perceptions of food safety and how does this relate to potential food risks arising due to labour shortages?

To answer these questions, we identified the key labour shortages in the food sector – food production, processing, and logistics – and the implications arising from these. We took a 'deep dive' into FSA operations to better understand the role of the FSA within the food system.

A comprehensive international literature and policy review was conducted to capture the state-of-the art in relation to labour shortages in the food system. This review informed the themes that were explored within interviews. Quantitative and qualitative data analysis using data from the Labour Force Survey, FSA Consumer Insights Survey and other relevant sources was used to disentangle short versus longer term effects (Defra June surveys, ongoing research projects and relevant FSA data). Analysis of the FSA-commissioned consumer survey identified the main socio-demographic, family, household, and contextual factors influencing consumers' attitudes towards key elements of the food supply chain.

A1.1 Key informant interviews

Thirteen key informant interviews were held with 26 FSA staff to explore the impact of labour shortages within the food systems and the associated risks. Respondents were identified through our contact point within the FSA. Several follow-up interviews were held to ensure that we captured the breadth of data required. Interviews were held virtually using video conferencing, and with the consent of participants, they were recorded and transcribed. Data was analysed through structured coding and thematic analysis. Discussions within the team validated and further explored those themes.

Interviewees were drawn from:

- Area Managers
- Field Operations Team
- Business Managers
- Operations Managers
- Inspection Team
- National Food Crime Unit

Eleven questions were identified and used as the basis for each interview, with these being altered according to the role of the interviewee. These are set out below:

1. Describe the factors that affect the recruitment and retention of the following categories of staff by the FSA and contract suppliers (Eville & Jones) for the meat processing sector?

a. Field operations staff (including area managers, export veterinarians, certification support officers, official vets-OVs, and meat hygiene inspectors-MHIs)
b. Office-based staff
c. Science Evidence and Research Division (SERD) staff

2. Reflecting on the delivery of official controls in meat processing plants, how have the recent labour shortages in the meat sector (butchers, drivers etc.,) impacted FSA staff capacity in terms of:

a. task prioritisation and collaboration
b. communication effectiveness
c. quality of service (expert scientific advice, risk assessments, research, sampling & surveillance)
d. timeliness of service delivery

3. Is there an ongoing MHI apprenticeship programme in place? Explain.
4. What strategies, policies, or practices are available or developed to support mid-to long-term MHI resource planning (for example, balancing short-term oversees recruitment policies with local capacity building)?

5. What are the existing or potential challenges/risks to workforce resilience and career pathways/prospects for FSA staff (itemised in question 1), as a result of the new Operational Transformation Programme (OTP) for proportionate risk-based engagement in the delivery of official controls?

6. Based on your expert opinion, what are the potential challenges/risks in managing the evolution of front-line MHIs and OVs roles to meet the new OTP priority of legislative compliance over manual inspections and oversight?

7. Describe any ongoing initiatives by the FSA, the veterinary community and trade unions to manage potential transformational risks and what kinds of (short-and mid-term) upskilling, recruitment, and retention plans are currently in place for front-line staff to meet the requirements of the OTP?

8. From the viewpoint of public and private sector MHIs on current job descriptions and conditions/provisions, what are the key factors that drive or mitigate job satisfaction, retention and professionalism?

9. From the viewpoint of public and private sector OVs on current job descriptions and working conditions/provisions, what are the key factors that drive or mitigate job satisfaction, retention and professionalism?

10. Do you think food safety, food crime and food authenticity have been affected following EU exit/pandemic and the subsequent shortages in the food supply chain? Explain.

11. What are the key challenges as you see them, for the FSA: i) in the next 12 months and ii) beyond 12 months?

A2 Types of Labour shortages in the food system

From the evidence reviewed, we identified three broad types of labour shortages that affect the UK food system and pose potential risks for the FSA: i) Weak seasonal labour shortages; ii) incentive-driven labour shortages and iii) skills underutilisation.

Type one: Weak Seasonal Labour shortages

Weak seasonal labour shortages result from the inability to recruit enough seasonal workers who are willing, able and qualified to fill the vacancies created by the sudden disruptions to labour demand and supply dynamics.

The food sector's reliance on migrants for seasonal labour such as poultry catchers, packers, pickers and other farmgate operatives has created a form of structural labour shortages, which arise from migration policies, and the ratio of workers on temporary contracts with less secure and less structured work arrangements.

Type two: Incentive-driven shortages

Incentive-driven shortages are underpinned by long-standing industry and regulatory constraints, which affect the ability to recruit and retain new labour to augment an ageing and experienced labour force due to non-competitive working conditions, incentives, wages and overall attractiveness (footnote 1). This form of labour shortage in the industry is characterised by high rate of voluntary redundancy, job switching, and retirement and a low rate of attracting, recruiting, training and retaining new employees at current work incentives (wages, ease of migration, welfare and working conditions) (Office for National Statistics, 2021a).

Increasing numbers of unfilled vacancies despite falling unemployment are indicators of tightening labour conditions in food production and processing (Office for National Statistics, 2021b) as the industry struggles with recruiting willing, able, or qualified candidates to fill available vacancies, resulting in over 60% of businesses across the UK having employees working longer hours (Office for National Statistics, 2021c).

Type three: Skills underutilisation

The third form of labour shortage arises when there is a viable pool of labour supply in the economy, but it remains underutilised due to structural (for example, technology or regulatory changes), regional (e.g., location or infrastructure-driven), or frictional unemployment (for example, COVID-19, furlough policies, Brexit). Underutilisation shortages are largely due to inability to access and match the skills, training and certification requirements of the existing labour pool, to the emerging skills and training required to carry out such roles. Underutilisation is typically associated with job categories where the pool of available skilled workers actively seeking employment, cannot be adequately matched to suitable and available vacancies. Effectively there is a mismatch between gaps in the labour market and the pool of workers (gaps currently exist in relation to seasonal workers, meat hygiene inspectors, official veterinarians, technicians, and HGV drivers, areas where there have been persistent labour shortages).

A3 Categorisation of labour shortage risks

Figure 10: Scope of risk identification for this study

Source: Louis and Pagell 2019

A3.1 Casual loop diagram of FSA internal labour shortages

System dynamics is an analytical approach to identifying complex cause-and-effect interactions to understand how several factors interact to give rise to systemic shocks. The following causal loop diagram highlights some system interdependencies that underpin internal labour shortage risks to the FSA based on synthesis of interview findings.

1. EFRA Evidence for shortages in Meat Hygiene inspectors and Official Veterinarians by the British Veterinary Association.