

The Impact of Covid-19 on Agrifood Supply Chains

Our supermarket shelves may appear frustratingly bare because of coronavirus (COVID-19) but getting food from the farm to our fork is more complex than many people realise, even when there is not a global pandemic. University of Leeds researchers have examined the challenges that exist within our complex food supply chains and the effect of coronavirus on these already fragile systems.

Understanding the chain

The flows of our food from producers to processors, to distributors, along to traders and on to the final consumer are part of a complex system known as agrifood supply chains.

Supply chains may be wholly local, with each process located in the same country, or in the case of large complex chains, each process can be located in multiple countries.

Food suppliers must meet specified food quality, food safety, food hygiene, animal welfare and environmental impact requirements.

These requirements are embedded into the chain by a combination of regional (EU) and UK law, and private standards included in supply contracts. Global trade in food is facilitated by a combination of World Trade Organization (WTO) rules and over 300 regional trade agreements.

Weak links in the chain

Modern agrifood supply chains operate on a just-in-time basis, allowing retailers to keep prices low by retaining only sufficient stocks of food to satisfy short-term consumer demand. This helps to keep the food prices competitively low by reducing inventory and storage costs.

Disruptions to UK agrifood supplies are anticipated from a range of sources, such as extreme weather impacts on agriculture and transport, geopolitical changes, including renegotiation of trade deals post-Brexit, and global financial downturns.

In these cases, it is expected that disruptions may increase prices and adversely affect UK consumer welfare and food security — especially low-income consumers' ability to afford healthy diets. .

Low prices have benefited low-income households. The complexity of just-in-time supply chains still creates operational and logistical pressures for food producers and prioritises the timing of production and delivery over other benefits. For example, timely delivery of food is more important than maintaining environmental standards for some companies and holding reserve stocks of food to protect against unexpected disruptions to the supply chain is not a desirable objective for a 'just in time' delivery model.

Disruptions have in the past increased food prices and caused retailers to rapidly switch between suppliers and pay the required price to maintain 'full shelves'.

Low-income families are discouraged from consuming healthy foods, such as more expensive fresh fruits and vegetables, and are forced instead to choose cheaper processed foods with poorer health benefits. Food and health inequalities are particularly an issue in urban areas, with many deprived neighbourhoods having poor infrastructure for fresh food redistribution. It is not just a question of income, but of also access.

There are many negative impacts of agrifood supply chains on the suppliers' side too. For example, food waste arising from an inability to reach target consumers in time; using up of scarce water supplies and soil degradation from the over-production needed to meet tight demand schedules. While these

are not related to COVID-19 disruption, the pandemic has put significant pressure on agrifood supply chains, exposing weaknesses in the chains to shocks and calling into question the modern food system's long term resilience.

Mapping the effect of COVID-19 on agrifood supply chains

COVID-19 has caused significant disruption to agrifood supply chains due to imposed national lockdowns in the short term. As lockdown eases, the pandemic continues to pose a challenge in the medium to long term to the continued resilience of modern just-in-time agrifood delivery systems.

Short Term Effects (December 2019 – April 2020)

- Emerging behaviours such as the rapid increase in consumer demand, restrictions of food exports and lockdown measures imposed by some countries started to disrupt the food supply chain significantly, especially in the farming and food processing sectors.
- The emerging disruptions facing farmers included an abrupt drop in demand for food in some sectors like restaurants, airlines, schools, hotels, etc. Food destined for those sectors that could not be diverted into the voluntary or retail sectors has become waste. By contrast, in other sectors, like supermarkets, there was a sharp rise in demand for food. Price volatility, unreliable supplies of seeds, fertilizers, shortages of farm workers, drivers, transportation and storage capacities have also been common too. Such disruptions became more pronounced as many more countries announced or continued the lockdown measures as they experienced an increasing number of deaths.
- From the start of lockdown, there was also a concerted effort on the part of local councils, businesses and charity sectors to distribute surplus food from some areas of the supply chain to others, in order to reach those who are food insecure. However, while this was appropriate and necessary in the short term, it is neither socially nor economically sustainable for the longer term.
- The main fear remains that sporadic or prolonged global food shortages will significantly affect low-income individuals and countries, according to the UN. This risk is exacerbated by the sudden economic downturn and employment losses that are accompanying widespread lockdown strategies. Many people are facing food insecurity for the first time, while the prospects for people who are already food insecure worsens. The lockdown has seen a rise in the number of families using food banks and food aid for daily survival.
- The UN is pleased that countries maintain continuous flows of food globally and not resort to export restrictions of key commodities. This move was supported too by a statement from the G20 committing to open trade in "critical agricultural products". Global Co-operation to keep trade in food open was announced between key international organisations, including the International Monetary Fund (IMF), World Bank, WTO and the World Customs Organisation (WCO).
- Some major exporters, including Thailand, Vietnam and Kazakhstan, imposed export restrictions on key staples, including rice, eggs, cereals and oilseeds despite this plea.
- The production of food became affected too by a long period of lockdown, shortage of workers, transportation and storage facilities, volatility in prices and unreliable just-in-time supply to retail shelves or delivery at point of consumption. Such disruptions are still happening in many major food producing countries, as evidenced by rolling shortages of some household staples, particularly in urban areas.

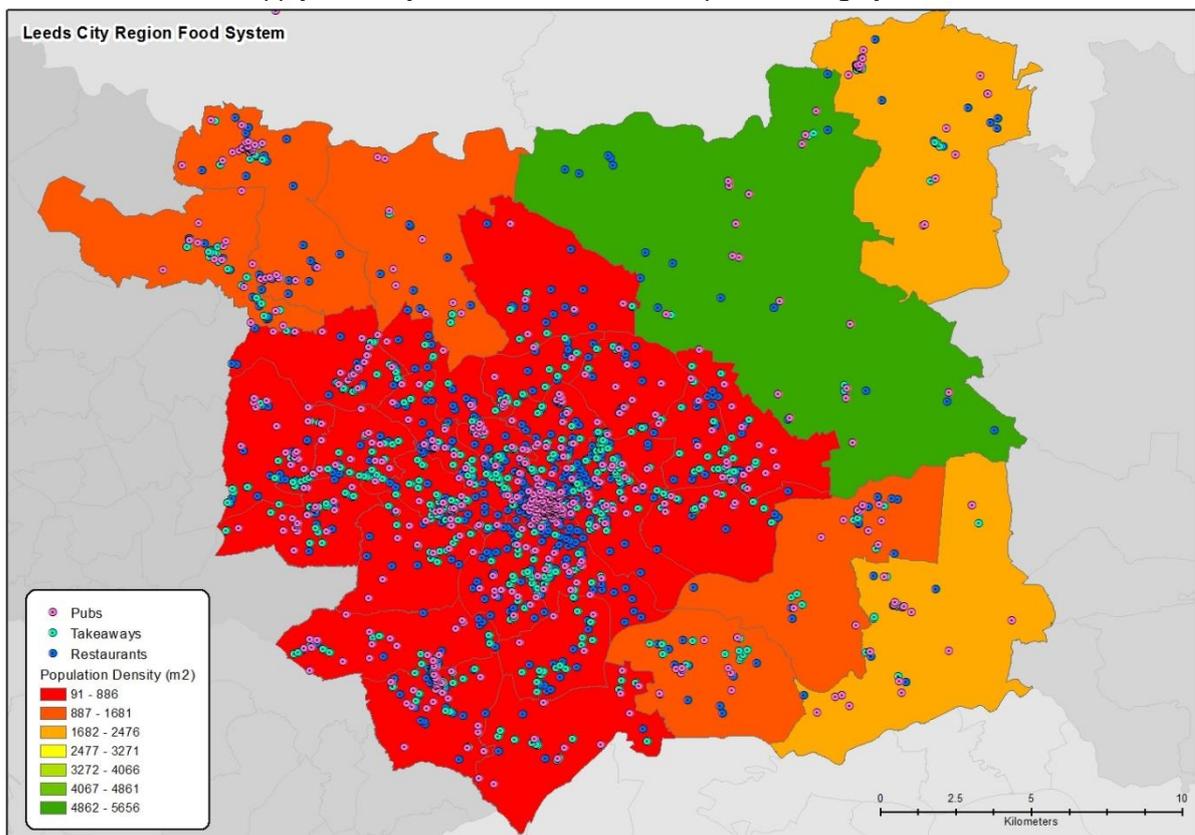
As a consequence of these disruptions, governments were advised not to focus on medical supplies alone, but to allow work and transportation in the food sector to also continue, and to provide the necessary funding to keep farming and wider food-related activities going. The recognition of food workers (around 12% of UK workforce) as 'key workers' is a recognition of their importance in the national effort to deal with the pandemic

Medium Term (May – August 2020)

- Earlier disruptions to the farming sector (e.g. less planting) might have an effect on major staple crops (e.g. spring wheat, potatoes, oilseed rape).
- Restrictions on travel impact too on UK food production. Seasonal workers cannot travel to the UK from Eastern Europe to pick seasonal fruit and vegetables. Crops may be left in the field, leading

to an increase in waste, a decline in supply and a corresponding increase in price, and decline in farming income.

- High prices for fresh food and general food shortages are increasing food and nutrition insecurity for all households. The medium to long term consequences of food parcel consumption on families' health and wellbeing needs to be considered.
- Supply chains have started to falter as small and medium-sized companies operating routinely on thin margins in key parts of the supply chain go out of business, with snowball effects for other players.
- On the positive side, some food producers have adjusted quickly by adapting their supply modalities, for example making use of online marketplaces to reach new consumers. Some producers have also been sharing knowledge and resources (e.g. staff, facilities, distribution). Moving to a collaborative model will provide resilience to future shocks.
- Local markets, small shops and suppliers (e.g. take-away) have provided local continuity to the food supply, especially in deprived neighbourhoods. The social, as well as economic, benefits of these smaller players is increasingly recognised.
- As lockdown eases, but with potential continuation or periodic re-imposition in some locations, and with international food sources still affected by the impact of the pandemic in many regions worldwide, UK food supply chain dynamics will remain disrupted and highly uncertain.



An example from the City of Leeds Mapping Project shows densely populated areas (in red) associated with significant food activity, most of which would have been shut down during the pandemic. Food production is limited in those areas.

What's next?

- The World Trade Organization reports up to 32% decline in global trade Between January-April 2020 and that COVID-19 has plunged the world into a deep recession. A global recession could put further downward pressure on companies' profitability, leading to further bankruptcies and reduction in sector capacity, unemployment and household finances for food access, and accelerating the need for food aid across the world in the medium to long term.



- Focus should move on to finding solutions to keep trade going, in order to support producers, particularly the small ones, to access markets.
- The food sector in the UK is a large part of the economy because it generates significant revenue from exports. As disruptions to food supplies continue, those revenue levels could decline and increasing levels of unemployment caused by bankruptcy and lockdown measures could lead to an increase in food aid needs in the medium to long term. The question is, who will pay for this food aid, if food revenues are down? Will it be for the government to provide food aid through increased taxation, or will the charitable sector meet this need?
- Data on food availability, food redistribution (following the closure of restaurants), food bank use and numbers of meals delivered through the volunteer sector to those considered at financial or health risk of food access in urban areas, like the City of Leeds, should be collected. The data will provide evidence of this effect during lockdown (between January-April 2020) and after easing of lockdown (from 4th July 2020). The fragmentation of the charitable sector means it is difficult to track how many households are accessing food aid. Improved monitoring is needed to monitor and track food and nutrition insecurity in the UK and globally.
- Research should focus on whether the predicted global recession leads to a consolidation in the food sector that causes more financially stable multi-national companies to merge or acquire financially weaker companies. If fewer, more powerful global food companies exist, new unfavourable supply terms could be forced onto smaller food producers and processors. Such unfavourable terms can result in significant loss of profits for the suppliers, which in turn could result in further bankruptcies. Some companies are also aggressively targeting the online food sector, which may signal more competition for traditional supermarkets and potential for new players entering the food marketplace. Informal markets are also emerging which may pose problems for food regulators.
- A question emerges as to whether environmental and social food standards are realigned to this supply chain power shift. Newly emerging, powerful multinational companies may not retain existing high environmental and social food standards, if such a move keeps their costs down. This trend should be monitored, and data collected to reveal whether sustainability standards are retained in these multinational companies' supply chains contracts.
- As central government grows investment to support the economy, it becomes one of the main buyers of food for de facto nationalised industries, so it may be possible for the government to insist sustainability standards are retained when it procures food from the private sector. And if the state does intervene in the sector, who is it stepping in to support and what incentives will the state use. The compatibility of state incentives with international trade rules should be monitored too, to check that such state intervention complies with those rules.
- There is also a debate for whether the COVID-19 disruption is an opportunity to re-design the food supply chain to be more resilient and community oriented. Many communities experienced food shortages for the first time, and are discovering local suppliers as well as building networks for food support. Future planning needs to consider a global food systems approach, to further detect weaknesses and risks, allowing governments, businesses and individuals to mitigate against future disruptions.

The COVID-19 virus is disrupting the way food gets from farms to our shops and then on to our plates, but it offers, too, a new and exciting opportunity to rethink our modern food system.

The [Global Food and Environment Institute](#) at Leeds is drawing on its research expertise to understand scenarios for continued disruption to national and global food supplies. How will the burden of disease, and travel and quarantine restrictions between countries, affect the availability of farm workers and impact sowing and harvests around the world? How severely will public health control measures hinder



farming and processing operations? What geopolitical forces will come into play; how will countries with surplus production play their hand? What opportunities does this open up for Yorkshire's incredible farmers, producers and processors, to strengthen their regional markets and offer secure supplies for consumers who are nearer to home?

As our researchers seek the answers to these questions, the University of Leeds will also be training the next generation of global leaders to think differently about food and food systems with courses such as the [Sustainable Food Systems MSc](#).

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