The Future of Food Security in the UK

Why Factory Farming is Not the Answer

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Contents

Executive summary

The UK is increasingly recognising the importance of maintaining strong food security. At the same time, more and more of UK meat comes from factory farms, with corporations claiming that this improves our food security. However, our review of the evidence suggests that conversely, the factory farming of chickens and pigs undermines UK food security. Instead, the key to boosting UK food security is to focus policy on cheaper British-farmed fruits and vegetables, as well as alternative proteins.

We evaluate factory farming and alternative proteins on 3 key pillars of food security:

1. **A self-sufficient UK food system**

- Factory-farming is dependent on imported soy for animal feed, reducing UK self-sufficiency. Taking imported soy feed into account, the UK is only 41% self-sufficient in pork, 54% in chicken and 57% in overall meat – far lower than DEFRA's official estimates.
- Despite this, the real crisis deserving policy attention is the UK's low self-sufficiency in fruit and vegetable production.
- Reducing factory-farmed meat consumption by 20% and reallocating the land to crop inputs for alternative proteins could increase UK meat self-sufficiency by 35 percentage points, greatly reducing the need for food imports.

2. An affordable, healthy diet for everyone

- Experts agree that the UK overconsumes meat, so further reducing the price of factory-farmed meat does nothing for nutrition security.
- Fruits and vegetables are the backbone of nutrition security, yet affordability remains a major barrier.
- Alternative proteins are healthier than the meat they replace, but similarly, insufficient investments in affordability are a key bottleneck to widespread adoption.

3. A fair, robust farming sector

- Factory farming breeds and amplifies animal diseases such as Bird Flu and African Swine Fever. Animal disease devastates farmers' livelihoods and destabilises the food system, causing sharp fluctuations in food prices and costing taxpayers millions in culls.
- Factory farming concentrates excessive power in a handful of large, profit-driven meat corporations, who obstruct food security reform for their own gain.
- Alternative proteins could create thousands of rewarding jobs for UK farmers.
- Factory-farmed meat contributes towards climate change which drives the extreme weather that ruins UK crop farmers' yields
- Factory farming pollutes our countryside, jeopardising long term food security and costing taxpayers millions.
- A 20% swap from factory-farmed meat to alternative proteins could reduce the environmental damage from factory farming by £32M a year.

Our Policy Recommendations

1. **Do not greenlight any new factory pig or chicken farms.** Rather than improving our food security, large-scale livestock production facilities cost government and taxpayers money and hurt small family farms, making us vulnerable to disease and pollution, and increasing our reliance on food imports.
2. **Invest considerably in building the UK horticulture sector.** This should include infrastructure and technology grants for glasshouses and automation, and farm adaptation grants for those wanting to transition from factory farming to alternative forms of farming.
3. **Explicitly recommend alternative proteins in the NHS Eatwell guide.** Switching from meat and dairy to plant-based alternatives reduces calories, fat, and cholesterol, helping to achieve government targets on health and obesity and reducing NHS costs.
4. **Continue investments into tasty, healthy alternative proteins.** Affordable alternative proteins will safeguard our food security. We echo the National Food Strategy in calling for increasing investment in alternative proteins from £91M to £125M. We recommend investing in both research grants and UK alternative protein startups.
5. **Implement nudges to increase plant-based selection in public catering.** Schools, hospitals, and government catering should utilise proven methods from behavioural science to encourage selection of plant-based foods. These include plant-based defaults, majority plant-based menus, and integrated plant-based options.

1. Background

1.1 UK Food security

What is Food Security? The most widely used definition comes from the 1996 World Food Summit, which states Food Security is when: "all people, at all times, have access to enough safe and nutritious food to meet their needs and preferences for an active and healthy life.[1]"

Food security is increasingly recognised as a key problem facing the UK. In 2021, The National Food Strategy was published[2]. Commissioned by the government, it was the first independent review of the UK food system in 75 years. It outlined numerous issues within the food system and proposed research-backed solutions. However, few of its recommendations were fully implemented in the following years. That same year also saw the publication of the UK Government's Food Security Report by DEFRA[3], which is now updated every three years (the 2024 report came in December[4]). In 2024 alone there were 9 food security debates[5] in the UK parliament, and in the 2024 general election, food security was mentioned in the manifestos of every major political party.

It is no surprise why the food security conversation has become so central. In the past few years, the UK has seen some of its wettest weather[6] and highest food price inflation[7], with the average food basket cost increasing 27% between 2022 and 2025[8]. Additionally, food security has been shaken by

[1] United Nations Food and Agriculture Organization
[2] National Food Strategy, 2021
[3] DEFRA, 2021
[4] DEFRA, 2024
[5] UK Parliament, 2024
[6] The Independent, 2024
[7] UK ONS, 2024
[8] The Food Foundation, 2025

ongoing farmers protests[9], the conflict in Ukraine and, of course, the COVID-19 pandemic. Historically, this "three C's"[10] framework of Conflict, Climate Change and Coronavirus (and other disease), has been used to describe the risks to food security in developing countries. However, it is increasingly hitting closer to home.

1.2 Factory farming and UK food security

Factory farming[11] is a system of large-scale industrialised, intensive animal agriculture. It is controversial, because of its focus on maximising profit, production and efficiency, often to the detriment of animal welfare and the environment. Factory-farmed animals are kept indoors for most or all of their lives, typically with little space to move around and express natural behaviours.

Factory farming has taken over much of UK livestock production, particularly in the broiler chicken and pig sectors. Despite its dominance, it has attracted numerous criticisms. For example, factory farming is estimated to be responsible for 11%[12] of human-caused greenhouse gas emissions. Moreover, our recent report[13] estimates that it incurs many hidden costs to UK taxpayers, by absorbing subsidies, causing air and water pollution, poisoning rural communities, and eliminating farming jobs, with total costs estimated to be over £1.2B annually. As a result, it is vital to ask: **"is factory farming good for UK food security?".**

The industries themselves think so. For example, The British Poultry Council champions food security in its core vision statement[14], and argues this to

[9] BBC, various
[10] The British Medical Journal, 2022
[11] World Animal Protection
[12] World Animal Protection, 2024
[13] Conservative Animal Welfare Foundation, 2024
[14] British Poultry Council

parliament[15]. But there is a growing chorus of academics[16], organisations[17] and communities[18] that are critical of factory farming and its role in food security. This report joins that chorus, highlighting numerous ways that factory farming undermines UK food security.

1.3 The real food security solutions

If factory farming is not the solution to the UK's food security problems, then what is? This report argues that true UK food security can be achieved through a combination of an increase in affordable UK-produced fruits and vegetables, a modest reduction in meat consumption, and investment in the UK's plant-based and novel alternative protein industries.

Alternative proteins[19] are substitutes for meat and dairy that aim to replicate their taste and texture, whilst providing the same or better nutrition, with significantly better environmental impact. They are typically made of plants, but can also be made through fermentation[20] or direct cultivation[21] of animal cells. This report primarily examines plant-based proteins, but also touches on cultivated meat.

Our report discusses factory farming, fruit and vegetable production, and alternative proteins along 3 key pillars of food security:

1. A self-sufficient UK food system
2. An affordable, healthy diet for all
3. A fair, robust farming sector

[15] British Poultry Council, 2023
[16] Bryant et al., 2024
[17] Sustain
[18] Sentient Media, 2021
[19] Good Food Institute, 2025
[20] Good Food Institute, 2025
[21] Good Food Institute, 2025

2. A self-sufficient UK food system

2.1 Factory farming misleads the public about our self-sufficiency

The first pillar of food security is self-sufficiency in food production. Whilst producing 100% of our food domestically is neither practical nor ideal, it is nevertheless important for the UK to produce significant amounts of its own food. This reduces our reliance on imports and the whims of other countries, and insulates us from the volatility of global trade.

Self-sufficiency is usually represented by the **production-supply ratio**[22], which is the value of domestic-produced food, divided by the total value of food consumed (both domestic and imported). It is often used as an approximation of the percentage of food produced domestically. In 2024, The UK[22] appears largely self-sufficient in poultry, producing 96% of what we eat. It has moderate pork self-sufficiency (69%). This appears to suggest that factory-farmed poultry (and to a lesser degree, pork) are providing good food security.

[22] DEFRA, 2024

However, these figures overlook a key issue—factory-farmed pork and chicken depend heavily on imported soy feed. A recent report[23] highlights that if we were to source all factory-farmed chicken and pig feed from domestic legumes, cropland devoted to animal feed would have to expand by 60-78%. The UK simply does not have that land. If we are to cut soy imports without increasing land devoted to feed, we would have to reduce chicken and pork consumption by 41-44%. This means that for all practical purposes, the UK is much less self-sufficient in chicken and pork than official figures state. Taking soy imports into account, we calculate that the UK is actually 54% self-sufficient in chicken and 41% in pork (see Appendix A). If soy imports were suddenly unavailable, the UK would be left scrambling to import 46% of its chicken supply and 59% of its pork to avoid bare supermarket shelves.

Moreover, we find that overall UK self-sufficiency in meat (poultry, beef, and pork) is 85% using official figures, but after taking imported soy into account drops to 57% (See Figure 1). Due to its reliance on imported feed, factory farming reduces self-sufficiency in the UK meat supply by 28 percentage points.

[23] The Landworkers' Alliance, Pasture for Life, Sustain and Hodmedod (2023)

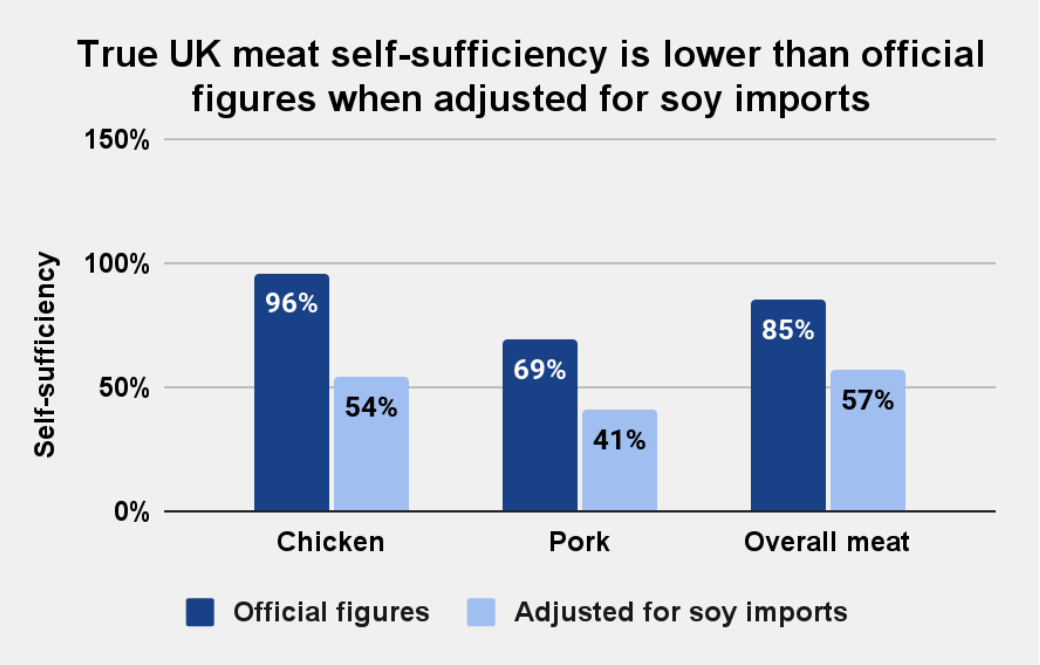


Figure 1: *UK self-sufficiency in meat, taking into account soy imports*

2.2 Self-sufficiency of UK vegetable production is the true crisis

The true food security conversation that deserves time and resources is our alarmingly low domestic vegetable production. In 2023 the UK produced[24] just 53% of its vegetables, down from 63%, 20 years earlier. Fruit is far worse: in 2023 we grew just 16% of our fruit, though this is considerably better than the 8% of 2003. The UK is hugely reliant on imported fruits and vegetables.

Without intervention, this will only get worse. It is widely accepted that The UK must eat more fruits and vegetables for our health. However, if consumption increases, but production does not keep up, our self-sufficiency reduces even more. In fact, to grow enough fruit and vegetables to meet the NHS EatWell standards of 5–7 portions a day, we'd need to increase production by up to 400%[25]! Rather than giving grants, planning permission and policy assistance

[24] DEFRA, 2024
[25] Food Foundation, 2023

to factory farms that do little for our food security, policymakers should focus support on UK horticulture.

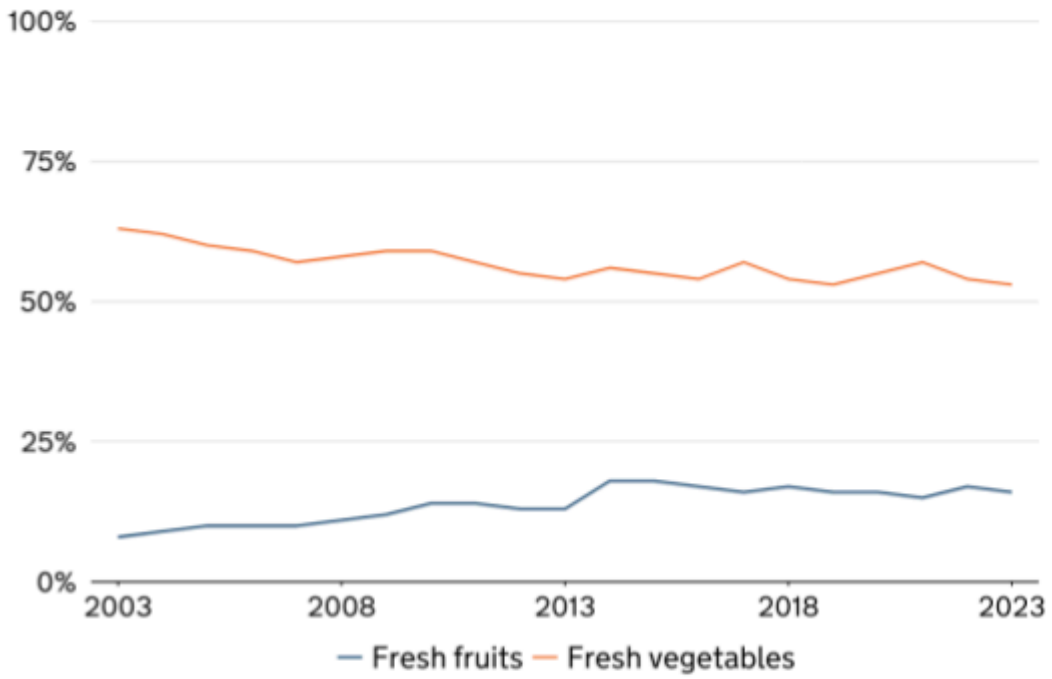
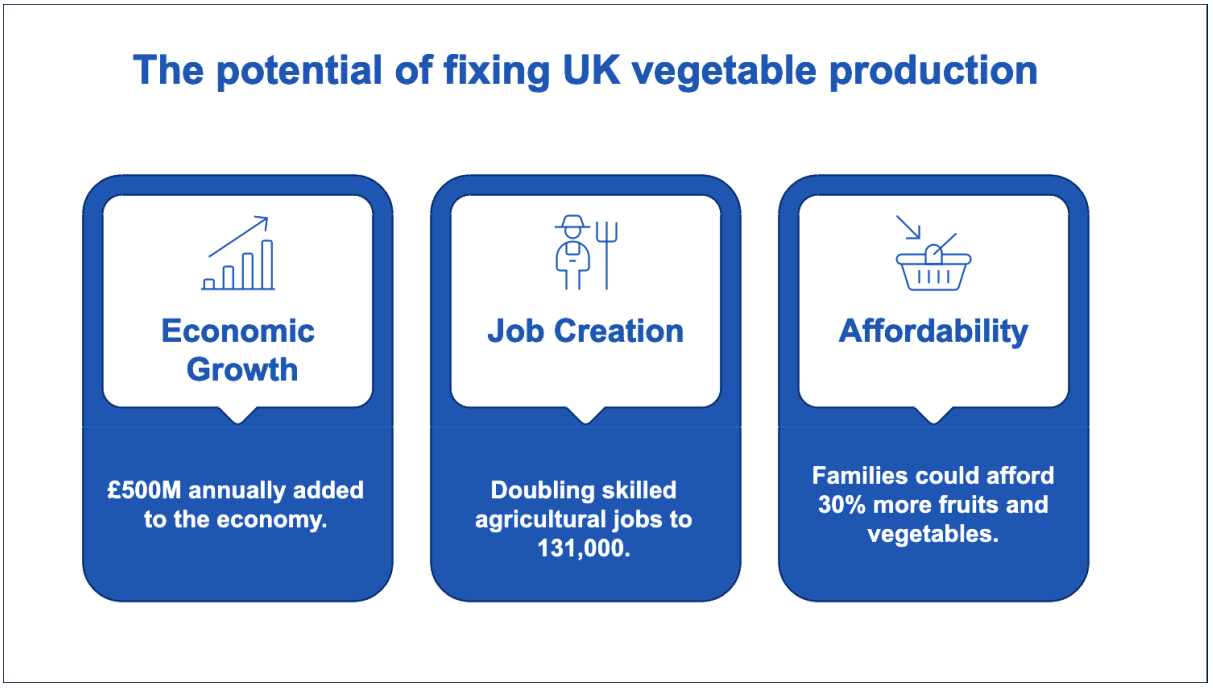


Figure 2: *Domestic UK production of fresh fruits and fresh vegetables as percentage of overall supply (production to supply ratio), 2003 to 2023. Source: 2024 UK government food security report*

Indeed, we can turn around The UK fruit and vegetable industry if we choose. Just 2% of our land[26] is devoted to (non-crop) fruit and vegetable production, making it extraordinarily land efficient. A doubling or tripling of UK horticulture would require very minimal extra land. Similarly, because most subsidies under the previous European Union Common Agricultural Policy (CAP) system were based on total land used, the horticulture sector has historically made do with few subsidies. Growth of the industry is bottlenecked[27] by several issues, including high land and equipment costs, and uncertainty about future subsidies and the availability of migrant labour.

[26] Bradshaw and Wentworth (2023)
[27] The Soil association, 2021

However, despite this, UK horticultural farmers that overcome these barriers earn some of the best profit margins in the sector[28].



The reinvigoration of UK horticulture would also benefit the economy. A report by the University of Warwick[29] outlines a plan for revolutionising UK vegetable production, adding an additional £0.5B (+28%) a year to the UK economy by 2032. Skilled agricultural jobs would more than double to 131,000. As a result, the UK population would be able to afford 30% more fruits and vegetables, with accompanying health benefits (which would also reduce healthcare costs[30]).

There are many specific strategies that would help revitalise UK horticulture, which are beyond the scope of this report (one example being plasticulture[31], with many other strategies, detailed here[32] and here[33]). However, two case

[28] DEFRA Farm Business Survey, 2023
[29] Napier, 2023
[30] Conservative Animal Welfare Foundation, 2024
[31] Cusworth et al., 2022
[32] Sustain, Soil Association, The Wildlife Trusts
[33] WWF and Tesco, 2023

studies are illuminating: Dutch Horticulture, and the “Thanet Earth” facility in Kent.

2.2.1 Case study 1: Dutch Horticulture

The Netherlands naturally has poor soil, and most of the country is prone to flooding. Despite this, they are the agricultural powerhouse of Europe[34]. Though they have roughly a third of the UK’s crop area, the Netherlands is the second-largest exporter of fruit & veg in the world, behind only the US. Dutch agricultural exports amounted to an impressive €11.5bn in 2023[35] (though it still imports €7.6bn worth, the majority being fruit).

The key to their success has been investment in the latest agricultural technology[36]. Dutch fields are monitored with drones and soil sensors, which allows them to optimise water and fertiliser use, minimise disease and maximise yields. The Dutch produce high quantities of vegetables year-round using hi-tech glasshouses. In 2023[37], the country had 4,100 hectares of land under glasshouses dedicated to tomatoes, peppers, cucumbers and aubergines alone. With climate control systems, energy-efficient lighting, and hydroponic techniques, they create ideal growing conditions. Some of these glasshouses even have smart lights[38] that dial down during peak electricity hours to minimise electricity costs, and experimental glass that better locks in heat.

[34] Hawaii Department of Agriculture, 2023
[35] Statistics Netherlands, 2024
[36] The Washington Post, 2022
[37] CBS Netherlands, 2024
[38] GrowSave, NFU Energy

2.2.2 Case Study 2: Thanet Earth, Kent

The UK has seen similar success applying similar methods in small pilots. Thanet Earth[39] is one of the largest glasshouse complexes in the world. The space for tomatoes alone is the size of 25 football pitches. It produces[40] about 400 million tons of tomatoes, 30 million tons of cucumbers and 24 million tons of peppers each year. By investing in sophisticated lighting and heating technology, they have managed to extend their UK cucumber season[41] by a month. This means they can produce cucumbers for all but two months of the year.

A key barrier to scaling UK glasshouse horticulture is energy. In 2022, surging energy costs meant that 50% of growers in the Lea Valley Growers Association could not plant their vegetables[42]. These growers account for around 65% of the UK's cucumber and pepper production, making this a substantial food security issue.

Thanet Earth, Kent. © Copyright David Anstiss and licensed for reuse under a Creative Commons Licence.

[39] Thanet Earth
[40] Brussels Times, 2022
[41] The Grocer, 2021
[42] Bradshaw and Wentworth, 2023

In stark contrast, Thanet Earth is a net energy generator. When conditions are favourable, it generates enough excess electricity to power 50,000 local homes. Thanet Earth achieves this through solar panels on-site, as well as innovative "Combined Heat and Power (CHP)" systems, which use excess heat from electricity generation to warm the glasshouses.

UK food and nutrition security sorely needs a high-tech horticultural sector that invests in automation and energy efficiency. The UK should import Dutch agricultural methods, not just its products, and Thanet Earth shows it is achievable.

2.3 Alternative proteins can eliminate the need for protein imports

We argue that it is not useful to focus food security discussions on self-sufficiency of specific meat products such as chicken and pork. UK meat consumption has changed considerably over time, and continues to change[43], including towards plant-based meat alternatives. A more forward-thinking metric is our self-sufficiency in *protein*, incorporating both meat and alternative proteins that mimic them in taste and culinary function. Doing this allows us to balance the needs of consumers with limited UK farmland.

Using latest figures, we estimate (See Appendix A for all calculations) that the UK is 85% self-sufficient in protein when ignoring imported soy feed, and 57% when taking imported feed into account. When we take this more holistic view, the opportunity of alternative proteins becomes clear: a 20% reduction in chicken/pork gives enough land for alternative proteins to increase protein sufficiency to 106%. This would make us entirely self-sufficient in our "meat" supply. A 50% shift from pork and poultry to alternative proteins could make

[43] Stewart et al., 2021

the UK a net protein exporter; with exports equivalent to nearly 40% of our current meat consumption.

As shown above, a switch from factory farmed meat to alternative proteins could eliminate our need for meat imports. This is important, because it is especially difficult to do this by simply producing more chickens and pigs. UK producers face a "carcass balance" issue: consumers reject many chicken/pig products, such as pig trotters or organ meat. Even if the UK produces more chicken/pork than consumers demand, much of it must still be exported at a low value (or processed into pet food) as UK consumers will not eat it. Similarly, even if we produce far more chickens, we may still have to import higher-value cuts (such as chicken breast). In contrast, when land is used to grow ingredients for alternative chicken/pork products, all of those inputs can be efficiently converted into exactly the desirable "cuts" consumers desire. This makes alternative proteins a doubly-efficient solution to the UK's self-sufficiency woes.

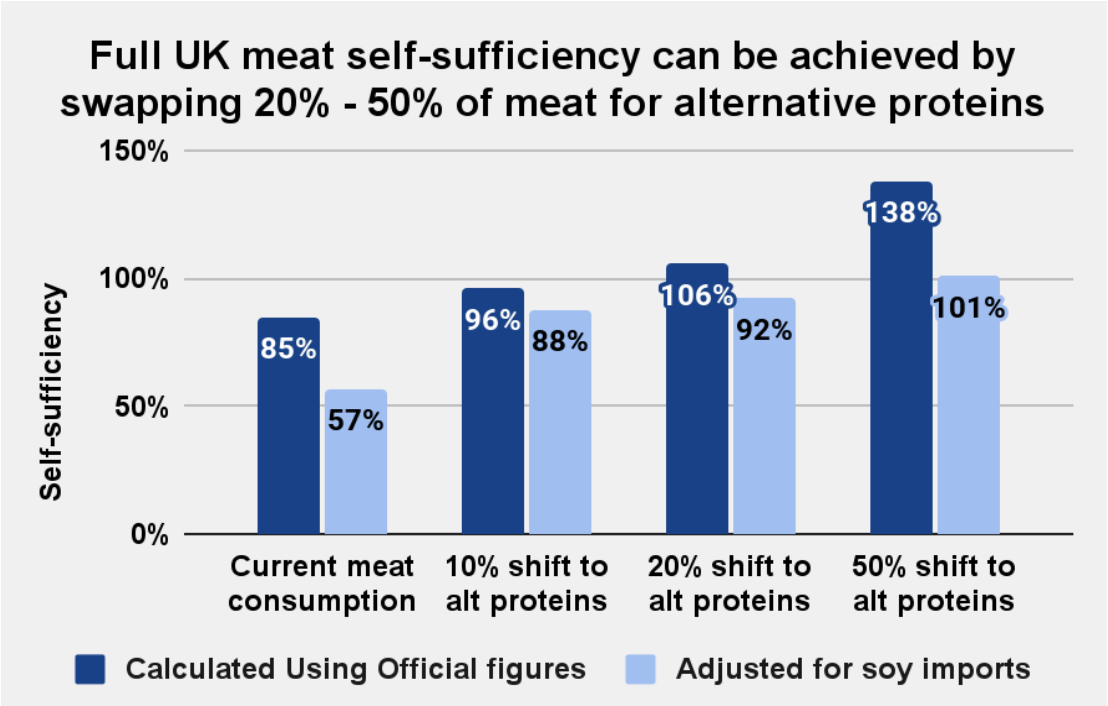


Figure 3: *how UK self-sufficiency in meat and protein is impacted by a switch to alternative proteins*

Whilst the UK has great potential[44] to be a leader in alternative proteins[45], we are not capitalizing[46] on this potential. Other countries also have ambitions in this space, with the USA[47], Canada[48], Denmark[49], The Netherlands[50], and China[51] among others making strong investments in alternative proteins[51]. Concerningly, the USDA has set its sights[52] on the UK alternative protein market. If we fall behind in the alternative-protein race, we risk becoming less self-sufficient in protein, and more dependent on imports, as British consumers may turn to products produced abroad.

3. An affordable, healthy diet for all

A second key pillar of food security is ensuring that a healthy diet is affordable for everyday people; what many call nutrition security. As with self-sufficiency, this pillar is undermined by factory-farmed meat, with fruit and vegetables being the true issue we should focus on. Moreover, alternative proteins are a valuable part of the solution here too.

3.1 Factory farming does not promote nutrition security

The corporations that produce factory-farmed meat argue that they play a vital role in UK food security by ensuring meat is affordable to all. We should first note that polling by The Conservative Animal Welfare Foundation[53] has shown that the public doesn't believe that the promise of cheap meat justifies

[44] Pardoe, 2024
[45] The Green Alliance, 2023
[46] Social Market Foundation, 2022
[47] AgFunder News, 2023
[48] Protein Industries Canada, 2023
[49] Forbes, 2023
[50] Good Food Institute, 2023
[51] Good Food Institute, 2023
[52] United States Department Of Agriculture, 2022
[53] Conservative Animal Welfare Foundation, 2024

the damage of factory farms. But more importantly, this ignores half the story; regardless of affordability, the UK consumes an unhealthy amount of meat[54].

The UK government considers obesity a key food security issue[55], and high meat consumption is a big driver.[56] Numerous health authorities in the UK recommend meat reduction (particularly red and processed meat), including Cancer Research UK[57], The British Heart Foundation[58], Diabetes UK[59], The UK Doctors Association[60] and of course, The NHS[61]. Modest meat reduction would have measurable health effects on obesity, cancer, heart disease and diabetes, and potential cost savings to the NHS could run into the billions[62]. Further decreasing the price of food that we overeat does not benefit UK food security. In fact, by contributing to obesity and poor health, overproducing cheap factory-farmed meat makes nutrition security worse.

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[54] Conservative Animal Welfare Foundation, 2024
[55] DEFRA, 2024
[56] Schlesinger et al., 2019
[57] Cancer Research UK, 2024
[58] British Heart Foundation, 2024
[59] Diabetes UK
[60] Doctors Association, UK 2024
[61] NHS Eatwell
[62] Conservative Animal Welfare Foundation

3.2 True nutrition security requires more and cheaper vegetables

Conversely, the true food security issue is that the UK does not eat enough fruits and vegetables. Only 33% of adults and just 12% of 11-18 year olds[63] eat the "five a day" recommended by Public Health England. A key issue is price; the poorest 20% of households would have to allocate nearly half of their disposable income[64] to afford a diet that meets government health recommendations. Another analysis found[65] that to increase fruit and vegetable sales by 10%, prices must come down 13% and 21% respectively. In fact, we may need even higher price reductions, as we must increase our consumption by 27.4% to reach the recommended 5 portions a day. It's clear that policy addressing the cost of food should primarily focus on vegetables, not factory-farmed meat.

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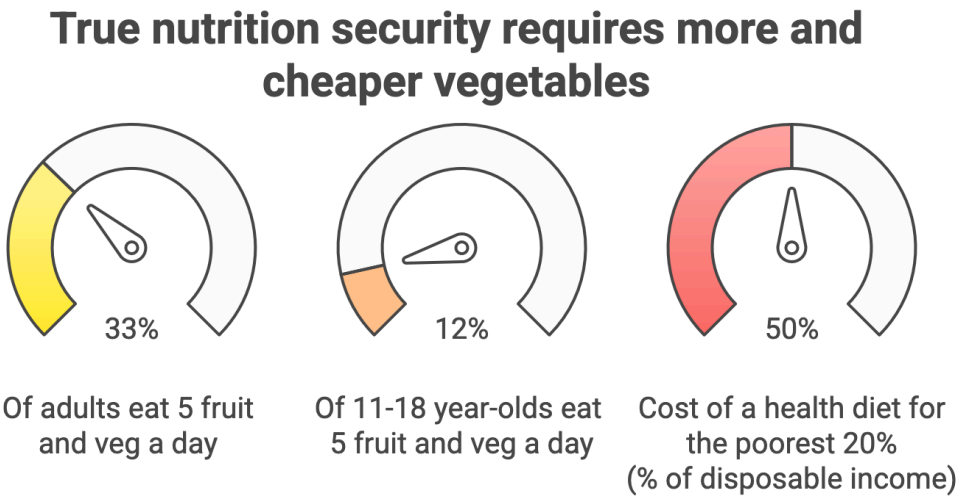
Additionally, meat reduction can improve nutrient security. Even factory-farmed meat is expensive relative to other foods. On the other hand, beans and whole grains are a healthy[66], more affordable[67] source of protein and nutrients, whilst also providing essential fibre. Swapping 20% of our meat consumption for whole plant foods could in fact save the UK households[68] £130 annually. As such, a move from factory-farmed meat to whole plant foods can be a double win for food and nutrition security.

[63] The Food Foundation, 2021
[64] The Food Foundation, 2023
[65] Dogbe and Revoredo-Giha, 2021
[66] Schlesinger et al., 2019
[67] Hirvonen et al., 2020
[68] Conservative Animal Welfare Foundation, 2024



3.3 Nutrition security is bolstered by alternative proteins

The UK government has recognised the health benefits of reducing meat in favour of plant-based alternatives. In the recent 2024 food security report[69], they said (emphasis added) that "Growing awareness of 'plant-based' diets and a fall in total meat consumption is also a longer-term trend which is a **positive trajectory for sustainability and health**, when accompanied by improvements elsewhere in the diet." and "replacing meat, dairy, and eggs with plant-based alternatives **could have large environmental and health benefits** in places where consumption of these foods is high". Additionally, data from The United Nations Food and Agriculture Organization (FAO)[70] shows that the UK can easily meet its entire protein needs through plant protein alone.

Despite recent concerns expressed in some UK media outlets, plant-based meat alternatives are, on average, healthier than meat on most metrics. As this

[69] DEFRA, 2024
[70] Macdiarmid et al., 2018

is a question for medical science, it is important to focus on peer-reviewed, systematic reviews that take all the evidence into account. One such review by Espinosa and colleagues (2024)[71] found that plant-based alternative proteins were lower in fat, similar in calories and salt, and higher in fibre and iron than meat. While they were lower in vitamin B12, for modest meat reducers this is highly unlikely to result in deficiency.

	Plant-based meat alternatives	Meat from animals
Calories	Similar	Similar
Saturated fat	Lower	Higher
Salt	Similar	Similar
Sugar	Similar	Similar
Cholesterol	Lower	Higher
Fibre	Higher	Lower
Iron	Higher	Lower
Vitamin B12	Lower	Higher
Other vitamins & minerals	Higher	Lower

Table 1: *Nutritional comparison of plant-based meat alternatives with the meat products they aim to imitate. Based on the reviews referenced in this report.*

[71] Espinosa et al., (2024)

Another 2024 systematic review[72] found that of the 8 studies that have focussed on micronutrients, 7 of them found plant-based meat alternatives contained significantly more iron and calcium than meat. Whilst they found that meat alternatives contained higher salt, this was due to some studies inexplicably comparing prepared alternative-proteins to raw, unseasoned meat. Given that consumers usually add salt/seasoning to meat during cooking, these findings are misleading if taken at face value.

Lastly, a recent analysis of 68 UK alternative-protein products[73] by the Food Foundation also found that they are generally healthier than meat on most metrics. Whilst many alternative-proteins are technically classified as "ultra-processed foods" based on the NOVA categorisation, this is not a health metric[74], and as such can be quite misleading[75]. Whilst some ultra-processed foods are associated with negative health effects, studies show that this does not apply to alternative proteins classified as ultra-processed[76].

One way in which alternative proteins fall short on nutrition security is price. Currently, most alternative proteins are more expensive than the meat products they aim to replace. However, the price-gap is shrinking each year, driven by innovation and increasing supermarket buy-in[77] (see also here[78]). In 2024, the price of meat alternatives fell below the price of meat[79] in The Netherlands for the first time. This was in part due to the fact that meat prices became unstable in the wake of the Russian invasion of Ukraine and a drought in Europe. Alternative proteins, with their simpler supply chains, did not see such price swings.

[72] Lindberg et al., 2024
[73] Food Foundation, 2024
[74] British Nutrition Foundation, 2024
[75] Bryant Research, 2023
[76] Cordova, 2023
[77] Vegconomist, 2024
[78] Plant-Based News, 2024
[79] Food Navigator, 2022

Progress in the UK has been slower, but still significant. During the 2024 Christmas period, Lidl UK debuted an affordable plant-based range[80] and recently Aldi UK launched a suite of new alternative protein products[81] starting at £1.49. Despite these positive moves, there is a clear need for government to support the development and commercialisation of affordable alternative proteins. Doing so would go a long way to improving UK nutrition security.

4. A fair, robust farming sector

4.1 Factory farming creates disease that destabilises the food system

Factory farming must battle constantly against disease outbreaks. This is because factory farming is particularly prone to creating and spreading disease[82]. Animals are densely packed, so disease spreads quickly. Selective breeding for higher meat production can impair health and reduce genetic diversity, so a disease that is deadly to one animal may be deadly to all animals in a farm. Finally, the low welfare conditions that intensively farmed animals are kept in are highly stressful, which impairs their immune systems (see Mace and Knight, 2023 for a review[78]). Factory farming by its very nature creates disease which can destabilise the UK food supply.

Of particular concern to the UK is Avian Influenza[83], also known as “bird flu”. The UK had 491 outbreaks of bird flu[84] alone between October 2021 and September 2022. The largest threat comes from a fast spreading, particularly lethal strain known as Highly Pathogenic Avian Influenza or HPAI[85], which the United Nations Food and Agriculture Organization (FAO) concluded

[80] Vegan Food and Living, 2024
[81] Vegconomist, 2024
[82] Mace and Knight, 2023
[83] US Centre for Disease Control, 2024
[84] European Food Safety Authority, 2022
[85] The Pirbright Institute

originated in poultry farms[86]. At the time of writing, the disease is rampaging across the USA. The UK has imposed a HPAI protection zone[87] across key poultry-producing areas to contain the disease, though a case has recently been detected in humans[88]. Worse, if we continue to factory farm chickens, diseases like bird flu may be impossible to control, let alone eradicate[89].

When an outbreak occurs, thousands of birds or hundreds of pigs must be culled, often over a period of days. The UK government compensates farmers for culled animals (at the taxpayer's expense), but farmers still lose income on animals that die of the disease *before* the cull, so these diseases can be devastating for farmer's incomes[90]. There are reports of poultry farmers leaving the industry as they cannot insure their flocks against the disease[91].

Additionally, when a factory farm culls its entire population, the local pork/chicken supply can rapidly disappear, with food security consequences for the UK public. A report by the FAIRR initiative[92] details how UK supermarkets over the last few years have been forced to ration eggs, chicken, and turkey due to bird flu. They also detail how in the Christmas period of 2022, poultry prices rose 24% due to supply shortages. Between September and November 2022, Suffolk-based Gressingham foods — a popular producer of ducks, geese, and turkeys — lost their entire flock of Christmas geese[93]. What is particularly poignant about this example is that many of Gressingham's farms are free-range[94]. Whilst factory farms create the perfect environment for the spread of bird flu, it is often smaller-scale and/or higher welfare farmers who pay the price.

[86] UN FAO scientific taskforce on avian influenza, 2023
[87] UK Government Animal and Plant Health Agency
[88] UK Health Security Agency (2025)
[89] Garske et al., 2007
[90] BBC, 2025
[91] BBC 2024
[92] FAIRR, 2023
[93] Open Access Government, 2022
[94] Gressingham Farms

Similarly, diseases that are created in factory-farmed animals frequently infect wild animals. This reduces biodiversity, a key pillar of our national environment and long term food security[95]. Bird flu alone threatens 78 species of UK birds[96]. RSPB Grassholm[97] have reported that bird flu killed a shocking 18,000 Gannets, 52% of the entire breeding population, in less than a year.

Another major threat is African Swine Fever (ASF). Whilst it has never been detected in the UK, DEFRA and the UK pork industry are in constant fear of it. The fear is well-founded. The 2018 ASF epidemic in China[98] killed so many pigs that *globally*, pork production was down 24%. Countries that imported pork were forced to compete with China, and prices doubled across the world for 14 months. The National Pig Association[99] admits that in the case of a severe UK outbreak, "large areas of the countryside would need to be shut down in an attempt to control the disease". It goes without saying that such an outbreak would be catastrophic to our rural communities.

Whilst our biosecurity controls have held thus far, we may see a threat from within our own borders if a new strain emerges on UK factory farms. Pigs are especially vulnerable to this as they are "mixing vessels[100]": they are able to host diseases from several species, including humans, and these diseases combine and mutate in large pig populations. The factory farming of pigs in the UK may be a ticking time bomb for our food security.

[95] UK House of Lords Library, 2022
[96] RSPB
[97] RSPB
[98] USDA, 2023
[99] The National Pig Association, 2024
[100] Gao et al., 2024

4.1.1 A plant-forward food system is more secure from the threat of disease

In contrast, a food system oriented more towards whole plant foods and alternative proteins would be much more robust to disease. Of course, crops, and vegetables also suffer from disease. However, there are three key reasons why this system would nonetheless be more secure than our current factory farming based system:

1. Any vulnerability of the crop system to disease also affects factory-farmed chickens and pigs, because they are fed those same crops. This means that factory-farmed meat is doubly vulnerable: both to animal disease and crop disease. Shifting consumption towards plant foods and alternative proteins reduces our vulnerability to crop diseases too, because we need fewer crops. A 20% swap to alternative proteins would require 2.6% *fewer* crops than present (see appendix B).
2. Factory farming makes new diseases more likely to emerge than traditional animal farming or crop farming. Additionally, when they do emerge, they are significantly more deadly and virulent.
3. Alternative proteins today are made from many protein crops, with 10 currently[101] in widespread use and a further 25[102] candidate crops actively being researched. As a result, alternative proteins inherently diversify the protein supply, increasing the robustness of the system and stabilising our food security. This means that were a virulent disease to emerge in one crop (such as soybeans), the alternative protein sector may be able to shift to using other plants for their protein.

[101] GFI, 2025
[102] GFI, 2023

4.2 Factory farming concentrates power in a few companies

As the factory farming business model has spread, it has concentrated power in the hands of a few large meat producers. In fact, as of 2020 half of UK chickens were slaughtered and processed by just 2 (American-owned) firms[103]. Being dependent on a few corporations for our meat supply brings food security risks, as it gives them considerable power. Unlike traditional farmers, who take pride in their role in feeding the nation, industrial meat producers are much more profit-driven. While many UK farmers struggle to make ends meet, top meat corporations pay their directors millions of pounds a year[104].

Under factory farming, UK pork and poultry have become vertically integrated industries, meaning that the largest producers often own everything from the farms to feed, to slaughterhouses and packing plants. For example, 2 Sisters Food Group owns 700 poultry farms[105], as well as sourcing additional birds from independent farmers. Many of these producers are buying up struggling independent farms to increase their own market dominance. In 2024, meat processing giant Cranswick[106] bought up several UK pig farms and increased the size of its poultry processing facilities. As small-scale farmers[107] are increasingly driven out of business and forced to sell their land, big meat producers are buying. This trend has been exacerbated by the recent abolition of the inheritance tax exemption for UK family farms. For the UK's small farmers, this represents a loss of one of their few remaining advantages over factory farms.

Being so large gives meat corporations the power to influence regulation to their advantage, even at the expense of food security. A 2024 report by

[103] The Bureau of Investigative Journalism, 2020
[104] Sustain, 2023
[105] 2 Sisters Food Group
[106] Watt Poultry, 2024
[107] Farmers Weekly, 2017

InfluenceMap[108] revealed that big meat corporations have successfully lobbied the EU to water down or abandon key climate policies. InfluenceMap notes that, for example, Cargill's official climate policy is highly inconsistent with scientific consensus, giving their policy a D- accuracy score.

As noted by the Changing Markets Foundation[109], animal agriculture interests have used well-established strategies to "distract, delay and derail" policy conversations about meat reduction. It has been alleged that big meat corporations fund research[110] to sway public opinion on related issues, with ex-UN officials and directors in the FAO[111] reporting that some are even able to influence the United Nations[112]. We cannot allow corporations to use lobbying to block pro-environmental, pro-health initiatives that would benefit UK food security, just because they are bad for profits.

Concentrating the UK meat supply in the hands of a few large corporations also brings a food security risk because it creates bottlenecks for the whole system. Hostile foreign actors and cybercriminals need only target a few companies to cause extreme damage to the food system. For example, the hacking of JBS[113] (the biggest industrial meat producer in the world) in 2021 closed all of its US facilities for several days until they were forced to pay a ransom of $11M. Similarly, a fire at a single Tyson food processing plant[114] affected beef prices across the US. Unfortunately, our pig and poultry sectors are moving towards similar consolidation and fragility.

Factory farms do little for rural communities. In fact, they are largely unwanted. Polling of rural UK residents shows that whilst 79% would be happy to live near a traditional farm, only 26% would accept living near a factory

[108] InfluenceMap, 2024
[109] Changing Markets Foundation, 2024
[110] The Guardian, 2023
[111] United Nations University, 2024
[112] The Guardian, 2023
[113] Supply Chain Digital, 2021
[114] CNBC, 2021

farm[115] (see Figure 4). Many communities attempt to prevent factory farms being built near them, but they are often outspent by the more powerful factory farmers[116] with larger budgets for legal fees.

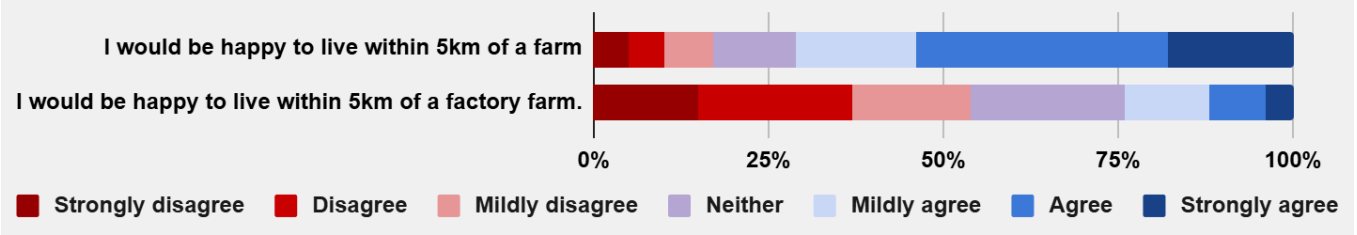


Figure 4: *Reanalysis of data from Conservative Animal Welfare Foundation, 2024[119], using the subsample of 228 rural UK citizens.*

4.3 Alternative proteins offer a better deal for farmers

With the right investment, The Green Alliance estimates that the UK alternative-protein industry could be worth up to £6.8 billion and create 25,000 jobs[117] by 2035. UK farming could be placed right at the centre, driving the change and reaping the just rewards. Canada's Protein Industries Cluster[118] offers a blueprint for such a system. Many of the jobs created in alternative proteins will be in research and manufacturing. However, The Green Alliance also estimates that 4000 of them will be created in the farming sector. Conversely, factory farming has resulted in the net loss of 14,000 farming jobs[119] since 1991. Farming jobs in alternative proteins will not be the low-skilled, undesirable jobs that characterise much of the pig and poultry sector (typically filled only by imported labour). Instead, they will place UK farmers at the forefront of tomorrow's global food system.

[115] Conservative Animal Welfare Foundation, 2024
[116] Byline Times, 2021
[117] The Green Alliance, 2023
[118] Innovation, Science and Economic Development Canada, 2024
[119] Conservative Animal Welfare Foundation, 2024

A key reason for farmers to be optimistic about alternative proteins is the fact that many of their major ingredients (peas[120], oats[121], wheat – even soy[122]) can be grown in the UK climate and soil. In fact, there are even methods to produce protein isolates on land unsuitable for crops. White clover, a common feature of the roughest Scottish grasslands, can reportedly be refined into leaf protein isolate[123], an ingredient with many uses. This may offer a better deal for farmers on even the most marginal land, whilst allowing them to continue producing food.

Many UK farmers stand ready to seize these opportunities, if regulation is favourable and financial incentives are fair. One survey of 51 Scottish livestock farmers[124] found that many are happy to change their farming practices towards growing crops for human consumption to meet consumer demands to plant-based diets.

4.4 Overconsumption of factory-farmed meat drives climate change, which sabotages UK farmer's yields

Climate Change is a threat to global food security, and the UK is no exception. In the 2024 UK Food Security Report[125], climate change hangs like a spectre over most sections, a factor that makes all other food security issues harder to address.

The bulk of climate change impacts will be felt in the medium-term future; a particularly alarming report by DEFRA[126] projects that by 2050, 75% of our highest grade cropland could be so degraded it would no longer be

[120] Nova Farina, 2025
[121] Glebe Farm Foods, 2025
[122] Soya UK
[123] StockFree Farming
[124] StockFree Farming, 2024
[125] DEFRA, 2024
[126] DEFRA, 2022

croppable. However, climate change is already affecting UK weather, increasing both rain and shine. Most of the highest temperatures the UK has seen since the 80s have come in the last 5 years[127]. Between October 2022 and March 2024, the UK experienced its wettest 18-month period[128] on record. UK winters[129] have become 1 °C warmer and 15% wetter in the past century. In 2022, a historic heatwave saw temperatures hit 40 °C[130] for the first time. An analysis by a team of UK academics on behalf of World Weather Attribution[131] concluded that climate change made the heatwave 10 times more likely.

Unpredictable weather due to climate change negatively impacts UK agricultural yields. Historically wet weather saw vegetable yields decrease 4.9%[132] in 2023, with fruit 12% down. UK grain farmers are estimated to have lost £1.18 billion[133] due to crops that were not able to be planted due to unusually wet weather. Conversely, there are records of the 2022 heat wave setting farmers' fields ablaze[134]. Additionally, factory-farmed poultry are particularly vulnerable to heat waves[135], due to their high stocking density. In large units where thousands of birds are packed tightly together, they cannot escape the deadly heat.

These negative weather effects can also create food insecurity by increasing the price of food. A 2023 analysis by The Energy and Climate Intelligence Unit[136] found that one-third of food price inflation in recent years can be attributed to climate change. This increased the food bills of the average British family by £605 in 2022 and 2023 compared to 2021.

[127] UK Met Office, 2024
[128] UK Environment Agency, 2025
[129] Carbon Brief, 2024
[130] Carbon Brief, 2022
[131] World Weather Attribution, 2022
[132] The Guardian, 2024
[133] Energy and Climate Intelligence Unit, 2024
[134] The Telegraph, 2022
[135] Davie et al., 2023
[136] The Energy and Climate Intelligence Unit, 2023

It is widely accepted that animal agriculture is a key driver of climate change, being responsible for up to 18% of global greenhouse gas emissions[137]. Indeed, the independent UK Climate Change Committee[138] recommends that we need to reduce meat consumption by 20% by 2035 to meet our carbon goals. Specifically, factory farming is estimated to be responsible for 11%[139] of human-caused greenhouse gas emissions. Factory farming accelerates climate change by promoting excessive meat consumption, jeopardizing UK food security.

Swapping some or all of the meat[140] in our diet for whole plant foods or alternative proteins is vital to tackle the climate crisis. Indeed, The World Bank ranked alternative proteins[141] second in their list of top 26 climate change solutions. Modelling by The Green Alliance[142] suggests that replacing processed meat with alternative proteins could cut emissions from meat and dairy by 35%, whilst still allowing for the UK public to continue eating beloved whole cuts of meat, such as a Sunday roast. Lastly, Boston Consulting Group[143] estimated that if alternative proteins reach just an 11% market share by 2035, it would provide greenhouse gas emission savings equivalent to decarbonising 95% of the aviation sector. It is clear that if the UK is to lead in tackling the climate crisis, even if for our own self-interest, alternative proteins are a vital tool to have in our arsenal.

[137] FAO, 2006
[138] UK Climate Change Committee, 2020
[139] World Animal Protection, 2024
[140] Kukowski, 2024
[141] The World Bank, 2024
[142] The Green Alliance, 2023
[143] BSG, 2022

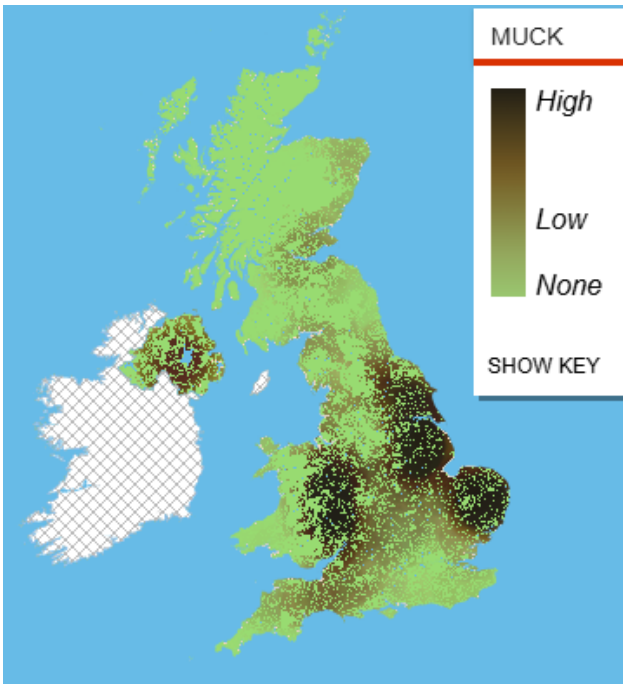


Figure 5: *The UK "Muck Map"[144] detailing the amount of manure from chickens and pigs spread on farmland. An interactive version can be found here.*

4.5 Factory farming harms the UK countryside

Britain has a verdant countryside and plenty of high quality farmland. Our medium-long term food security depends on maintaining the good quality of our natural resources. Unfortunately, factory farming degrades our countryside far more than traditional agriculture.

UK rivers have reached crisis point, with only 15%[145] meeting the criteria for good ecological status. A key issue is the build up of nitrogen and phosphorus, which happens when manure and fertilisers washes into waterways. This can happen when too much manure is spread on farmland or is spread incorrectly. This build up of nutrients causes eutrophication, which causes algal blooms and hypoxia, killing aquatic animals. Every region in the UK now has more

[144] Compassion in World Farming, Sustain, Friends of the Earth and Materiality, 2024
[145] UK Environment Agency, 2022

nitrogen than it can absorb, and regions with more factory farms have the biggest nitrogen surplus[146] (see Figure 5). Smaller farms spread their manure across a wide area, whereas factory farms produce unmanageable amounts of waste[147] in a small area, and much of it washes into rivers. Analysis by The Soil Association places the blame squarely on the shoulders of factory farms. Their 2024 report[148] argues that 10 UK river catchment areas are at risk of becoming "dead zones" in the coming years if we allow factory farms to proliferate.

Conversely, alternative proteins outperform factory farming on all environmental metrics[149]. They use 82-85% less land, require less fertiliser, energy, and water. They emit less carbon dioxide into the atmosphere and pollute rivers less (See table 2). If the UK swapped 20% of its factory farmed meat for chicken and pork alternatives (10% of each), it could save the UK taxpayer £32M a year from reduced air and water pollution alone (see table 2, and Appendix C for methods)

[146] Sustain, 2023
[147] Caffyn, 2021
[148] Soil Association, 2024
[149] GFI

Environmental Impact	Reduction for plant-based alternative proteins, compared to: Pork	Chicken	Taxpayer savings from a 20% switch to alternative proteins
Air Pollution (Fine particulate matter)	65%	79%	£28.5M
Water Pollution (Marine eutrophication)	51%	75%	£3.6M
Total	–	–	£32.1M

Table 2: *Reductions in environmental impact and resulting taxpayer savings from switching factory-farmed meat for alternative protein*

5. Food security forever: the prospect of cultivated meat

One exciting prospect for food security in the medium-term future is cultivated meat. Cultivated meat is real animal meat, grown from animals' cells rather than being taken from slaughtered animals.

Cultivated meat has a number of powerful food security advantages. Because it grows the most desirable cuts of meat directly, it solves the carcass balance problem and is very efficient, producing no low-value cuts. Cultivated meat requires fewer resources—land, water, and agricultural inputs[150]—while reducing greenhouse gas emissions. It is 2.8 times more efficient at converting feed into meat than chicken, and 4.6 times better than pork. Whilst it may require more energy to produce, we are able to produce more

[150] GFI, 2024

energy; land, water and carbon budgets are finite. If we can feed the UK on far less land, farmers are free to refocus towards being stewards of a vibrant UK countryside; rewetting their peatlands, reforesting to store carbon and help us reach net-zero, rewilding to increase biodiversity, or even producing energy via solar farms.

Cultivated meat replicates the nutrition of conventional meat as its starting point, but could offer additional health advantages. Some cultivated meat producers are investigating novel ways to make their products healthier than their conventional counterparts – for example, by replacing unhealthy saturated fat[151] found in conventional beef with healthy omega-3 oils. Assuming it can reach affordability, it could achieve perhaps the "holy grail" of nutrition security; good health without any meat reduction.

Moreover, the strict regulation and safety requirements in place for cultivated meat production ensure a level of product hygiene and safety that far exceeds that of conventional meat. For example, a cultivated meat producer may use a completely sealed process whereby no contamination is possible after the cells are introduced, and they may be required to perform precise scientific safety assessments for each batch of cells they use. Unlike factory farming, where disease is an unavoidable risk, cultivated meat could be disease free.

British farmers have expressed curiosity and openness in getting involved in cultivated meat[151]. Of course, farmers will be needed to grow the crop inputs for cultivated meat. Additionally, some will have opportunities to be involved in production itself. For example, Welsh livestock farmer Illtud Dunsford[152] is also the co-founder of Cellular Agriculture Ltd, a UK company engineering bioreactors for cultivated meat production. Given its efficiencies, a thriving, UK cultivated meat sector could allow UK farmers to profitably supply our entire

[151] MacMillan et al., 2024
[152] New Harvest 2021

population for generations to come, with as much meat as they desire, without need for imports.

As with alternative proteins, the UK has the potential to lead the emerging cultivated meat industry, securing its long term food security. The FSA has already pioneered[153] the world's first regulatory sandbox for it, and in February 2025 The UK became the first company where consumers could buy cultivated pet food[154]. But as with alternative proteins, the UK must continue to invest in innovation to maintain their position at the forefront of this exciting new future of food security.

Image from the Good Food Institute's cultivated meat library – https://show.pics.io/cultivated-meat-image-library

[153] Food Manufacture, 2024
[154] BBC 2025

Food Security Issue	Factory Farming	Fruits and Vegetables	Alternative Proteins
Self-sufficiency	Low due to dependency on imported soy feed	Poor, but solutions exist	Could provide full self-sufficiency Land efficient
An affordable, healthy diet	Overconsumption harms health Further price reductions unnecessary	Vital for health Strong price reductions needed	Healthier source of protein Progress on price competitiveness is slow
A fair, robust farming sector	Automates jobs, skilled labour issues Contributes to the climate crisis Consolidates power in big corporations Creates and worsens disease	Skilled labour issues Helps meet Net Zero Will play a vital role in a vibrant farming sector but requires technological innovation	Could provide new, skilled jobs Can be made from UK crops Less vulnerable to disease

6. Policy recommendations

We welcome the December 2024 announcement by Steve Reed MP, Secretary of State for Environment, Food and Rural Affairs, that the UK government will develop a new "ambitious" National Food Strategy. As our report has argued, a food strategy that maximises UK food security should trade factory farms for fruits, vegetables and alternative proteins. A bold National Food Strategy should position the UK as a global leader in alternative proteins: plant-based alternatives in the short term, and cultivated meat in the medium and long term.

We propose the following five targeted policies to enhance UK food security:

1. **Do not greenlight any new factory pig or chicken farms.** Rather than improving our food security, large-scale livestock production facilities cost government and taxpayers money and hurt small family farms, making us vulnerable to disease and pollution, and increasing our reliance on food imports.
2. **Invest considerably in building the UK horticulture sector.** This should include infrastructure and technology grants for glasshouses and automation, and farm adaptation grants for those wanting to transition from factory farming to alternative forms of farming.
3. **Explicitly recommend alternative proteins in the NHS Eatwell guide.** Switching from meat and dairy to plant-based alternatives reduces calories, fat, and cholesterol, helping to achieve government targets on health and obesity and reducing NHS costs.
4. **Continue investments into tasty, healthy alternative proteins.** Affordable alternative proteins will safeguard our food security. We echo the National Food Strategy[155] in calling for increasing investment in

[155] GFI Europe, 2021

alternative proteins from £91M[156] to £125M. We recommend investing in both research grants and UK alternative protein startups.

5. **Implement nudges to increase plant-based selection in public catering.** Schools, hospitals, and government catering should utilise proven methods from behavioural science[157] to encourage selection of plant-based foods. These include plant-based defaults[158], majority plant-based menus, and integrated plant-based options.

[156] Food Navigator, 2024
[157] Bryant Research 2024
[158] Conservative Animal Welfare Foundation, 2024

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Appendix A: Calculating the self-sufficiency of the UK meat supply, with and without soy imports and alternative proteins.

First, we calculated the self-sufficiency of the UK for meat. We did this by combining the self-sufficiency metrics for beef, pork, and poultry. For our measure of self-sufficiency, we used the production supply ratios from the 2024 UK government food security report. We took a weighted average of the production supply rations for beef, poultry and pork; 87%, 96% and 69% respectively. We weighted each ratio by how much of each meat is typically eaten by the average UK citizen. For example, The UK eats more poultry than other meats and less beef, so poultry contributes more to the overall metric and beef less. For UK meat consumption, we used FAO data from 2021, served through Our World in Data.

From this, we calculated that the UK produces 85% of the value of its meat supply, importing the other 15%.

Secondly, as Sustain has highlighted, these are misleading numbers as they count chicken and pork as domestically produced even if it is totally reliant on imported soy. We calculate the “true” self-sufficiency of pork and poultry. Sustain estimates that if the UK fed domestic chicken and pork using only UK-produced legumes, production would have to decrease 44% and 41% respectively. This means that our self-sufficiency would drop to 96% x (100% - 44%) = **54%** for poultry and 69% x (100% - 41%) = **41%** for pork. To protect against dramatic shocks to the meat supply, the UK would thus need to import 46% of its chicken and 59% of its pork.

Combining these true self-sufficiency estimates with that of beef the same way we did above, we find that the UK's self-sufficiency in meat is not 85%, but is in fact 57%.

Finally, we modelled the improvements to our self-sufficiency in meat if chicken and pork consumption was reduced, and that the land used to produce these products was instead used to grow inputs for plant-based meat alternatives. We used land savings from published life cycle analyses (LCAs) comparing pork and chicken products to their plant-based alternatives, which are summarised here. We took a simple average of the land savings across LCAs. This suggested that plant-based pork alternatives use 64% less land than pork, and plant-based chicken alternatives use 81% less land than chicken.

However, not all the land spared could be used, as some of this land is outside the UK. Specifically, the soy used in chicken and pig feed (though the UK can grow soy). To model true food security, we handicap plant-based meat alternatives to only use the land freed up in the UK. As 5-18% of pig feed and 15-26% of chicken feed is soy (See Sustain report), we take the mid-point of these estimates and assume that this % of land is not available for alternative proteins.

Reduction in factory farmed meat	0% swap (no change)	10% swap	20% swap	50% swap
UK meat self-sufficiency	85%	96%	106%	138%
UK true meat self-sufficiency	57%	88%	92%	101%

Assumptions and caveats

- We are using the production supply ratios as if they represent weights of product produced, not value of product produced. Whilst this is a

commonly made assumption, it means our scenario assumes that plant-based meat alternatives have the same price as the meats they replace.

- Crucially, our results show that we can greatly increase the supply of protein products. For this to translate into consumption, we first must achieve price parity.
- We assume that the land previously used to grow chicken and pork feed can be repurposed to grow inputs for plant-based meat alternatives.
- Because 15-26% of chicken feed is soy, and soy is the primary component of feed grown outside the UK, 15-26% of the land used to grow their feed is outside the UK. This is based on the assumption that soy and other crops used in animal feed have equivalent yields per unit of land. If soy is more productive than other feed crops such as barley (which seems likely), we will underestimate the amount of alt proteins we can produce with the land.

Appendix B: Estimates of arable land savings from a switch to alternative proteins

We previously estimated that 40% of UK arable cropland is devoted to animal feed, of which 37.1% for broiler chicken feed and 15.7% for pig feed. This means that 6.3% of all UK cropland is used for pig feed and 14.9% for broiler feed.

In appendix A we calculated that alternative proteins have a domestic land saving of 64% compared to chicken and 56%. Thus, a 100% swap from chicken to alternative proteins would result in a UK cropland saving of (64% x 14.9%) = 9.5% of all UK cropland. Similarly, for pork it would save (56% x 6.3%) = 3.5% of all UK cropland, for a total of 13.1% saved. For smaller reductions the results are given below:

Percent Swap	% Reduction in total UK cropland		
	Chicken	Pork	Total
10%	1%	0.3%	1.3%
20%	1.9%	0.7%	2.6%
50%	4.8%	1.8%	6.6%
100%	9.6%	3.5%	13.1%

Appendix C: Estimates of environmental costs from swapping factory-farmed meat for alternative proteins.

In a previous report, we estimated the cost of air pollution and river damage from UK factory farming of chickens and pigs. We used these figures to estimate the potential environmental savings from a switch to alternative proteins. We used figures on reductions in environmental damage from The Good Food Institute for river damage and for air pollution. In the case of air pollution, they reviewed several lifecycle analyses of available alternative protein products, comparing them to the meat products they aim to replace (i.e. chicken breast or pork sausage). We averaged all life cycle assessments (LCAs) for each category to get average reductions.

To get estimates of cost savings, we modelled a 20% swap of factory-farmed meat for alternative proteins. We split this evenly between chicken and pork, assuming a 10% of chicken consumption and 10% pork consumption. We took 10% of our cost estimates for air and river pollution for each meat type, and multiplied that by the reduction percentage for alternative proteins. We assumed that consumers swapped UK produced chickens and pork for UK produced chicken and pork alternatives.

Meat	Pollution type	Cost (£M)	Reduction in pollution achievable by swapping to alt proteins	Cost savings from 10% swap
Chicken	Air	£242M	79%	£19.2M
Pork	Air	£143M	65%	£9.3M
Chicken	River	£23M	75%	£1.7M
Pork	River	£37M	51%	£1.9M
Total		£445M	—	£32M