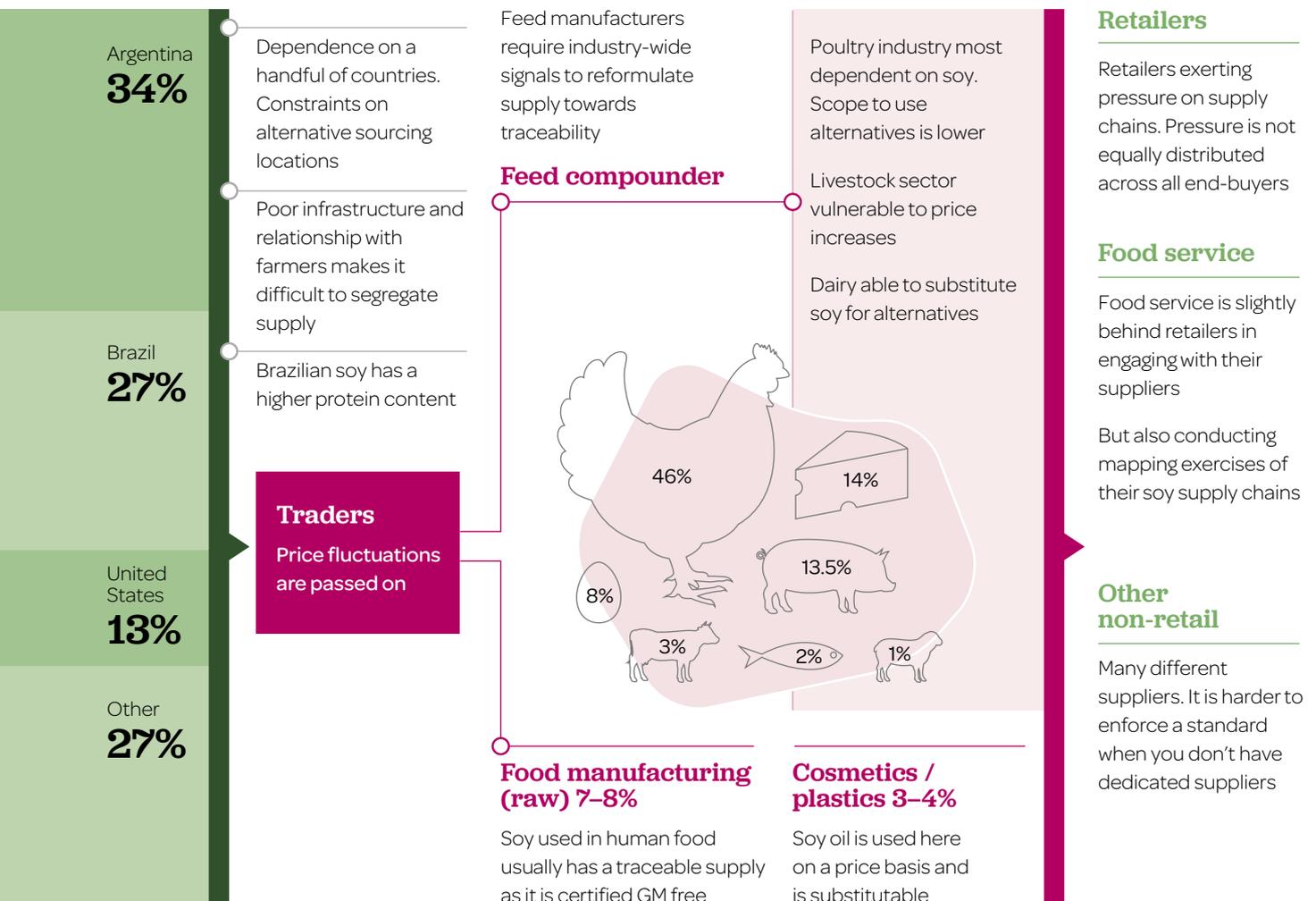


# Resilience of the UK food system regarding demand for soy

## Key findings

- Deforestation, and the reputational impact and Scope 3 emissions associated with this, constitute the most severe, soy-related risk that UK industry currently faces.
- The livestock industry is the most exposed to soy supply or price shocks, as around 90% of imported soy is used as feed in the UK. The poultry sector is particularly exposed, as it is most dependent on soy and least able to substitute it in the poultry diet in comparison to diets of other livestock.
- Traders and feed compounders are less affected by a soy supply or price shock, as price changes are passed to their customers.
- There are various opportunities for industry actors to respond to the risks associated with soy, such as switching to alternative feed crops, increasing the ability to source from alternative regions, and using traceable or certified sustainable soy.

## The UK's soy supply chain after import



## Introduction

The UK imports over 3 million tonnes of soy every year, more than 75% of which has historically come from just three countries: Brazil, Argentina and the United States<sup>1</sup>. The livestock industry heavily depends on soy as a protein feed source, as there are no other crops that compare in terms of price, availability and nutritional quality. The dependence on this main type of feed, and from only a few sources, exposes the sector to risks. Examples include deforestation and due diligence legislation, Scope 3 emissions, price volatility, direct and indirect aspects of climate change, political instability in producing countries, and the influence of China's demand on the global market (see Figure 1).

This research has focused on understanding the UK's dependence on soy and how this varies by industry, as well as what this dependency means in terms of resilience:

- What are the risks?
- How would shocks manifest themselves in the UK food system?
- How significant are these risks?
- How are these perceived by stakeholders and where are the opportunities to increase the resilience of the soy-linked supply chain?

## About the research

This research aims to understand how dependent the UK is on soy, which risks UK industry are exposed to, and how prepared sectors are to deal with these risks.

It is based on desk-based research combined with interviews with industry stakeholders.

## Methodology – what did we do?

- This study combined desk-based research<sup>2</sup> with 11 interviews with supply chain stakeholders<sup>3</sup>. Interview questions followed a common structure but varied in emphasis depending on the position of the actors in the supply chain, and – in addition to probing into the dependence of stakeholders on soybean – aimed to understand how resilient actors perceive their supply chain to be at responding to risks in terms of the three key resilience categories: robustness; recovery; reorientation<sup>4</sup>.
- The perceived relevance of these categories varied by supply chain actor given the nature of the risks associated with the soy supply chain and the relative position of stakeholders within it. Interview questions targeted aspects of the market that currently hinder actors' ability to respond to risk and opportunities to increase the resilience of their supply chain.

## Recommendations in summary

- Industry actors need to come together under a single 'ask' to generate a market requirement for increased transparency in the soy supply chain, extending beyond UK traders. The newly launched UK Soy Manifesto provides a potential platform for this.
- Due diligence legislation should be aligned with existing reporting frameworks.
- Research into alternative feed crops needs to be accompanied by fuller assessments of the economic and environmental trade-offs involved.
- Contracts for sourcing sustainable soy must be long-term focused. This will give soy farmers the assurance that customers will follow through on their commitments to source farmers' sustainable soy if the farmers provide the necessary accreditations.

# 75%

The UK imports more than 3 million tonnes of soy every year, more than 75% of which has historically come from just three countries: Brazil, Argentina and the United States



**Figure 1:** A treemap visualisation illustrating the approximate proportions of soy imported to the UK consumed by different industries within the UK<sup>9</sup>.

## Results

### What are the risks?

- Deforestation, and associated risk in terms of reputation and Scope 3 emissions, are putting the biggest stress on soy supply chains.
- Other risks include the impact of climate change on yields, the implications of prolonged use of pesticides and political instability in producing countries.

Deforestation and its reputational risk were identified as the most significant supply chain risk. This was seen as a 'live' risk by some stakeholders, due to the implementation of forthcoming due diligence legislation. This would require industry actors to ensure their products are not linked to illegal deforestation. This may potentially change the structure of the supply chain or have implications for the supply of soy to the UK from regions of production. Some stakeholders were less concerned as the legislation prohibits illegal deforestation, which they expected to have already been removed from the supply chains of larger companies that may be affected by the legislation.

Other risks, which are perceived by industry actors to be less severe, include the associated Scope 3 emissions from deforestation<sup>5</sup>, the impact of future yield variability driven by weather changes and the use of pesticides in production that have long been banned for use in the UK<sup>6</sup>.

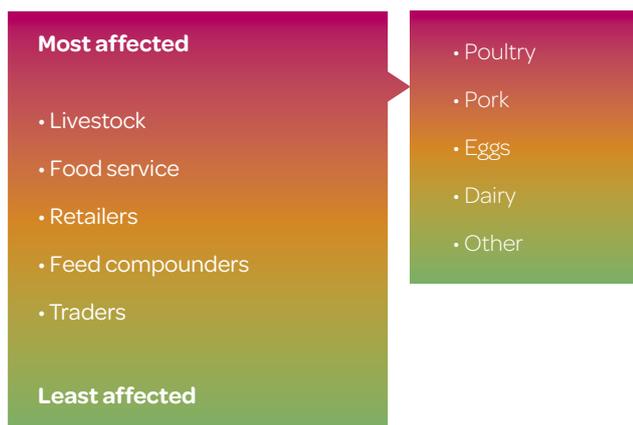
The impact of climate change on yields, and therefore prices, was perceived to be of lower risk, with price fluctuations already a common occurrence in the soy supply chain, and the perception that alternative sources would generally be available, albeit with higher prices over the short-term that would likely be absorbed by the supply chain. One industry actor mentioned that, while deforestation is today's 'hot topic', the impact of pesticide use on water quality and biodiversity could become an increasing risk in the future.

In sum, while these risks could manifest differently along stakeholders' supply chains, they were broadly divided into those associated with restrictions on the availability of soy that is suitable for import into the UK, or the price of soy on the global market increasing following supply disruptions.

### Who is the most exposed?

- Livestock producers are the most exposed to supply or price shocks.
- Poultry producers are particularly exposed, as they consume the most amount of soy and are less able to substitute soy for other crops.
- Traders and feed compounders will be less exposed, as they are able to pass on price changes to their customers.

As the UK uses around 90% of imported soy in livestock production<sup>7</sup> (see Figure 1), and feed is the biggest variable input cost of production<sup>8</sup>, this supply chain would be the most impacted by any change affecting supply or price.



**Figure 2:** The industries within the livestock sector in the UK that depend on soy ranked by how affected they would likely be by a supply or price shock

The traders have perhaps the smallest profit margins of all actors in the UK's soy supply, but they would all be relatively evenly affected by any general disruption and price increases would be passed on to their customers. Similarly, feed compounders operate in a competitive environment whereby all actors are likely to be affected to a similar degree by a price rise. Dependencies on soy vary by livestock, and therefore it is here where the impact experienced will differ (see Figure 3).

The poultry industry is the most dependent on soy, as suitable alternative protein sources are particularly sparse due to poultry's sensitivity to anti-nutritional factors found in other sources. The poultry industry is also more heavily dependent on soy from a specific region – Brazil – due to its particular protein qualities. Sourcing alternative products, or from alternative regions, is therefore likely to have some cost implications, manifesting in terms of either increased feed prices or decreased poultry productivity. Whether or not these prices are passed on to retailers and food service will depend on how significant costs are following any changes in the supply or price of soy. But in an industry characterised by tight profit-margins, the opportunities to absorb costs in the long-term are limited.

The pork industry would also be affected by changes in supply chain sourcing, although the industry is expected to be more adaptable as pigs can be fed on, e.g. food and drink by-products (whey, brewers' grains, or surplus fruit and vegetables<sup>10</sup>) without significant productivity issues. Dairy production would be less affected, as cattle are less nutritionally dependent on soy which – where used – is typically based on its lower cost, with rape being substituted when it's economically beneficial to do so. Some dairy producers have already eliminated soy from their supply chain.

It is likely, with soy comprising only part – albeit an important part – of diets, that even in the event of short-term supply chain disruptions, the poultry industry would be robust enough to be able to keep chicken on the menu. The eventual impact of either a restriction in the supply of soy to the UK or an increase in the price of soy may be an increase in consumer prices; a key take-home from our interviews was that many stakeholders felt that opportunities to further remove soy from animal feed are likely to become more difficult as 'quick wins' have already been made. However, opportunities to further reorient the supply chain, including a shift towards slower-growing breeds of poultry (i.e. those that have more flexibility in their diet), may be possible. Slower-growing breeds would increase production times – and thus likely prices to consumers – and several stakeholders raised the issue that alternative sources to soy would likely require greater land areas (due to lower yields) and thus may have additional or unforeseen negative impacts on the environment.

### What are the opportunities for actors to respond to soy-linked risks?

Opportunities to reorient the supply chain away from soy are appealing to supply chain actors considering the chronic reputational risk that is linked to soy sourcing.

**There are various responses that actors can adopt to reduce soy-related risks including using alternatives to soy for feeding livestock, changing sourcing regions, and reformulating the supply chain to source sustainable or traceable soy. These responses all involve significant challenges, however.**

As described above, the dairy industry perhaps has the greatest potential to reduce their soy dependency and could work towards replacing soy with other feed crops. However, there remain complications, as shifting the UK's dairy herd to rapeseed (as an obvious alternative feed source) is estimated to require the UK's entire crop<sup>11</sup>, and UK rapeseed production has fallen dramatically in the last five years<sup>12</sup>. Poultry have low tolerance for anti-nutritional factors and require highly digestible feed. Alternative feed sources for poultry which have the potential to maintain productivity are still in the early stages of research and development. Feeding insects to poultry appeared to be the most attractive alternative being explored by the industry actors spoken to, but there are legislative and energy-use concerns associated with this alternative source.



**Figure 3:** A depiction of how a supply or price shock may affect different soy dependent industries in the UK

## Recommendations in full

### To support reduced dependency on soy in the livestock supply chain and to improve the supply chain's ability to recover from price or supply shocks:

- Continue to invest in alternatives to soy (both traditional and novel) and accompany these investments with fuller assessments on the economic and environmental trade-offs.
- Assess the costs and benefits of switching towards a slower-growing breed of poultry, in terms of their adaptability to other feed sources and the environmental impact associated with these alternatives.

Sourcing soy from non-tropical regions would help supply chain actors reduce their exposure to risks associated with deforestation prevalent, for example, in Brazilian soy. However, concerns about the impact on price is a potential barrier to reorienting sourcing away from this region. Work has previously been commissioned by an interviewed retailer looking into the affordability of switching sourcing regions to outside of Brazil, and they found that the cost implications would mean it would be uncompetitive to do so<sup>13</sup>. Additionally, Brazilian soy has unique protein content favourable to poultry production. Finally, a strong argument was made that moving away from sourcing from Brazil due to the deforestation risk could be seen by industry actors as forfeiting a 'seat at the table' when it comes to negotiations to promote more sustainable practices.

This would not demonstrate UK leadership, but would instead have the potential to exacerbate deforestation-related issues in regions of production.

### To support the supply chain in exploring alternative sources for soy, therefore increasing robustness to price or supply shocks:

- Conduct further analyses into the steps that need to be taken, and resources involved, in ensuring that diversifying sourcing regions is affordable.
- Ensure that support is provided, both to the supply chain and to producer groups in regions of production, to ensure that existing soy sources are not driving deforestation and, where possible, are actively supporting attempts to end deforestation and conversion at landscape level.

Our interviews suggested that enhancing resilience of UK retailers to forthcoming due diligence legislation, and to reputational impacts associated with current sourcing behaviour, is currently hindered by their inability to demand traceable soy from their suppliers. Our interviews suggest, for example, that livestock producers don't feel that they have enough influence to dictate to the feed mills where they want their soy to be sourced from, and it's not in the feed mills interest to provide a certain type of soy (e.g. segregated, certified, material) for what is considered still to be relatively marginal group in the supply chain. Soy traders are seen by industry actors as the 'gatekeepers' to unlocking more transparency across the supply chain. Progress towards untangling the complexity of the soy supply chain to provide evidence to downstream stakeholders that their supply chains are not exposed to risk will hinge on the ability of industry actors to come together under a 'single ask' and require this information from the traders.

Because the UK depends on EU countries for processing around 17% of the soy products that are imported<sup>14</sup>, particularly from the Netherlands, this ‘ask’ for enhanced transparency will need to be made across the supply chain more broadly and not exclusively to UK traders.

Traders are likely to need information from producing regions, and many industry actors that we spoke to also mentioned push-back from farmers in e.g., Brazil in response to additional information requirements, with it being seen as ‘neo-colonial’ to demand that farmers go above what is dictated by the law. There are also trust issues, with one interviewee expressing that farmers are wary of putting into place sustainable practices then losing their customers because they subsequently decide to source from an alternative region entirely.

A mechanism to reduce exposure to deforestation risk is to demand traceable and certified-sustainable soy – so called segregated supply. However, this comes with significant barriers and potential drawbacks, particularly as the current flexibility of sourcing for ‘any origin’ soy allows the commodity to remain competitively priced and affordable for livestock producers. Attempts to introduce more segregation into the supply chain may also have food security implications, as actors would only be able to source from particular ports and particular supply chains who are able to provide segregated material, which is non-trivial in a supply chain which is characterised by bulk-trade. One of our interviewees suggested that as infrastructure in Brazil remains relatively poor, an attempt to introduce more complexity could create bottlenecks in the system.

#### **To support the supply chain in enhancing transparency to reduce reputational risk:**

- The supply chain needs to be supported to come together under a single ‘ask’ to generate a market-wide pressure for increased transparency along the supply chain. Platforms such as the UK Roundtable on Sustainable Soy and the new UK Soy Manifesto should be supported, therefore, to diversify their membership to encompass a broader range of supply chain stakeholders.
- Contracts for sourcing sustainable soy must be long-term focused, to give soy farmers the assurance that their customers will follow through on their commitments to source their sustainable soy if the farmers provide the necessary accreditations.

- The expected due diligence (DD) legislation should ensure that information requirements are clearly defined for those supplying soy-linked products on the UK market, with an emphasis on information being as transparent as possible so that downstream stakeholders can evidence their compliance. Forthcoming due diligence legislation focusing on legality should work with existing frameworks with broader scope such as FEFCO Responsible Sourcing Guidelines, the Accountability Framework Initiative, and the UK Roundtable on Sustainable Soya.

The UK should seek close alignment with the due diligence laws and other activities (such as public-private platforms) taking place in the EU and in areas of deforestation risk to ensure that requirements for transparency are harmonised and scaled effectively.

## **Conclusion**

While other risks exist, and may increase in future, the primary risk associated with UK supply is linked to deforestation. The reaction to this will manifest mainly in a desire for industry actors to reorient their supply chains to reduce dependency and explore alternatives while also being conscious of the unintended consequences of such reorientation.

Stresses on the UK system, whether driven by short-term shocks (which are typically expected to have marginal effects) or longer-term transitions in response to reputational risk, are disproportionately likely to affect the poultry supply chain, which is most constrained by its soy dependency. These stresses, where they do occur, will likely manifest themselves in changes in the price of products which – given low profit margins – are likely to be borne eventually by consumers. However, price concerns are minor compared to the pressing need to respond to the soy supply chain to improve its sustainability; something which all stakeholders recognised was fundamental to the supply chain’s ability and ‘social licence’ to operate. Therefore, providing mechanisms to reorient the supply chain, whilst minimising cost implications and ensuring a continued role for the UK in responding to environmental problems in regions of production, is critical. This will require investment in, and assessment of, alternatives to existing soy supply chains, whilst concurrently ensuring close cooperation among supply chain actors, who must in turn be supported by policy and regulation.

Severity	Risk	Producing country affected	Initial source(s) used to identify potential risk in soy supply chain	Mentioned in interview by whom
	Deforestation and due diligence legislation	Brazil, Paraguay and Argentina	CDP, 2015. <a href="#">Soybean overlooked? The investor case for deforestation-free soy: A white paper exploring regulatory risks from soy associated with deforestation</a>	Retailers (3) Trade Association Poultry producer Sustainability consultancy (2) Traders (2) Food service (2)
	Scope 3 emissions	Those associated with deforestation	SEI, 2018. <a href="#">Soy trade from Brazil's Cerrado driving climate emissions</a>	Retailers (3) Poultry producer
	Price volatility is relatively governed by China's demand	N/A	Wall Street Journal, 2020. <a href="#">Soybean prices hit two-year high, buoyed by Chinese demand</a>	Trade Association Trader
	Climate change (impact on yields/prices and mycotoxin levels of soy)	All. Climate change will impact yields in dry areas, and mycotoxin levels will affect soy in wet and warm areas.	Zhao et al, 2017. Temperate increase reduces global yields of major crops in four independent estimates. doi: <a href="#">10.1073/pnas.1701762114</a> Lee et al. 2018. Prediction of mycotoxin risks due to climate change in Korea. doi: <a href="#">10.1007/s13765-018-0370-8</a> Nelson, G. et al, 2009. Climate change: impact on agriculture and costs of adaptation. doi: <a href="#">10.2499/0896295354</a> IFPRI, 2009. <a href="#">Climate change: Impact on agriculture and costs of adaptation</a> <a href="#">World Mycotoxin Survey 2020</a> <a href="#">World Mycotoxin Survey: Impact 2021</a>	Trade Association Food Service Trader
	Political instability	Brazil Argentina	Reuters, 2020. <a href="#">Soaring Amazon deforestation splits Brazil's agriculture lobby</a> New York Declaration on Forests, 2019. <a href="#">Brazil: A history of success, but a future of uncertainty</a> Sly, E. 2017. The Argentine portion of the soybean commodity chain. doi: <a href="#">10.1057/palcomms.2017.95</a>	Retailers (3) Sustainability consultancy Trader (2)
	US-China trade deal following retaliatory tariffs	United States	Bloomberg, 2021. <a href="#">China is so thirsty for soy that America could soon be importing</a>	
	Pesticide use	Brazil and Argentina	Pengue, W. 2005. Transgenic crops in Argentina: the ecological and social debt. doi: <a href="#">10.1177/0270467605277290</a> Miyazaki et al. 2019. Insufficient risk assessment of herbicide-tolerant genetically engineered soybeans intended for import into the EU. doi: <a href="#">10.1186/s12302-019-0274-1</a> Friends of the Earth, 2013. <a href="#">The environmental impacts of glyphosate</a>	Trade Association Sustainability Consultancy

## Some limitations of our research

Orientation of industry stakeholders: All of the stakeholders interviewed were 'active' in dialogue linked to soy and particularly its deforestation risks. Stakeholder engagement with a larger cohort may throw up additional concerns linked to the soy supply chain.

The more active role of the stakeholders interviewed means their viewpoints are likely representative of thought leadership, but consideration must be given to potential biases e.g. alignment of their messages with the activities that they are already conducting around soy sustainability or resilience.

Public information on the utilisation of soy in the UK is still lacking. More information on the industrial use of soy in the UK would help draw more specific conclusions about industry exposure to supply chain risks.

## References

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3. Conducted with representatives from food service, retailers, traders, a poultry producer, sustainability consultants, and a trade association.
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5. WRI, 2018. [By the numbers: the value of tropical forests in the climate change equation](#).
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## Useful Resources

IKnowFood. [Integrating knowledge for food systems resilience](#).

## About the Programme

The Resilience of the UK Food System in a Global Context (GFS-FSR) is a £14.5 million, five-year research programme. It was launched in 2016 by the Global Food Security Programme (GFS), the UK's cross government programme on food security research.

The Programme has been funded by UK Research and Innovation's Biotechnology and Biological Sciences Research Council (BBSRC), Economic and Social Research Council (ESRC), Natural Environment Research Council (NERC) and the Scottish Government.

Across UK universities and institutes, 13 collaborative research projects are producing new evidence and recommendations for policy and practice. The results will help to identify and develop interventions to enhance the resilience of the UK food system.

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