



Stink or Swim:

The ten factory farm corporations producing more toxic excrement than the UK's ten largest cities

Briefing by Friends of the Earth and Sustain

Overview

Intensive agriculture is the main cause of river pollution incidents in England and is responsible for more pollution entering rivers than water companies. It has been linked to the ecological collapse of the river Wye in Wales and Lough Neagh in Northern Ireland. It is estimated that just ten large agribusinesses are responsible for the bulk of this waste. Collectively, they produce the equivalent of over 120 double decker busloads of excreta per hour – almost double what is produced by the 10 largest UK cities.

These agribusinesses concentrate in certain areas of the UK and supply to all the major UK retailers. None have publicly available strategies capable of preventing this waste polluting our rivers and air. The companies named in this report were contacted for further information, and their responses are on the Sustain website.

Much greater scrutiny and regulation of polluting agribusinesses is needed to meet targets for nature recovery, air and water pollution and climate change.

The agribusinesses responsible for thousands of tonnes of toxic animal waste per day

Table 1: The UK's 10 largest intensive livestock agribusinesses, showing the average number of animals in production at any one time in their supply chains, and estimated volumes of waste produced. More information about the businesses analysed is in Annex A.

Estimated number of animals in production at any one time							Estimated excreta produced	
Company	Meat chickens	Egg chickens	Turkey	Pigs	Dairy cows	Sows	Tonnes/day	Tonnes/hour
Arla					460,000		21,390	891
Avara Foods	33,000,000						2,970	124
Banham	7,428,000						669	28
Bernard Matthews			2,692,307				377	16
Cranswick	9,642,857			1,500,000		62,000	9,693	404
Hook2Sisters	45,000,000						4,050	169
Karro				1,300,000		28,000	7,879	328
Moy Park	35,000,000						3,150	131
Noble Foods		7,200,000					672	28
Pilgrim's Pride				750,000			4,413	184
Total	130,070,857	7,200,000	2,692,307	3,550,000	460,000	90,000	55,262	2,303

Credit: Sustain. [Methodology](#)

Three companies dominate intensive chicken production, with Hook2Sisters, Moy Park and Avara Foods collectively responsible for an estimated 110 million chickens at any one time. For pigs, Cranswick and Karro have nearly an estimated 3 million pigs in production between them. Just one business – Arla – dominates intensive dairy production, with 460,000 cows.

Collectively, these 10 companies own over 144 million animals and are responsible for up to 55,262 tonnes of animal excreta per day. By comparison, the 10 largest cities in the UK produce around 30,000kg of excreta per day. Factory farm animal waste is usually

untreated and spread on nearby fields where it washes into rivers. A [2022 study on phosphate pollution in the Wye catchment](#) found that the largest source of phosphates was from manure produced in factory farms and spread on agricultural fields.

A proportion of manure is used for energy generation through anaerobic digestion or incineration, producing digestate and ash as byproducts, which are widely used as fertiliser. [Feedback](#) have raised concerns about large-scale anaerobic digestion, saying it ‘at best provides a sticking plaster to problems like food waste and the intensive livestock industry, and at worst it is actively expands polluting industries’.

Intensive livestock production is on the rise. [According to Compassion in World Farming](#), the number of intensive livestock units in the UK has increased by 20% since 2016. This is increasingly concentrating resources, wealth and power in the hands of a few global corporations. The ten companies included in this analysis are owned by just five parent companies.

The concentration of power in the farming industry is hurting farmers. Last year [Sustain reported](#) that large agribusinesses are seeing turnover grow and paying millions to company directors, while contract farmers are [struggling to make ends meet](#). Sustain’s ‘[Unpicking food prices](#)’ report found that often farmers receive just 1% of profits for common food stuffs like cheese, beefburgers, carrots and bread.

Agribusinesses lack satisfactory policies to prevent pollution

Most of the UK’s largest agribusinesses have no publicly available plan or policy for managing their waste to prevent it from polluting rivers, air, or nitrate vulnerable zones and nature conservation sites when it is transported off site. For companies that do have policies in place, most lack detail, timelines or targets to reduce pollution.

Table 2: Analysis of waste prevention and pollution minimisation policies of the UK’s 10 largest intensive livestock agribusinesses, using publicly available data such as environmental, sustainability and animal welfare reports and annual reports.

Company	Policy	Analysis
2 Sisters	No publicly available strategy or policy available	
Arla	<ul style="list-style-type: none"> Provides financial incentives for environmentally friendly practices, including optimisation of nutrients from manure, storage and redirecting slurry to biogas plants. Arla also say they want to see increased government support for anaerobic digesters. 	<ul style="list-style-type: none"> No policy to prevent waste sent off-site from polluting air and water Anaerobic digestion has been found to have failed to solve nutrient pollution issues. No timelines or targets for reducing pollution or reducing waste.

Company	Policy	Analysis
<u>Avara</u>	<ul style="list-style-type: none"> The company claims chicken manure is not sold as fertiliser within the River Wye catchment. Instead, it is exported to farms and processing facilities outside of the catchment. This means that up to 75% of chicken manure, or 2,000 tonnes a week, is exported out of the Wye catchment. The company claims that any Avara farms that spread their waste on their fields are required to undertake an audit process under 'Red Tractor linked soil assurance standards.' As far as we can ascertain, this standard is a pilot scheme rolled out to under 1% of farms in Avara supply chains. 	<ul style="list-style-type: none"> Exporting chicken manure outside the Wye catchment risks moving the pollution problem elsewhere. A significant <u>proportion of UK soils</u> are in nutrient surplus and almost all rivers in England and Wales have been assessed as <u>poor quality</u>. <u>55% of England</u> is designated as a nitrate vulnerable zone, which means that it is sensitive to additional nutrient pollution. Avara do not disclose where nutrients are sent, with the River Severn to the east and the Avon to the south, we would like to understand how Avara is mitigating potential impacts in these and other polluted catchments. Spreading large quantities of nutrient rich manure on any soils presents a risk to the UK's collapsing freshwater systems. You can read Sustain's analysis of this policy in full <u>here</u>.
Banham	No publicly available strategy or policy available	
Bernard Matthews	No publicly available strategy or policy available	
<u>Cranswick</u>	<ul style="list-style-type: none"> Cranswick has an objective to manage farmlands so that contaminants from manure do not enter the water system. 	<ul style="list-style-type: none"> No detail on how this objective will be met, or what happens to waste exported offsite. No timelines or targets specified.
Karro	No publicly available strategy or policy available	
Moy Park	No publicly available strategy or policy available	
<u>Noble Foods</u>	<ul style="list-style-type: none"> Noble Foods is collaborating with the Wye and Usk Foundation to assess farms and put mitigation measures in place to reduce the impact of farming on water. 	<ul style="list-style-type: none"> Lacks detail. No publicly available strategy for managing run-off risks outside of the river Wye catchment. No timelines or targets specified.
<u>Pilgrim's Pride</u>	<ul style="list-style-type: none"> Claim to assess water risks on farms before housing pigs. Claim to carry out research and development projects to improve water stewardship. Claim to conduct supply chain mapping and risk assessment, issuing advice within high-risk catchments. 	<ul style="list-style-type: none"> No mention of restrictions or a strategy for where, when and how slurry is managed or spread No timelines or pollution reduction targets specified.

Which agribusinesses are polluting your area?

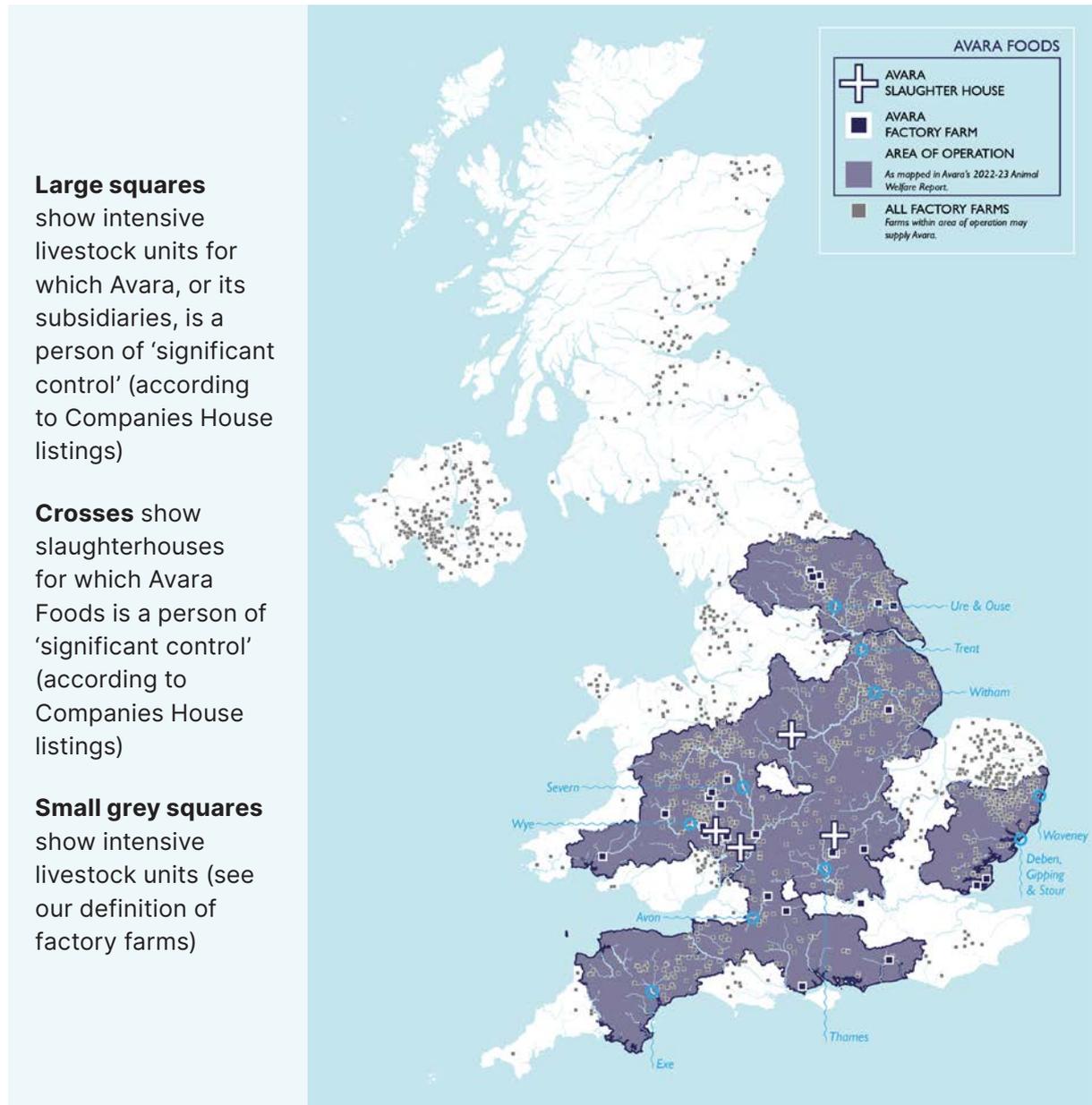
The major agribusinesses in the UK describe themselves as having 'vertically integrated supply chains', meaning they either own or have relationships with suppliers and do not need to source from an open commodity market.

Agribusiness operations are clustered geographically, often around processing facilities, which reduces transportation costs and times. We have mapped the processing facilities (slaughterhouses) and intensive livestock units (factory farms) that each agribusiness either owns directly or for which they are named as a person of significant control. The areas in which they operate, within which they source their livestock, have been estimated from the companies' animal welfare reports and, in some cases, direct correspondence with the company.

The following maps estimate the areas of operations of the dominant agribusinesses. The maps cover Avara, Pilgrim's Pride, Moy Park, Cranswick, and the subsidiaries of Boparan Holdco Limited and Boparan Private Office Limited, which includes Hook2Sisters and 2 Sisters Food Group and Banham and Bernard Matthews respectively.

Our methodology for representing the areas of operation relies on slaughterhouse locations and livestock travel time information. Due to the lack of available data, maps were not produced for Arla, Noble Foods and Karro.

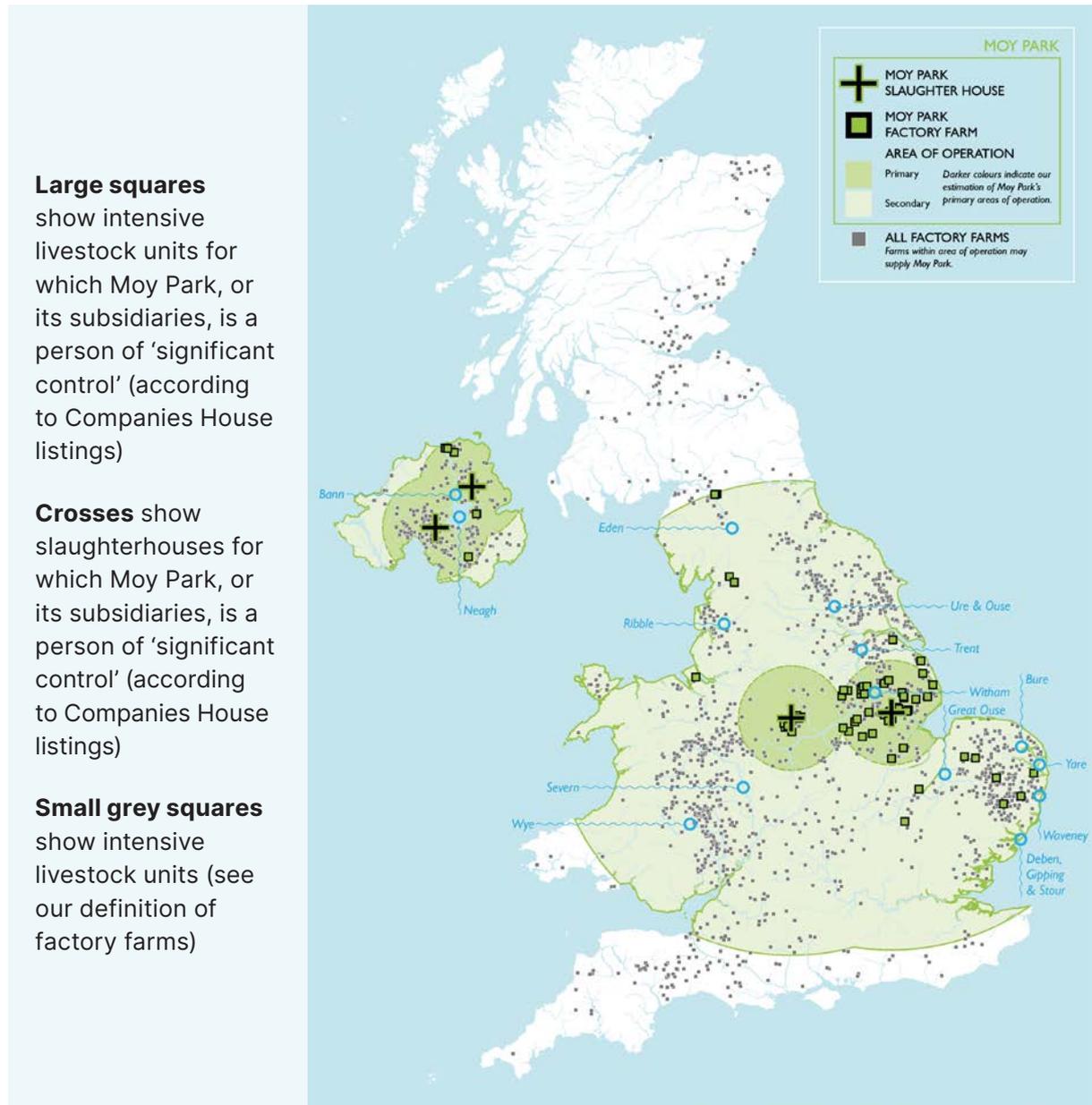
Map 1 Avara Foods areas of operation in the UK



Credit: Materiality / Friends of the Earth / Sustain

Map 1 shows the area of operation for Avara Foods, one of the largest chicken producers in the UK. Avara Foods has over 30 million chickens in their supply chain at any one time. The shaded area on the map indicates Avara's area of operation, reproduced from the map in Avara's 2022-23 [Animal Welfare Report](#). Given the location of processing facilities and units over which Avara has 'significant control', it is likely that most intensive livestock units in Avara Foods' supply chain are situated in the region around the rivers Wye and Severn, and in the Northeast of England. It follows that a significant amount of waste associated with Avara's supply chain is likely to be produced in these regions.

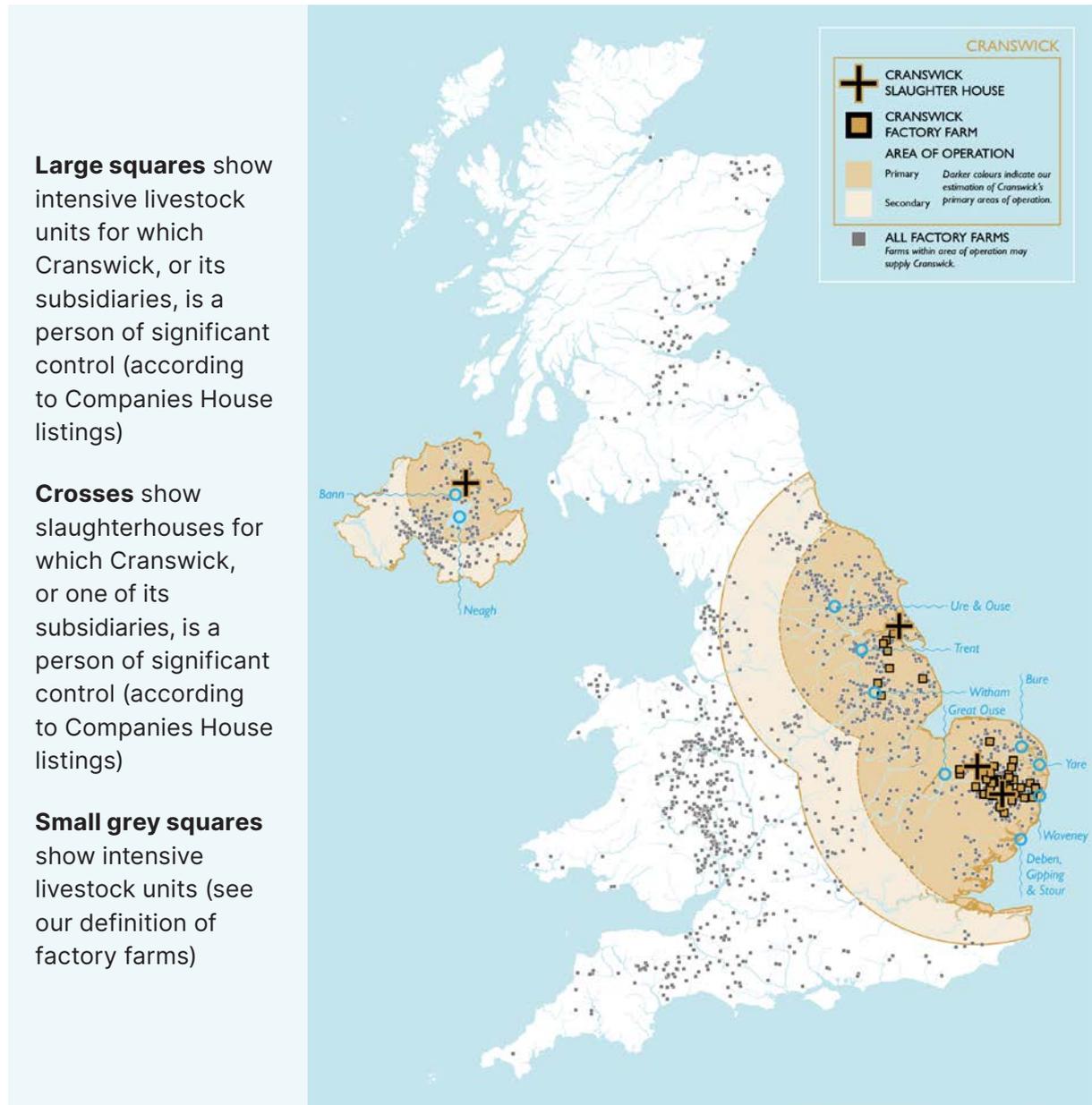
Map 2 Moy Park areas of operation in the UK



Credit: Materiality / Friends of the Earth / Sustain

According to Moy Park's 2022 [Animal Welfare Report](#), the company avoids transporting birds over long distances, and a majority of its farms are located within a 30-mile radius of its fresh primary sites. It also reports that less than 0.5% are transported more than 4 hours. Darker shading therefore shows the likely location within which 'the majority' of Moy Park's 35 million chickens are housed. From this, we can see that most intensive livestock units (and waste produced from these units) in Moy Park's supply chain are likely to be in the East and West Midlands, Northwest and Northeast England and Northern Ireland. The primary supply areas overlap with Lough Neagh and the River Bann in Northern Ireland, and with the rivers Trent and Witham in England.

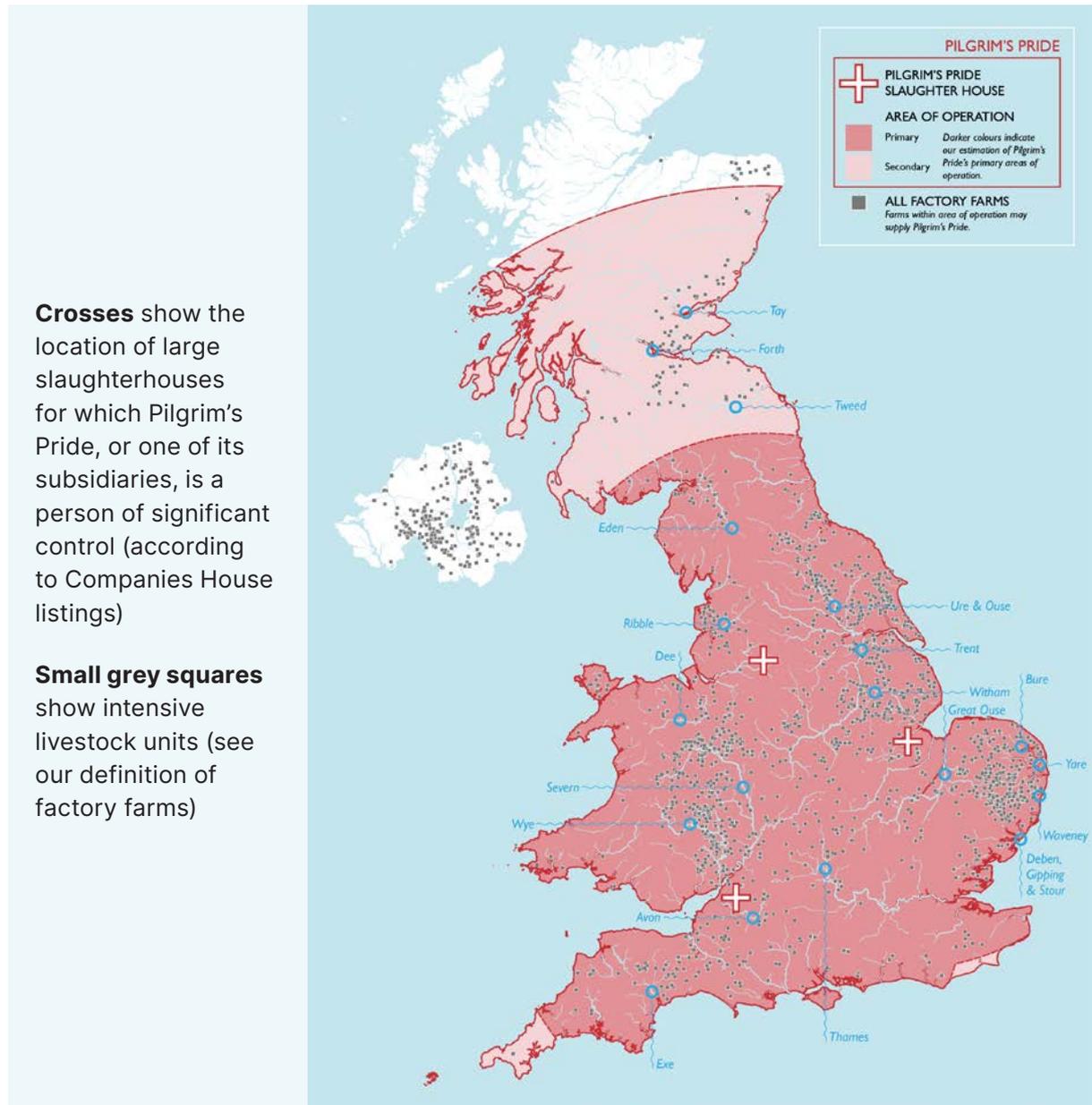
Map 3 Cranswick areas of operation in the UK



Credit: Materiality / Friends of the Earth / Sustain

According to Cranswick's 2022 [Animal Welfare report](#), the company sources most of its animals from farms near its large regional slaughterhouses. Darker shading shows the likely area within which the majority of Cranswick's poultry and pigs are sourced. This includes 100% of chickens in the region of the Crown poultry slaughterhouse in Norfolk, 75% of pigs for the Norfolk pig slaughterhouse, 81% of pigs for the pig slaughterhouse in Yorkshire and 51% of pigs for the Northern Irish pig slaughterhouse. Therefore, it is likely that most intensive livestock units and most waste associated with Cranswick's supply chain in Northern Ireland overlaps with the River Bann and Lough Neagh, and in England with the Trent, Ouse and Humber River basins, and multiple rivers within East Anglia.

Map 4 Pilgrims Pride areas of operation in the UK



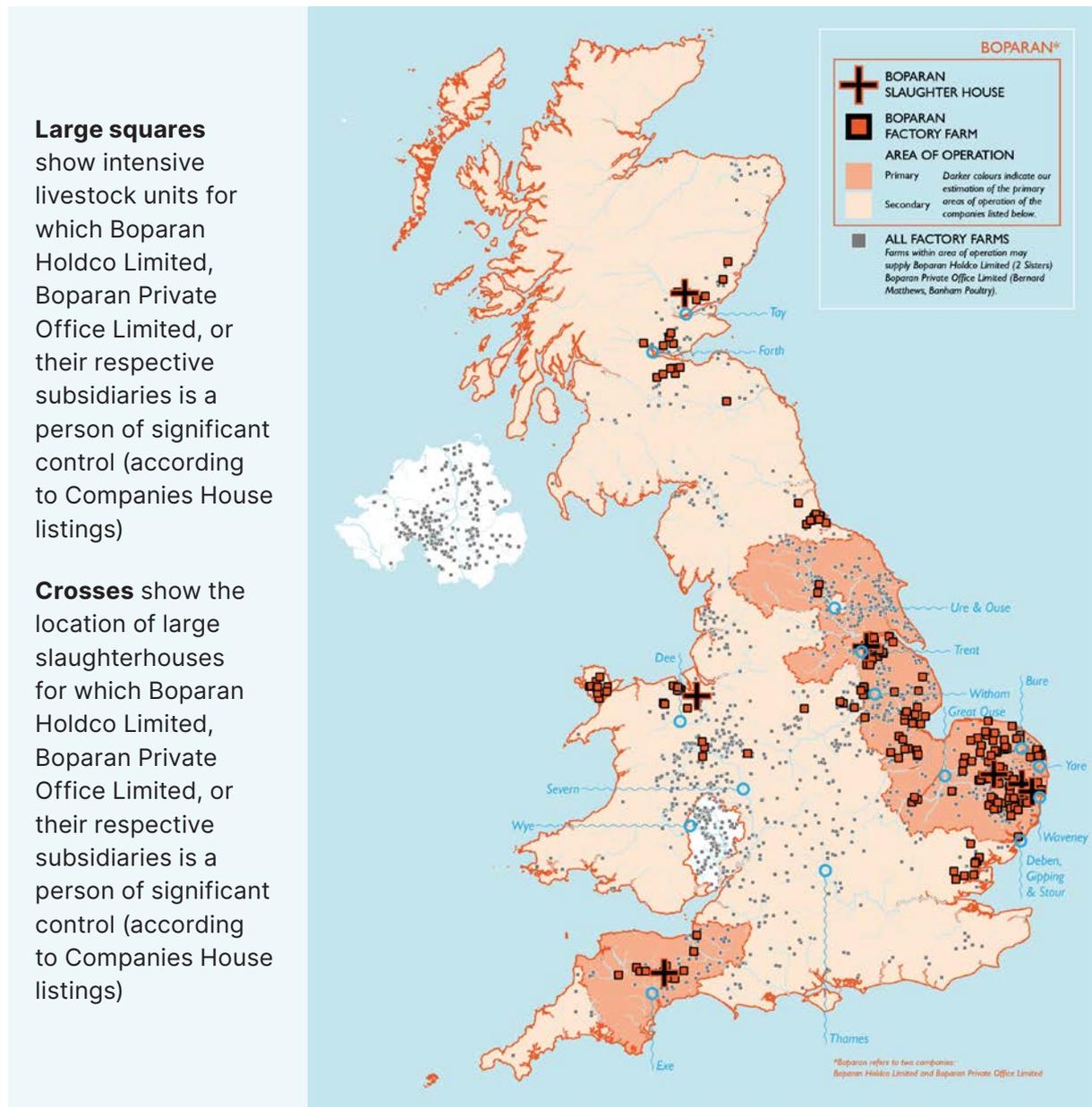
Crosses show the location of large slaughterhouses for which Pilgrim's Pride, or one of its subsidiaries, is a person of significant control (according to Companies House listings)

Small grey squares show intensive livestock units (see our definition of factory farms)

Credit: Materiality / Friends of the Earth / Sustain

According to its [Animal Welfare Policy](#), Pilgrim's Pride transport animals nearly four hours on average and up to eight hours, indicated by the darker and lighter red shaded areas respectively. Its 750,000 pigs are therefore most likely to be sourced from across England and Wales. It was not possible to locate the intensive livestock units owned or controlled by Pilgrim's Pride, apart from those which operate under the Moy Park brand. Moy Park is a subsidiary of Pilgrim's Pride and shown in Map 2.

Map 5 Boparan Holdco Limited and Boparan Private Office Limited (including Hook2Sisters, 2 Sisters Food Group, Banham and Bernard Matthews)



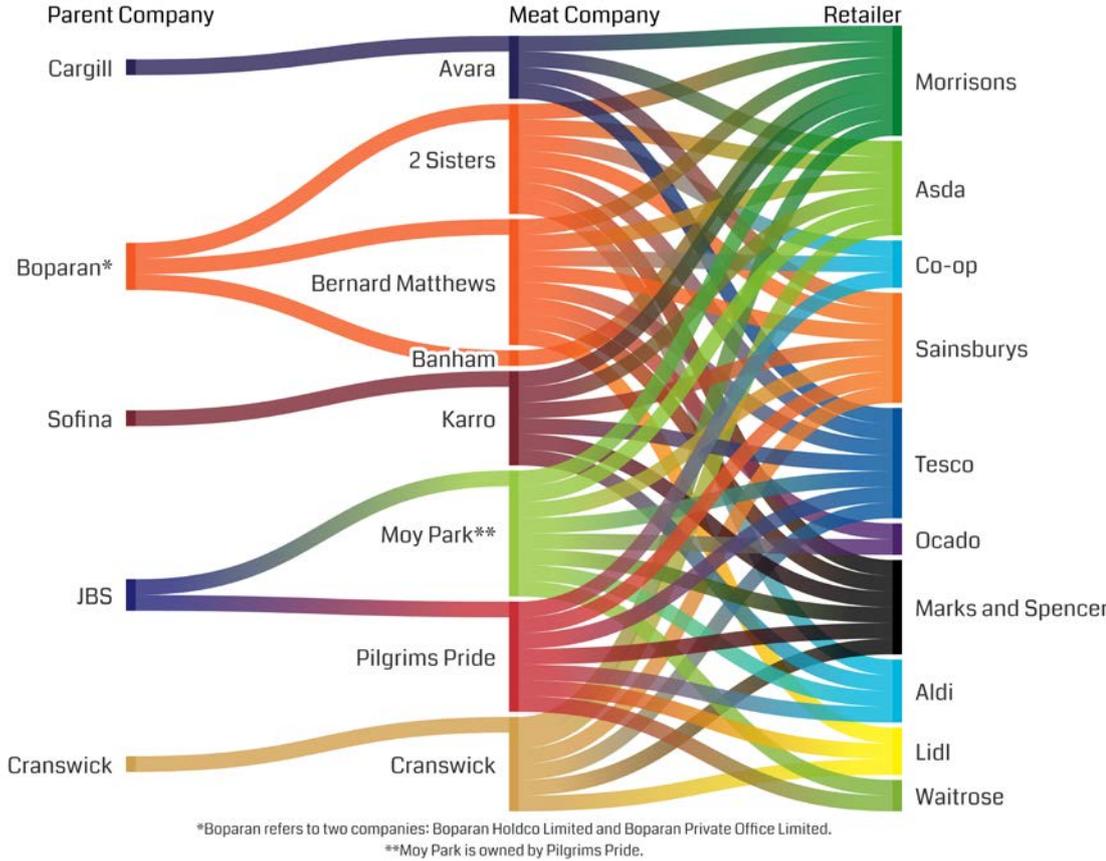
Credit: Materiality / Friends of the Earth / Sustain

Small grey squares show intensive livestock units (see our definition of factory farms)

This map charts the facilities where Boparan Holdco Limited, Boparan Private Office Limited, or their subsidiaries is a person of significant control, including Hook2Sisters, 2 Sisters Food Group and Bernard Matthews and Banham Poultry respectively. According to [2 Sisters' 2019 animal welfare report](#), most of its chickens were sourced within 6 hours, the lighter shaded area. Correspondence with 2 Sisters Food Group revealed that Boparan Holdco and Boparan Private Office subsidiaries operate facilities within the darker shaded area.

Polluting agribusinesses' links to major retailers

Figure 1: Links between UK retailers and meat chicken and pig companies included in this report.



Credit: Materiality / Friends of the Earth / Sustain

Figure 1 shows the operational links between meat chicken and pig companies analysed in this research, the UK’s major retailers, and the large conglomerates that act as holding companies. For example, Avara Foods supplies Asda, Morrisons, Sainsburys and Tesco, and is owned by US agribusiness giant and soy producer Cargill. US meat giant JBS is the holding company for Moy Park and Pilgrim’s Pride, but Moy Park is also a subsidiary of Pilgrim’s Pride (it was sold to the company in 2017).

The intensive livestock industry in the UK is characterised by the concentration of power and profit in the hands of a small number of large corporations. All the major UK retailers are linked with at least one agribusiness included in this investigation. Five large conglomerates, including international ones, such as Cargill and JBS, act as holding companies for eight of the companies assessed in this report.

Recommendations

Recovering our rivers, tackling the climate and nature emergency and improving air quality requires that all polluters take responsibility for the waste they produce.

National Governments

- ✓ **Halt the development of new intensive livestock units or the expansion of current intensive livestock units in river catchments where nutrient loads are exceeded, or rivers are in unfavourable condition** until and unless operators can prove a new development or expansion of an existing development would pose no risk to freshwater systems through nutrient pollution and until and unless monitoring, oversight and compliance are put in place to ensure that agribusinesses are operating in a manner that does not pose a risk to freshwater systems.
- ✓ **Give regulators powers to sanction polluting agribusinesses (not just sewage companies)**, including banning payment of executive bonuses.
- ✓ **Restore funding of environmental regulatory and delivery bodies to at least 2010 levels (in real terms) so that they have the resources and skills to enforce standards for river testing and for the enforcement of regulation**, with a strong commitment to the polluter pays principle and penalties for non-compliance.
- ✓ **Create equitable and just incentives for operators of intensive livestock units** to transition to more sustainable systems.
- ✓ **Support sustainable farming systems**, which enhance rural communities, are able to produce more fruit and vegetables per hectare, employ more people and keep wealth within communities.
- ✓ **Reform the planning, consenting and permitting system, and make river pollution and climate change material planning considerations across England, Wales, Scotland and Northern Ireland.** All development decisions must be required to consider pollution in the wider catchment and demonstrate how they adhere to local and national targets for nature recovery and pollution mitigation. All intensive livestock units – including dairy units - must be required to get planning permission and have an environmental permit.
- ✓ **Introduce a roadmap to make sustainable and healthy food affordable and accessible**, following the Eating Better Alliance's roadmap to a 50% reduction in meat and dairy consumption and production by 2030. Include minimum standards for public sector food, and mandatory emissions reduction reporting and targets for large retailers.
- ✓ **Introduce a new Business, Human Rights and Environment Act** to require UK companies to carry out due diligence to prevent environmental harm and human rights abuses in their supply chains.
- ✓ **Introduce into UK law a new human right to a clean, healthy and sustainable environment**, as recognised by the UN General Assembly.

Local Authorities

- ✓ **Join Planning for the Planet** and adopt local planning policy to prevent the further spread of intensive livestock units in your area.
- ✓ **Support sustainable food and nature-friendly local producers through procurement.**
- ✓ **Establish a Sustainable Food Partnership** (or work with them if you have one already).

Businesses

- ✓ **Adopt measurable and timebound targets to prevent excreta from polluting rivers**, including recording and reporting on the end-destination of all waste, and not spreading waste in catchments in which rivers are in unfavourable condition.
- ✓ **Provide contracted farmers with financial support to store and dispose of manure produced by livestock in your supply chains** in a manner that does not increase the nutrient pollution of freshwater systems.
- ✓ **Reduce Scope 3 emissions in line with the Paris Agreement Targets.**
- ✓ **Back Friends of the Earth's calls for a new Business, Human Rights and Environment Act.**

Annex A: Further information about the large agribusinesses analysed in this report

Company	Company information
2 Sisters Food Group and Hook2Sisters	2 Sisters was founded in 1993 by Ranjit Singh Boparan (see Boparan Holdco Limited and Boparan Private Office Limited). It has a turnover of <u>£1.4 billion</u> , with more than half its business coming from producing chicken products for other brands, including supermarkets. The company operates 20 large processing facilities in the UK.
Arla	Arla is the UK's largest dairy company by milk pool. It is the largest supplier of butter, spreads and cheese in the country and the fifth largest dairy company in the world. Arla is a Danish-Swedish multinational corporation.
Avara	Avara foods is one of the UK's largest food businesses. It was formed in 2018 when Faccenda Foods (at the time one of the largest poultry suppliers in the UK and owned by Hillesden Investments) joined with American global food corporation Cargill. In 2002, the company was fined £75,000 for polluting the River Avon and is currently facing a multi-million pound legal case over River Wye pollution.
Banham Poultry	Banham Poultry is a British poultry producer, based in Attleborough, Norfolk, with an annual turnover of £100 million, selling 650,000 chickens a week. In 2021, Banham Poultry was bought by Boparan Holdings (see below)
Bernard Matthews	Bernard Matthews operates throughout the east of England, including farms in Norfolk, Suffolk and Lincolnshire producing nearly 7 million turkeys each year. It also has poultry production operations in Derby and Sunderland. The company has been owned by an investment company owned by Ranjit Singh Boparan since 2016 (see below).

Company	Company information
Boparan Holdco Limited (BHcL) and Boparan Private Office Limited (BPO)	<p>BHcL and BPO are part of a large, complex and expanding network of companies which have Ranjit Singh Boparan, known as the ‘chicken king’, at their centre.</p> <p>BHcL include the following companies either as subsidiaries or as companies over which they have significant control*. In some cases, this control is via intermediary companies:</p> <ul style="list-style-type: none"> • Hook 2 Sisters Limited: Manages more than 170 farming operations. • 2 Sisters Food Group Limited: Operates five slaughterhouse processing centres. <p>BPO include the following companies either as subsidiaries or as companies over which they have significant control. In some cases, this control is via intermediary companies:</p> <ul style="list-style-type: none"> • Banham Poultry (2018) Limited: Operates one slaughterhouse processing centre and manages farming operations. • Bernard Matthews Foods Limited: Operates one slaughterhouse processing centre. • 2 Agriculture Limited: Manages farming operations. • Amber Real Estate Investments (Agriculture) Limited: Operates one slaughterhouse processing centre. <p>Ranjit Singh Boparan is a shareholder in both BHcL and BPL, and thus has significant control over both according to Companies House. He is a majority shareholder in BHcL, and Ranjit Singh Boparan and his wife Baljinder Kaur Boparan own over 50% of shares in BPO between them.</p> <p>*According to Companies House People of Significant Control records</p>
Cranswick	Cranswick’s core market is the UK but the company has a rapidly developing export business serving the European, US and South East Asia.
Karro	Karro processes circa 50,000 pigs each week for delivery to the UK’s major supermarkets and wholesale food supplier markets. Karro Food Group headquarters’ are located in Malton, North Yorkshire.
Moy Park	Moy park is one of the UK’s top 15 food companies, Northern Ireland’s largest private sector business generating £1.83 billion in sales in 2022 and one of Europe’s largest poultry producers. Moy Park is a subsidiary of Pilgrim’s Pride.
Pilgrim’s Pride	A division of Pilgrim’s Pride Corporation, Pilgrim’s Pride UK is part of the largest food company in the world, JBS, operating in more than 100 countries.

Definition of Intensive Livestock Units or 'Factory Farms'

Sometimes referred to as 'intensive production units' (or, for chickens, 'intensive poultry units'), intensive livestock units are the most industrialised and polluting agricultural operations. Animals are kept indoors for most or all their lives, in crowded conditions with little or no natural light. They are more akin to an industrial operation than a farm, with associated traffic generation, noxious processes, waste and effluent emissions, in addition to the wider issues of biodiversity loss and greenhouse gas emissions.

For the purposes of planning policy, permitting requirements and pollution reporting, and for this report, intensive livestock units are defined as those which require planning permission and a license from the Environment Agency to operate. Developments that require planning permission house 40,000 poultry or 2,000 pigs or 750 breeding sows. In the UK, the number of these units increased by 26% between 2011 and 2017, from 1,332 to 1,674 respectively.

Intensive livestock production is distinct from more sustainable, higher welfare and nature-friendly agroecological farming, which is more resilient to climate change and vastly better for local communities and the planet, as well as reflecting the recommendations of the Climate Change Committee that UK diets need to change, towards healthier and less carbon-intensive foods.

Methodology

Waste production rates

Estimates were drawn from several sources. Weekly slaughter figures were used to estimate data for Moy Park, Avara Foods, Banham and Hook2Sisters. Estimates were calculated by multiplying weekly slaughter figures to generate an annual slaughter figure. This number was divided by seven, as broiler sheds typically process seven cycles of broiler chickens annually. This gave us a figure that represented the average number of animals in each company's supply chain at any one time. Figures for Noble Foods and Cranswick's poultry operations were gathered from publicly disclosed information, rather than through extrapolation.

A similar method was used to estimate figures for Cranswick, Pilgrim's Pride and Karro's pig operations. Weekly slaughter figures were gathered from published information and multiplied to generate an annual estimate of pig production. This figure was divided by two, as, according to the RSPCA, pig operations typically process two cycles of production annually. Figures for sows for Cranswick and Karro were publicly available, either on their website or through reporting.

To estimate the number of Turkeys reared by Bernard Matthews at any one time, a similar method was used. Annual slaughter figures were determined and then divided by approximately 2.5, based off BBC reporting that the average age of slaughter for a Turkey is around 20-weeks.

Arla's dairy cow numbers are publicly reported.

To estimate excreta per day per farmed animal, government figures were used to calculate an average figure for excreta per day for each livestock type.

The excreta figure for the 10 largest UK cities was calculated by multiplying the median weight of faeces produced by a human by the combined populations of the 10 largest UK cities, with a separate source used for Glasgow.

Analysis of Public Policies

Sustain analysed the publicly available policies for the ten agribusinesses included in this report. A variety of publicly available reports and documents were analysed. Table 2 contains links to these sources. The businesses were contacted and invited to provide further publicly available information that may have been missed.

Responses can be found on the Sustain website.

Zone of operation maps for Avara Foods, Moy Park, Cranswick, Pilgrim's Pride, and Boparan (Boparan Holdco Limited and Boparan Private Office Limited).

Assumptions for the likely zones of operation are from publicly available data published by companies on the stated livestock travel times and/or distances between their farms and slaughterhouses (mainly taken from animal welfare reports). These reports are linked in the main report.

Where possible, the proportion of livestock sourced within certain distances or times was used to estimate likely areas of operation. Travel areas where a majority, more than 50%, of livestock is sourced are described as primary. The remaining travel areas, where a minority or below 50% of livestock is sourced, are described as secondary.

Travel distances and/or times were used to determine the radius of travel around each slaughterhouse. Distances disclosed by the company were used to map the radius of travel. Where distances were not disclosed by the company, a Department for Transport average rural road speed figure was used to estimate distances from published travel times. These figures were used to determine the radius of circles plotted around each slaughterhouse.

Data for Avara's area of operation was taken from a publicly available report published by the company, linked above in the main report.

The links between meat companies and slaughterhouses and factory farms were found through Companies House records of People of Significant Control (PSC). According to Companies House, "a person with significant control (PSC) is someone who owns or controls a company. They are sometimes called 'beneficial owners'."

Open Corporates and the Companies House API were used to search for the names of slaughterhouses and factory farm parent company names detailed in the Food Standards Agencies and DEFRA datasets listed below. Company matches were found for the majority of farms and slaughterhouses, and their company numbers recorded, with the exceptions usually being the names of family businesses or individuals.

The company numbers were searched using the Companies House API, to return the PSCs for each company. This search was then repeated for the PSCs until no further PSC matches were returned. This iterative searching allowed a branched and hierarchical network of PSCs to be revealed. The PSC networks for each of the mapped companies was checked manually through the Companies House website.

Data for the locations of and PSCs of slaughterhouses and intensive livestock units for maps 1-5 was gathered from the following sources:

Data	Scope	Source	Source Link	Notes
Slaughterhouses	England	Approved Food Establishments in England and Wales	https://data.food.gov.uk/catalog/datasets/1e61736a-2a1a-4c6a-b8b1-e45912ebc8e3	Filtered to slaughterhouses only
Slaughterhouses	Wales	Approved Food Establishments in England and Wales	https://data.food.gov.uk/catalog/datasets/1e61736a-2a1a-4c6a-b8b1-e45912ebc8e3	Filtered to slaughterhouses only
Slaughterhouses	Northern Ireland	Approved Food Establishments in Northern Ireland	https://data.food.gov.uk/catalog/datasets/dae35822-ca4e-41a2-b2af-b10b6163085a	Filtered to slaughterhouses only
Slaughterhouses	Scotland	Approved Establishments Register	https://www.foodstandards.gov.scot/publications-and-research/publications/approved-premises-register	Filtered to slaughterhouses only
Intensive Farms	UK	UK Pollutant Release and Transfer Register	https://prtr.defra.gov.uk/full-dataset	Filtered to intensive farms only
Company Information	Global	Open Corporates	https://opencorporates.com	Open Corporates UK data is derived from Companies House - Reconciled (searched) using OpenRefine
Company Information	UK	Companies House	https://find-and-update.company-information.service.gov.uk/	Searched using API

Rivers and Lakes:

Lehner, B., Grill G. (2013): Global river hydrography and network routing: baseline data and new approaches to study the world's large river systems. *Hydrological Processes*, 27(15): 2171–2186. Data is available at www.hydrosheds.org

Messenger, M.L., Lehner, B., Grill, G., Nedeva, I., Schmitt, O. (2016): Estimating the volume and age of water stored in global lakes using a geo-statistical approach. *Nature Communications*: 13603. doi: 10.1038/ncomms13603. Data is available at www.hydrosheds.org.

Catchment information and names were sourced from the following government dataset:

<https://www.data.gov.uk/dataset/dc105e0b-89af-4cdb-86df-7105bfc04a1b/integrated-hydrological-units-of-the-united-kingdom-hydrometric-areas-without-coastline>

Associations between agribusinesses and major retailers

This data was found using the most recent publicly available supply chain information, as follows:

Company	Link to information source
Aldi	https://www.poultryworld.net/the-industrymarkets/market-trends-analysis-the-industrymarkets-2/aldi-now-the-second-largest-fresh-poultry-retailer-in-uk/ https://sustainability.pilgrims.com/our-stories/customers-and-consumers/secures-five-year-fresh-pork-deal-with-aldi/ https://www.aldi.co.uk/corporate/corporate-responsibility/fairer/british-quality https://www.foodmanufacture.co.uk/Article/2022/01/17/Aldi-s-1.6bn-commitment-to-British-suppliers
Asda	https://asdasupplier.com/file-download/Tier%201%20Food%20NEG%20Produce%20and%20GM%20facilities_1.pdf https://www.thegrocer.co.uk/eggs-and-poultry/moy-park-launches-frozen-fakeaway-products-into-asda/689296.article
Co-op	https://www.pilgrimsuk.com/app/uploads/2023/03/Public-report_HRIA-Pilgrims-Lamb-and-Pig-Supply-Chain-FV.pdf https://assets.ctfassets.net/bffxiku554r1/2aPERfUjew9bRkWNsfypQ1/3332ce86fc074d5076051716b03a82cf/2021_Tier_1_and_Worker_Profile_Data-1-.pdf
Lidl	https://corporate.lidl.co.uk/content/download/25746/fileupload/Lidl%20Food,%20Fruit%20%26%20Veg%20Supplier%20List%202023.pdf
M&S	https://interactivemap.marksandspencer.com/
Morrisons	https://www.morrisons-corporate.com/globalassets/corporatesite/corporate-responsibility/ethical-trading/2022-morrisons-own-brand-food-homewares-health-and-beauty-supplier-list---own-brand-food-homewares-health--beauty-01.2022.pdf
Ocado	https://www.poultrynews.co.uk/news/moy-park-secures-new-deal-with-ocado.html https://www.ocado.com/products/bernard-matthews-battered-turkey-dippers-621896011
Sainsburys	https://www.about.sainsburys.co.uk/~/_media/Files/S/Sainsburys/CRS%20Policies%20and%20Reports/Food%20Supplier%20List%20Tier%201%202022.pdf
Tesco	https://www.tescopl.com/media/asxnw5ep/primary-supplier-list_-april-2023.pdf
Waitrose	https://www.pilgrimsuk.com/app/uploads/2023/03/Public-report_HRIA-Pilgrims-Lamb-and-Pig-Supply-Chain-FV.pdf https://www.johnlewispartnership.co.uk/content/dam/cws/pdfs/Juniper/ethics-and-sustainability/ES-reporting/JLP-Factory-List.pdf

Note: In Asda's Tier 1 supplier list, 2 Sisters Food Group has been abbreviated to '2SFG'.