

Turning the Food System Round

The role of government in evolving to a food system that is nourishing, sustainable, equitable and humane

We have a food system that does the opposite of what it is meant to do: it makes us unhealthy. In addition, it undermines the natural resources on which the future health of farming depends and places our climate targets out of reach. It produces poor and volatile incomes for many farmers and, all too often, animal welfare that falls far short of our obligations to them as sentient beings.

If we want a better system we will need to embark on far-reaching changes.

As consumers we need much better information of the implications of different farming methods and dietary choices for our health, the environment, climate change and animal welfare.

We need to embrace new online business models that link farmers much more directly to consumers allowing farmers to receive a greater share of the income generated by their produce and consumers to buy fresh, local, humanely produced food at lower prices.

We need policies that ensure that everyone including the most disadvantaged can access nutritious food that enhances rather than undermines their health and well-being.

We need farming methods that restore and build soil quality and biodiversity.

We need much improved animal welfare that enables animals to have lives worth living.

The question is, how can all of this be achieved?

This report sets out guidance on the role of Government in achieving a new food system that is nourishing, sustainable, equitable and humane.

There is growing recognition of the need for the UK to move to a better food system. The defects of the current system are well documented:

Dietary Health

The Faculty of Public Health states that “In the UK, the poorer people are, the worse their diet, and the more diet-related diseases they suffer from”.¹

In recent years healthy foods have been consistently more expensive than less healthy ones.²

Poor diet – including high red and processed meat consumption - is now the major contributor to disease in England and the second biggest risk factor for mortality in the UK after tobacco.^{3 4}

Environment

The Natural Capital Committee points out that "farming can produce large external costs to society in the form of greenhouse gas emissions, water pollution, air pollution, habitat destruction, soil erosion and flooding."⁵

A UK study concludes that “modern agriculture, in seeking to maximize yields ... has caused loss of soil organic carbon and compaction”.⁶ It highlights “the extent to which modern agricultural practices have degraded soil natural capital”. It points out that depletion of soil organic carbon “in conventional agricultural fields is now thought to be an important factor constraining productivity as many arable soils have suboptimal concentrations”.

A 2015 report by the Committee on Climate Change states: “Some of the most productive agricultural land in England is at risk of becoming unprofitable within a generation due to soil erosion and the loss of organic carbon.”⁷ It adds: “Agricultural soils are being degraded by intensive farming practices in some areas”.

Bio-diversity

The Department for Environment, Food and Rural Affairs (Defra) points out that “bird populations are considered to be a good indicator of the general state of wildlife as they have a wide habitat distribution, [and] they are near the top of the food chain”.⁸ Defra data show that in 2016 the UK farmland bird index stood at 44.1, its lowest ever and less than half of its 1970 level”.⁹

There has been a marked decline in pollinating insects including bees in the UK.¹⁰ The Parliamentary Office for Science & Technology states that intensive farming has resulted in a significant loss of habitats with the resultant loss of food and nesting resources for pollinators –and the use of pesticides and monocultures – being a leading driver in pollinator declines.¹¹

Climate change

The 2018 report by the UK Committee on Climate Change (CCC) states that “agriculture now accounts for a larger share of UK economy wide emissions (10%) than at any time since 1990 (7%). This reflects no change in agricultural emissions since 2008 and the faster pace of decarbonisation in other sectors.” Put simply agriculture is simply not playing its part in reducing UK emissions.¹²

Another 2018 report by the CCC states that incremental changes will not deliver climate goals and that a substantial reduction in the consumption of meat and dairy is needed if we are to meet UK climate targets.¹³

Farmers

In 2016, the agri-food sector contributed £111 billion to the UK economy. Of this just 7% was produced by farmers.¹⁴ The lion's share was generated by middlemen – retailers, foodservice operators, food manufacturers and wholesalers.

Animal welfare

Hidden behind government and industry assurances that the UK has some of the highest animal welfare standards in the world, lie some serious welfare problems. For example:

- 44% of UK laying hens are kept in 'enriched' cages which are only marginally better than the banned barren cages¹⁵
- 50% of UK sows are confined in farrowing crates
- 70% of UK fattening pigs are tail docked despite routine tail docking having been banned since 1994¹⁶
- 32% of UK fattening pigs do not have access to effective enrichment despite the provision of such enrichment having been required by law since 1994¹⁷
- Around 94% of UK chickens reared for meat are farmed intensively indoors
- Around 20% of UK dairy cows are 'zero-grazed' i.e. they never or only rarely have access to the outdoors¹⁸
- 86% of British pigs are slaughtered with high levels of carbon dioxide¹⁹ even though in its 2003 report the Farm Animal Welfare Council concluded that "the use of high concentrations of CO₂ to stun and kill pigs is not acceptable and we wish to see it phased out in five years".²⁰

The challenge of moving to a better food system may appear daunting as a number of factors operate to 'lock-in' the status quo.²¹

However, the history of the last 70 years shows us that major societal transformations are possible. The position of women has changed greatly though of course much remains to be done. We have gone from homosexuality being a criminal offence to gay marriage. The prevalence of smoking is hugely reduced. Each of these and many other changes have been achieved by a myriad of different measures as gradually fresh cultures, social norms and behaviours are forged.

Similarly, a wide array of initiatives will be needed if we are to move to a better food system.

This report examines just some of them.

It focuses on the role of government while recognising that many other actors – farmers, retailers, consumers, caterers – must play a part if we are to move to forms of farming that nourish our health, soils and biodiversity and provide decent livelihoods for farmers and good lives for animals.

“Strong government policy is essential to help achieve a healthy, profitable, equitable and sustainable food system that benefits all”

Mozaffarian *et al*, 2018 *BMJ* 2018;361:k2426

What steps can be taken by Government to help us move to a first-rate food system?

A report by Chatham House stresses that while they have important roles to play, the restructuring of our food system cannot be left to “industry goodwill or enlightened self-interest”.²²

The Chatham House report highlights the need for governments’ non-interventionist approach to be replaced by a willingness to set a strong policy, regulatory and fiscal framework. It emphasises that governments must govern and must be prepared to step in and lead.

The report stresses that “lack of evidence should not be used as an excuse for policy inaction. Indeed policy inaction leads to a paucity of empirical evidence. Trials and experimentation particularly based on some of the more politically challenging fiscal and regulatory approaches discussed are essential ... robust monitoring and evaluation processes need to be in place so that impacts in the short, medium and longer term can be understood. In this way the evidence base is built and policies progressively refined and improved.”²³

Building a fresh vision for future food and farming

Government must itself recognise and then communicate to society the need for a new vision of food and farming. It must generate and sustain commitment among all sectors of society – including of course farmers and food businesses – to realising this vision.

Government must develop integrated, cohesive policies. It needs to move away from the current practice of formulating policy in silos with different Government departments, or sections of departments, being responsible for agriculture, the environment, animal welfare, dietary health, climate change and agri-tech. As a result policies in this arena often do not cohere and are sometimes contradictory.

What would a good food system look like?

Dietary
Health

It would produce nutritious food and promote healthy diets.

The diets of poorer members of society would be as nutritious as those of wealthier people.



Environ
ment

Crops and animals would be farmed in ways that rebuild soil quality, restore biodiversity and minimise air and water pollution and use of water.

The UK food system would not lead to environmental degradation, deforestation and biodiversity loss in other countries.



Climate
change

Greenhouse gas (GHG) emissions from food and farming would be substantially reduced. Failure to do this would put pressure on other sectors to shoulder more than their share of emission reductions; it would increase the cost of mitigation in other sectors or reduce the feasibility of meeting the UK's statutory climate targets.



Farmers

As farmers provide the crops and animal products used by the agri-food sector, they would receive a fair share of the income generated by this sector. They would receive an income that is sufficient to provide decent livelihoods and to enable them to farm to high environmental and animal welfare standards.



Animal
welfare

Animals would be reared to high standards of welfare that not only prevent negative outcomes but also provide animals with opportunities for positive experiences.

Better information: The government should develop programmes to increase public awareness of the implications of different farming methods and dietary choices for human health, the environment, food security, climate change and animal welfare. Sustainable Development Goal 12.8 requires governments to ensure that by 2030 “people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature”. While improved information on its own may not substantially change consumer behaviour, it is a crucial first stage and, when combined with regulatory and fiscal incentives, it can contribute to behavioural change.

Research indicates that consumers have low awareness of the impact on climate change and sustainability of (i) food compared with other factors such as transport and (ii) of meat compared with other foods such as vegetables, but that clear labelling of food as to GHG emissions and energy use would influence purchasing decisions.²⁴

Mandatory point of purchase labelling as to farming method: Governments rightly state that consumers must play their part in driving improvements in animal welfare. However, consumer demand is being impeded by lack of clear information at point of sale as to how meat and dairy products have been produced. Since 2004 the law has required eggs and egg packs to be labelled as to farming method. This has been an important factor in the substantial shift away from cage eggs; 54% of UK egg production is now free range.²⁵

With meat and milk, however, consumers are largely in the dark. The problem is particularly acute as regards milk and dairy products. Most milk is pooled together making it impossible to distinguish between intensive and pasture-based milk, cheese, butter and yoghurt.

The UK should require meat, milk and dairy products, including those which have been produced intensively, to be labelled as to farming method. It should also extend the existing labelling scheme for shell eggs to egg products e.g. eggs used as ingredients in food. The Commons Committee on Environment, Food and Rural Affairs has twice in 2018 recommended “that the Government [should] introduce mandatory method of production labelling”.^{26 27}

End misleading labelling: Meat and milk are often labelled misleadingly.²⁸ Images are often used that suggest the animals were farmed outdoors when in reality they were kept indoors throughout their lives. Such labelling is in many cases in breach of the Consumer Protection from Unfair Trading Regulations 2008. Government must properly enforce this legislation as such labelling not only misleads consumers but also undermines those farmers who invest time and money in farming to high welfare standards; misleading labelling makes it difficult for them to distinguish their products in the marketplace from those derived from animals farmed intensively indoors to low welfare standards.

End obfuscation: Defra and industry regularly assert that ‘Britain has some of the highest animal welfare standards in the world’. While this may be true in some cases, it serves to hide the fact that, as indicated earlier, many UK animals have poor welfare. Defra talks of ‘Great British food’ which seems inapt in a country in which poor diet is a major contributor to disease. The Government should be honest about the need for major transformations in our food and farming.

Creation of a new food culture: The current food culture gives great weight to factors such as low prices and convenience. There is no part of this culture that invites consumers to think about how low-cost meat, eggs and milk are produced. A new food culture must be created which cares about the nutritional quality of food and values farming methods that protect the environment and animals. A 2019 *Lancet* Commission report suggests that “we need to define consumer welfare by something other than low prices”.²⁹

The need to challenge the “We’re just giving consumers what they want” myth

Food businesses tend to justify the production and sale of unhealthy or inhumane food by saying: “We’re just giving consumers what they want” as if these wants had arisen of their own accord. However, consumer demand for certain foods has been manipulated by years of advertising and more recently by sponsorship of sporting events and digital marketing techniques.

A paper in *The Lancet* concludes that “Today’s food environments exploit people’s biological, psychological, social, and economic vulnerabilities, making it easier for them to eat unhealthy foods.”³⁰ It continues: “This reinforces preferences and demands for foods of poor nutritional quality, furthering the unhealthy food environments”. The paper adds: “Research using rats suggests that exposure to ultra-processed foods high in added sugar, fat, and salt leads to behavioural and neurobiological changes, consistent with an addictive process.” Ultra-processed foods are energy-dense and nutrient-poor; they are attractive to food companies as the ingredients are cheap and provide high profit margins.³¹

Massive advertising and marketing and the use of ingredients that are possibly addictive has shaped consumer demand.^{32 33}

There is a legitimate role for government in informing consumers as to what constitutes a healthy diet produced by sustainable agriculture. The *Eatwell Guide* produced by Public Health England (PHE) is helpful with its ‘five a day’ message and its advice to “eat less red

and processed meat”.³⁴ PHE has also produced *Sugar Smart* and *Be Food Smart* apps. Government takes some steps to tackle obesity.

These moves are welcome but much more needs to be done by government to provide and disseminate information that counterbalances the food industry’s huge expenditure in persuading people to eat unhealthy food of low nutritional value. In addition, regulatory actions are needed to control the food industry’s production and promotion of unhealthy food as voluntary moves - including those carried out in partnership with government - have not been sufficient to tackle diet-related ill-health.^{35 36 37 38}

An article in the British Medical Journal states: “delegating policy making and regulation to commercial interests represents a dereliction of government responsibility”.³⁹ A 2019 *Lancet* Commission report emphasizes the need for government to be willing to adopt regulations designed to reduce obesity and address climate change despite what it refers to as “Big Food’s obstructive power”.⁴⁰

The retail environment: The government has now recognised that the retail environment is not neutral but manipulates consumers to buy more of certain products by location and price promotions.⁴¹ It states: “It is clear from the academic evidence that marketing and promotions in stores are extensive, deep and effective at influencing food preferences and purchases”.⁴²

The government now intends to introduce legislation in England to restrict promotions of products high in fat, sugar or salt (HFSS) by location (e.g. store entrances, checkouts and aisle ends) and by price (e.g. buy one get one free).⁴³

The government also wants to “shift the balance of promotions towards healthier options and maximise the availability of healthier products that are offered on promotion, to make it easier for parents to make healthier choices when shopping for their families.”⁴⁴ The government points out that voluntary commitments to restrict promotions of HFSS food have not been effective and that introducing legislation will ensure “that a level playing field is created within the retail sector as well as across the food industry as a whole, and that forward-thinking businesses are not penalised for taking action”.

The government has also recognised that the food industry’s motives are not necessarily benign. It states: “Although promotions appear to be mechanisms to help consumers save money, data shows that they actually increase consumer spending by encouraging people to buy more than they need or intended to buy in the first place. ... Consumers do not stockpile these extra purchases to take advantage of the lower price instead they increase their consumption.”⁴⁵

Crucially the government stresses that it is “not our aim to increase the cost of food for consumers. Therefore, it is not our intention to restrict all types of price promotions. We are proposing to only target volume based types of promotions that require the consumer to purchase more in order to take advantage of the discount, for example multibuy promotions like buy one get one free These types of promotions have been shown to specifically encourage and stimulate over-purchasing to a larger extent compared to simple price reductions.”

The government’s proposals are welcome but must be seen as just the first step in discharging government’s responsibility to counter the food sector’s promotion of unhealthy, unsustainable diets.

Improving the nation's food

UK families consume the most 'ultra-processed' diet in Europe. 50.7% of family food purchases are ultra-processed, compared to 14.2% in France and 13.4% in Italy.⁴⁶

The following sections look at a number of issues including: how to improve the dietary health of those on low incomes, increasing the sustainability of our food, and public procurement. For convenience we have divided these into separate sections but in reality these and other issues – such as reconnecting farmers with consumers – are closely intertwined.

“The poorer people are, the worse their diet, and the more diet-related diseases they suffer from”: *The Faculty of Public Health*⁴⁷

Unhealthy diets among the poorest in society lead to disease and reduced lifespan. Such diets result from many factors including of course poverty.

However, the problem is broader than this. Olivier de Schutter, former UN Special Rapporteur on the right to food, says: “Access to food is in fact a key indicator of broader socio-economic inequalities. Food insecurity hotspots generally correlate not only with poverty, but also with a series of factors that marginalize people and particular population groups”.

Government social policies should ensure that everyone has sufficient income to purchase, and opportunities to access, nutritious food. No-one should have to 'make do' with unhealthy food. A 2019 report by the *International Panel of Experts on Sustainable Food Systems* (iPES Food) stresses that “cheap calories can no longer be a substitute for social policies, which must be rebuilt and redesigned to tackle the root causes of poverty and promote access to healthy food for all”.⁴⁸

A growing number of initiatives seek to ensure that nutritious food is accessible by the most deprived in our society and that healthy, local, sustainable food that provides decent returns to farmers is more widely available. A few such schemes are briefly described below. Government, local authorities and other public bodies should give greater financial support to – and indeed themselves develop – such initiatives.

The fostering of a healthier food culture is essential, such as schemes that encourage people to learn how to cook and grow food, for example in community farms and gardens. Not being able to cook from fresh ingredients means people are more likely to turn to less healthy processed foods that are high in salt, sugar and saturated fats. The Scottish Government is increasing its support for *Grow Your Own Activities* in disadvantaged areas as a way of increasing understanding of where our food comes from and supporting healthy eating and exercise.⁴⁹ Schools should provide gardens or other food growing opportunities. Government must tackle fuel poverty as some people cannot afford to cook food.

The *Food for Life* initiative aims to “make it easy, normal and enjoyable to eat well”.⁵⁰ It provides a wide range of resources designed to help schools to provide healthy meals and imaginative food education including growing and cooking food and farm visits. It encourages schools to take practical steps to make lunchtime a positive experience for all pupils. It reports that pupils in *Food for Life* schools eat around a third more fruit and vegetables than pupils in comparison schools, and significantly more fruit and vegetables at home.⁵¹ Indeed 45% of parents reported eating more vegetables and 38% said their family's

attitude to food had changed as a result of their child's involvement with *Food for Life*.⁵² Clearly a well-designed initiative can have beneficial ripple effects.

Food for Life provides food poverty guidance for schools.⁵³ It advises on how to ensure that those entitled to free school meals, who may be discouraged from taking them by fears of stigma, do in fact eat them. It points out many children arrive at school too hungry to learn. It advocates the setting up of breakfast clubs that can support improved nutrition and help bridge the attainment gap. It advises that charging for attendance at breakfast clubs can create a barrier for lower income households and that ideally breakfast clubs should be free for all pupils at the school.

The *Sustainable Food Cities* programme is another excellent example of how healthy, sustainable food can be promoted.⁵⁴ Their website states: "The Sustainable Food Cities approach involves developing a cross-sector partnership of local public agencies, businesses, academics and NGOs committed to working together to make healthy and sustainable food a defining characteristic of where they live".⁵⁵ A number of local authorities are taking constructive steps to counter food poverty.⁵⁶

Community food outlets take a variety of forms but in essence aim to provide fruit and vegetables, where possible from local farms, and sell them in pop-up shops, community centres, sheltered housing, etc.⁵⁷ They are run by volunteers and produce is sold at near-cost price to ensure affordability for customers. A constructive model can be found in *West Lothian Food and Health Development*. This acts as the central buyer and distributor of fresh fruit and vegetables for community food outlets and works "with a range of partners to reduce barriers associated with eating a healthy diet particularly focused on areas of deprivation where the biggest challenges of cost and access are experienced".⁵⁸

Initiatives that promote healthy sustainable food and reconnect farmers with consumers

This section provides just a few examples of such initiatives. Government and local authorities should support and encourage developments of this kind.

Cambridge Sustainable Food Hub aims to provide the infrastructure that will enable good, local, sustainably-produced food to be available to all, regardless of income, within the city of Cambridge.⁵⁹ It is currently planning its pilot phase. It aims to have short supply chains that support local farmers and small businesses. At the heart of the Hub will be a food store and distribution centre that will be mainly filled with food that has come directly from local farms that can be purchased by trade buyers, chefs and the public. The Hub also plans to provide a number of kitchen units for small businesses, a training kitchen and space for a farmers' market.

The distribution system will include an online trading platform where local farmers can upload produce they have available and buyers can purchase directly from them. In addition, a fleet of electric vans will collect produce and distribute it with the minimum environmental impact.

Farmdrop is an online ethical grocer that has high environmental and animal welfare standards and sources direct from producers and delivers direct to consumers in electric vans, aiming to give much more of the price obtained for the product back to the producer than do supermarkets, whilst keeping the price to the consumer on a par with the supermarkets or cheaper. Most of their food comes from local farms. Local suppliers of fresh produce like meat, eggs, dairy, and fruit and vegetables are paid 75% of the final retail price.⁶⁰ All the pigs, poultry, cattle and sheep that provide Farmdrop's meat are raised 100% free range.

Fresh-range is an online enterprise that purchases food from local farmers and producers and delivers directly to consumers.⁶¹ By cutting out middlemen it is able to provide fairer prices for farmers and lower prices for consumers. Its online store includes farmers with high animal welfare standards including *RSPCA Assured* and *Soil Association* accredited producers.

Riverford Organic Farmers is an organic food box scheme, delivering meat, dairy, and seasonal fruit and vegetables nationally to 50,000 customers per week.⁶² They have good standards regarding animal welfare, the environment, packaging and workers' rights and give the farmers who supply them long-term, dependable contracts to see them through difficult times. Riverford is now an employee-owned business.⁶³

Public procurement: taking the lead, setting the standard

Public sector bodies should use their buying power to augment the market for food produced to high nutritional, environmental and animal welfare standards. Public bodies' commitment to quality will help change our attitude to food.

Government and other public bodies must ensure that nutritious food is the norm in the public sector. Important steps are being taken to achieve this – see, for example, the Scottish Government's Good Food Nation Programme of Measures⁶⁴ and the NHS commitment to serving healthier food for staff.⁶⁵ However, much remains to be done. For example, more hospitals should emulate those such as the North Bristol NHS Trust and Freeman Hospital Newcastle by taking advantage of *Food for Life's* support in improving the quality of food for patients, staff and visitors.^{66 67 68}

The organisation *Health Care Without Harm* offers advice and case studies on how hospitals can provide and promote healthy and sustainable food produced to good standards of animal welfare.⁶⁹ Its *Less Meat, Better Meat* approach is a two-tiered strategy for hospitals to reduce their meat and poultry purchases, and invest their cost savings in sustainable meat options.⁷⁰

While there have been improvements in school meals in recent years, further progress is needed. A major report examines school catering across Europe.⁷¹ It explains how a range of school authorities are able to provide meals with high nutritional and sustainability standards. This can be done without increasing costs by using less (but better quality) meat and more vegetables, buying seasonal food, minimising food waste, using tap water and improving energy efficiency. Some schools involve pupils in growing food in a school farm or allotment; this enables pupils to be educated on food and sustainability issues.⁷²

East Ayrshire Council provides school meals in which freshness and seasonality are prioritised. There has been an impressive reduction in carbon emissions. There has been a beneficial effect on the local economy, with an estimated social return of £6 for every £1 spent in the form of employment, environmental, health and social benefits.⁷³

West of England Food Procurement Group has been set up by the four West of England local authorities to provide leadership on healthy and sustainable food procurement.⁷⁴

The City of Malmö in Sweden aims to be 100% organic by 2020; it follows the EAT S.M.A.R.T. model developed by Sweden's Institute of Public Health:

- Smaller amounts of meat
- Minimise intake of empty calories
- An increase in organic produce
- Right sort of meat and vegetables

- Transport efficiency.⁷⁵

High standards do not have to lead to increased costs: Improving the quality of public food does not need to increase costs. In Denmark, the *Copenhagen House of Food* is

McDonald's has higher standards of farm animal welfare than most public bodies. It uses free range eggs and all its bacon and sausages come from pigs reared to RSPCA Assured standards.

responsible for meals provided in the city's public sector. 90% of those meals are now organic.⁷⁶ By carefully balancing the contents of meals, they have been able to do this without increasing costs.^{77 78}

Some US hospitals use meat produced more sustainably and to higher animal welfare standards but reduce the quantity of meat used in their meals.^{79 80} The savings made by using less meat can cover the extra cost of buying higher quality meat. This can produce two 'wins': (i) support for sustainable, high-welfare farming and (ii) healthier diets for patients.

Research shows that for every £1 spent, the *Food for Life* programme creates a social return of £4.41 in terms of increased revenue for farmers and other local businesses and the value arising from the improved dietary health, education and environmental sustainability attributable to the programme.⁸¹

All bodies providing food and meals in the public sector should aim for the high standards achieved in the cases outlined above.

Animal welfare: Defra's *Government Buying Standards for Food and Catering*⁸² and the *Balanced Scorecard for public food procurement*⁸³ include animal welfare considerations. However, these documents only require meat, milk and eggs to have been produced to legislative minimum standards. Particularly disappointing is the fact that in its section on 'award criteria/evaluation' the *Balanced Scorecard* provides that even if just 30% of the total monetary value of animal-derived food meets UK (or equivalent) minimum legislative standards on animal welfare it may be classified as "good". Even if less than 30% meets UK (or equivalent) legislative standards it is classified as "satisfactory".

This is deeply unsatisfactory. Public bodies should procure and supply food and meals produced to high levels of welfare as this will support farmers who raise animals to good standards and will help deliver Defra's commitment to achieving gold standard animal welfare.⁸⁴

A number of schools, hospitals and local councils do supply meals that come from animals raised to high standards⁸⁵; Compassion in World Farming publishes a list of public sector bodies that provide food produced to good welfare standards.⁸⁶ However, many others only procure food to legislative minimum standards. Scottish law requires the procurement strategy of public bodies to "promote the highest standards of animal welfare".⁸⁷ The rest of the UK should now introduce similar legislation.

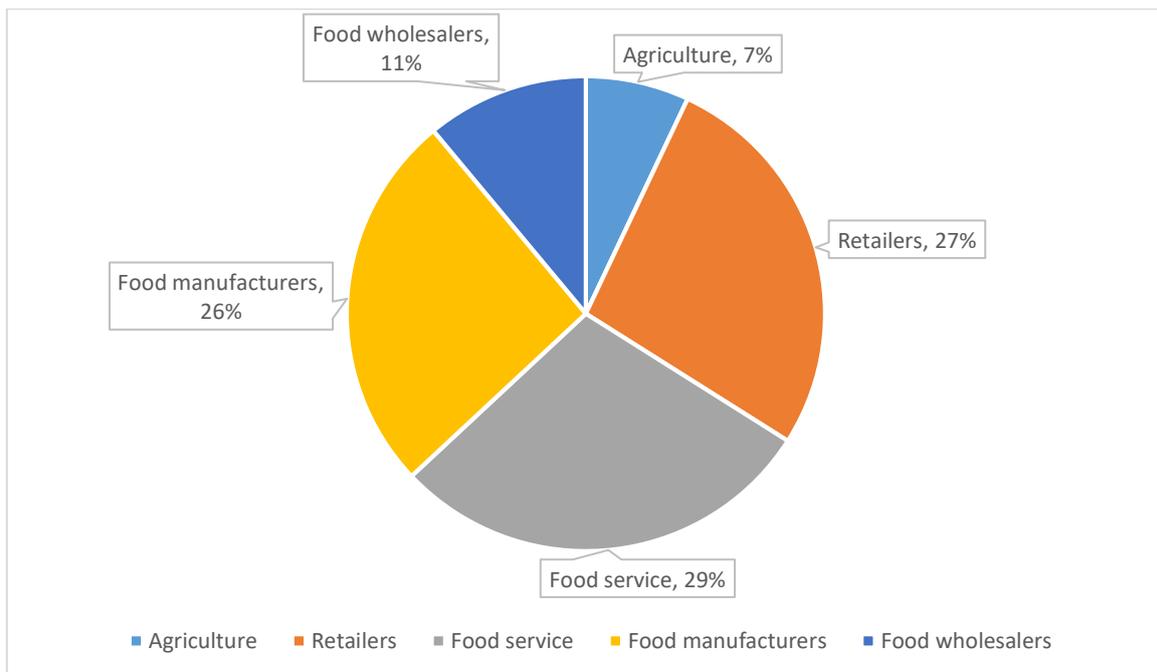
Improving farming livelihoods

Farmers' precarious incomes stem from a range of factors including cheap imports that in some cases are produced to lower animal welfare standards and the fact that farmers receive a very low share of the value generated by the food chain. Government data show that livestock farmers generally receive much less than half of the retail price paid for their products.⁸⁸ For eggs and milk they receive just 32% and 38% respectively while for chicken and pork they get 40%; these figures relate to 2015, the last year for which figures are

available. In the case of chicken, pork, beef and lamb, the share farmers receive has declined substantially in the last 30 years.

The problem is compounded by the fact that farmers have been swamped by other parts of the food chain. In 2016, the UK agri-food sector contributed £111 billion to the economy. Within this, manufacturing, retailing and catering accounted for over one quarter each. Food wholesaling produced 11% of the sector's value and agriculture made the smallest contribution at 7%.⁸⁹ The percentages of this £111 billion that were generated by these various sectors are set out in Chart 1.

Chart 1: Proportion of the revenue generated by the food chain by different sectors



Source: Annual Business Survey (ONS) and Aggregate Agricultural Accounts (Defra) and Defra's Agriculture in the UK 2017.

The various 'middlemen' sectors have important roles to play but it is anomalous that they have come to dominate the food chain to such a high degree with farmers being left with a much weakened position. Elsewhere in this report we advocate the increased use of short supply chains which reconnect farmers with consumers; this would leave a smaller (but important) role for the middleman and would allow a larger share of the food chain's income to go to farmers.

Government must encourage food businesses to pay farmers prices that are commensurate with their production costs, provide farmers with decent livelihoods and allow farmers to provide good environmental and animal welfare standards.

If encouragement proves to be insufficient, Government should introduce regulatory measures designed to even out the discrepancies in market power between major retailers and farmers.

Restoring the natural world

Defra recognises that intensive agriculture has had a damaging impact on key natural resources, such as soils, water, biodiversity and habitats.⁹⁰

However it does not identify the root causes of these problems even though there is compelling evidence that it is the intensification of farming that has been – and continues to be – the key driver of wildlife losses and environmental degradation (see references 95-100).

The link between intensive animal and intensive arable production remains insufficiently acknowledged.

Intensive livestock production is dependent on feeding human-edible cereals to livestock. Defra data show that 47% of UK cereals (wheat, barley and oats) are used as animal feed.⁹¹

However, animals convert these crops very inefficiently into meat and milk. For every 100 calories of cereals fed to animals, we receive on average just 17-30 calories as meat.^{92 93} Chatham House states that the feeding of cereals to animals is “staggeringly inefficient.”⁹⁴

Intensive livestock’s huge demand for cereals has contributed to the intensification of arable production which, with its monocultures and agro-chemicals, has led to water pollution,⁹⁵ soil degradation,^{96 97} biodiversity loss^{98 99} and air pollution.¹⁰⁰ In addition, the UK imports over three million tonnes of soy per year mainly from South America.¹⁰¹ The vast majority is used as animal feed mostly in the intensive pig and poultry sectors.¹⁰² The land footprint associated with imported soy consumed in the UK equates to 1.3 million hectares of land.¹⁰³

To reverse these trends a wholly fresh approach as to how we grow crops and rear animals is needed:

Redefining the role of livestock: As indicated earlier, grain-based livestock production is an inefficient use of crops and a key driver of environmental degradation. Studies show that livestock are only efficient when they are converting materials that people cannot consume – grass, by-products, crop residues and unavoidable food waste – into food that we can eat.¹⁰⁴
¹⁰⁵

The role of livestock should be transformed so that they are primarily seen as converters of inedible materials into meat and milk.

Farming that works in conjunction with natural processes: We need to move to forms of farming that work in harmony with natural processes such as agroecology, circular agriculture and organic farming. Through the use of rotations, legumes, green manure and animal manure, they can build soil quality. This produces healthier plants less susceptible to diseases and pests. Soils with high levels of organic matter can store carbon and improve water retention so reducing flooding risks and enhancing plants’ ability to withstand drought. Such forms of farming could restore biodiversity enabling farmland birds, pollinators, butterflies and other wildlife to flourish once again.

Rotational integrated crop-livestock systems: The link between animals and the land should be restored through mixed rotational farming where animals are fed on the grass phase of the rotation as well as where necessary, crop residues and forage crops. In these systems, the manure from the animals, rather than being a pollutant, enhances soil quality.

The use of rotations: With rotation a crop that removes certain nutrients from the soil (e.g. cereals) is followed by a dissimilar crop that may replenish those nutrients (like grass) or utilise different nutrients. In rotational systems at least one cycle of the rotation should usually involve legumes as these are able to fix atmospheric nitrogen thereby reducing the

need for synthetic fertilisers. A much-used model is to follow several years of cropping with three years of pasture with clover, a member of the legume family, which helps fix nitrogen in the soil. Soil quality can be strengthened by the use of green manure in the rotation. This involves leaving crops, often specifically grown for this purpose, to decay on the surface or ploughing them into the soil. Rotational systems can also reduce the use of pesticides. Crop rotation impedes the build-up of pathogens and pests that often occurs when one species is continuously cropped.

Agroecology: A detailed French study shows that agroecology could provide a healthy diet for Europeans by 2050 while reducing GHG emissions from the agricultural sector and restoring soils and biodiversity.¹⁰⁶ The study proposes a phase out of pesticides and minimal or nil use of synthetic nitrogen fertilisers. Nitrogen would instead be supplied by the use of legumes and manure from ruminants farmed on permanent pasture and on temporary grasslands. Imports of soy for animal feed would be ended. In order to minimise food-feed competition, most livestock would be ruminants raised extensively on grasslands; pig and poultry production would be reduced.

There would be a drop in production of 35% compared with 2010. For this to be feasible consumers would need to change to diets with less animal products (but those consumed being of better quality) and more seasonal fruit and vegetables and fibre.

Innovation: Defra places undue reliance on high-tech to reduce the impact of intensive farming on natural resources. Of course new technologies have a role to play. But in some cases there is a danger that in making damaging systems to a degree less harmful, agri-tech will cement in place approaches that are *inherently* damaging. For example, precision farming can enable better targeted use of agro-chemicals. However, the resulting reduction in the use of pesticides and fertilisers simply makes an intrinsically harmful approach somewhat less damaging. It does not convert it into a form of farming, such as agroecology, which is positively beneficial to natural resources.

A 2019 report by the *International Panel of Experts on Sustainable Food System* (iPES Food) stresses that “high-tech, capital-intensive, digitization-based innovations end up reinforcing existing production models”.¹⁰⁷ The report is critical of ‘techno-fixes’ that “reinforce production models (large-scale, intensive monocultures & feedlots) which ultimately rely on management practices that are environmentally unsustainable (e.g. chemical inputs rather than system redesign)”.

Research and innovation must be reoriented away from ameliorating the detrimental impacts of industrial production and should instead focus on supporting forms of agriculture that enrich soils, enhance biodiversity, capture carbon and provide first-class animal welfare.

Extending the Eatwell Guide to include sustainability: The *Eatwell Guide* should now be expanded to include sustainability concerns in its dietary advice. Environmental sustainability is already included in the national dietary guidelines of Canada, Germany, Sweden, Brazil and Qatar.

Gold standard animal welfare

We welcome the Government’s ambition to “set a global gold standard for animal welfare as we leave the EU”.¹⁰⁸ This section highlights some of the best standards already in use in the world including in the UK. These are what we need to aim for if we wish to achieve gold standard welfare. Defra should use subsidies and other mechanisms (e.g. tax breaks) to help farmers adopt such systems. It should also make it clear that the government’s vision is for these approaches to become the norm in our livestock sector.

1

Label rouge broiler chickens

French *Label Rouge* broiler standards are much higher than those of most UK broiler production. *Label Rouge* requires chickens to be reared free range. The maximum permitted stocking density for the indoor housing is 11 chickens/m² whereas UK chickens can by law be stocked at 39 kg/m² which equates to around 17 chickens/m².

Label Rouge chickens are slow growing breeds; the minimum permitted slaughter age is 81 days whereas UK broilers are typically slaughtered at 38-40 days of age. The slow growing *Label Rouge chickens* are much less vulnerable to the painful leg disorders that often affect the fast growing breeds used in nearly all UK production.

Just 4-5% of UK broiler production is free range and 1-2% is reared to *RSPCA Assured* standards (some of these are in the 4-5% free range figure). In contrast to this, around 16% of French broiler production is *Label Rouge*.¹⁰⁹ Indeed 60% of whole chickens purchased by French households is *Label Rouge*.

Defra should aim, with the help of post-Brexit financial assistance, to have a similar proportion of English broilers reared free range and/or to *RSPCA Assured* or similar standards.



Label Rouge broiler chickens

Farmers should be encouraged to move away from farrowing crates. The best would be to change to outdoor breeding. If they wish to stay indoors, a number of well-designed free farrowing systems are in use which, if well-managed, can keep piglet mortality as low as, or lower than, in crates.^{110 111}

Free farrowing in Switzerland

© Suisag

Suisag says Swiss Large White sows are considered to be calm, even-tempered pigs and particularly suited to free farrowing



PigSAFE developed by researchers at Scotland's Rural College and Newcastle University

© PigSAFE

“An intact curly tail may well be the single most important animal-based welfare indicator. In addition, it stands for high-quality management and respect for the integrity of the pig.” Technical Report prepared for European Food Safety Authority, 2011



An “iceberg” indicator is a single factor that provides a reliable overall assessment of welfare; it effectively summarises many measures of welfare. FAWC has identified the presence of intact tails on pigs (tails that have been neither bitten nor docked) at slaughter as an “iceberg” indicator.¹¹² Farmers who get their pigs through to slaughter without their tails being bitten or docked will be operating a very good system. The German State of Lower Saxony pays farmers €16.50 per undocked pig.¹¹³



Brydock Farms, Scotland



Thierry Schweitzer, French farmer

The very best of free range systems have small flocks, low stocking density, mobile housing and plenty of trees and bushes. Skilful farmers running such systems can manage without beak trimming while achieving low mortality and good plumage scores.

Maple Farm in Suffolk keeps their hens in flocks of around 300 birds; very much smaller than most commercial flocks. The hens are stocked at less than 300 per hectare which means they have much more space than most free range hens. The hens are kept in mobile sheds that are moved every three weeks; this makes for healthier birds. They have very good ranging behaviour, mainly due to breed selection and small flock size. The hens are not beak trimmed but there is very little feather pecking.



© Maple Farm, Suffolk

Noble Foods egg production





© Kipster <https://www.kipster.farm/>

Normally we prefer free range farms for laying hens. However, the Dutch **Kipster** farm is a remarkable barn system which not only has very good welfare but also successfully addresses several traditionally intractable problems. Its features include:

Carbon neutral: uses no fossil fuels – its energy needs are met by over 1000 solar panels in its roof

Uses no human-edible feed – the hens are fed on by-products such as sunflower meal and left-over bakery products

Usually the male chicks in egg farms are slaughtered shortly after birth as it is assumed they cannot provide worthwhile meat. **Kipster** has overturned this assumption – the **males are reared till the age of 15-17 weeks** when they are slaughtered for various meat products including chicken burgers and nuggets

Sustainable egg box - made from potato starch, cellulose fibre and water. The CO₂ footprint of the egg box is 90% smaller than a standard egg box

First-rate animal welfare – the barn provides a natural wooded environment with plenty of variety, daylight and fresh air

Regenerative agriculture: Kingclere Estates, Pitt Hall Farm – conversion of intensive arable farm to low-input rotational system

Kingclere Estates manages 2,500 acres of land which used to be intensively farmed arable land, growing winter wheat, oilseed rape and spring barley. The crops needed 10 sprays per year (3-4 herbicide, 2-3 fungicide, 1-2 insecticide and 2-3 nitrogen fertiliser). Previously they had also managed a dairy herd and an intensive pig unit.

What was in effect a highly intensive farm operation with arable monocultures has now been transformed by the reintroduction of livestock into their ecological niche as rotational grazers.

They have switched to a rotational system with herb-rich grass leys to build up fertility in the deep clay soil. The roots of the grasses collect minerals from deep in the soil. Leguminous plants such as clover help to fix nitrogen.

The new system involves an end to the application of chemical fertilisers and pesticide sprays. The reduction in nitrogen inputs has reduced the decomposition of soil organic matter and this has also been built up by the remains of plant roots, stems and animal droppings. The increased food supply increased the soil fauna, with reduced risk of mortality due to ploughing and pesticide inputs.

Deep worm burrows enable the roots of plants to grow deeper into the soil, drawing up nutrients from below and helping to build up fertility without additional chemical inputs. Under intensive cultivation, the topsoil was thin with limited organic matter and a hard crust. Under a herb-rich grass ley, the topsoil layer became deeper again, darkened by increased levels of organic matter, in the process sequestering carbon from the air.

Reducing chemical inputs reduces energy inputs and in turn carbon emissions. Building up organic matter in the soil helps to sequester soil carbon.

Grass leys in rotational farming not only permit the farm to reduce chemical inputs, decreasing pollution and resources consumption, but provide feed for free-ranging animals. The pastures are primarily grazed by 400 milking cattle and 1,700 sheep, though there are also 300 laying hens, with room for expansion, and sometimes a few pigs which are rotated around the farm every 1-2 days (partly depending on the weather) following the cattle. The idea is that the hens move onto the pasture at the point at which a maximum number of insect larvae are likely to be found in the cow pats, providing a useful source of protein.

Because they are moved onto new pasture every few days, there is always plenty of vegetation and insects for the pigs and chickens to forage on, minimising the risk of tail biting and feather pecking (both displaced foraging behaviours). Keeping hens in small groups of a hundred or two in mobile huts also encourages foraging behaviour.

A key element of the farm is that the ruminants are entirely pasture-fed, without the use of supplementary feeding of grain or other concentrated feeds.

The fertility that is built up over four years of grass production is used to support the growth of four years of arable production without the need for chemical inputs.

This farm has managed the conversion from its own resources. A role for subsidy in helping more farmers move towards regenerative agriculture is to support incomes during the period

during which the land gradually builds up fertility and production, for example as mycorrhiza gradually recolonise the soil.

7

Pasture for Life

The *Pasture-Fed Livestock Association* (PFLA) is a group of beef, dairy and sheep farmers who raise their cattle and sheep exclusively from pastures and grass. No grains are fed. The PFLA Certification Standards¹¹⁴ require animals to be able to graze pastures when the grass is growing. In the winter they are given conserved pasture in the form of hay or silage or other agreed forms of forage.

The PFLA points out: “Fields of just grass can provide all the nutritional components an animal needs. However, pastures which contain a variety of plant species, including herbs, wildflowers and clovers provide an even better diet – rich in essential vitamins and minerals drawn up from the soil below. They also support a diverse range of wildlife”.



© Pasture-Fed Livestock Association

Pasture-fed beef is of higher nutritional quality than grain-fed beef. It has less overall fat, higher proportions of omega-3 fatty acids and a healthier ratio of omega-6 to omega-3 fatty acids than grain-fed beef.¹¹⁵

PFLA animals are reared to high welfare standards. Pasture farmers sow legumes such as white and red clover in their fields. These help reduce the use of chemical-based fertilisers, which can make the soil acid and unhealthy. Extensive pastures can support biodiversity; they provide a diverse environment, rich in plants and invertebrates and beneficial to a variety of birds. In addition, they store carbon which can significantly offset ruminant methane emissions.¹¹⁶

Pasture for Life: Romshed Farm, Kent

In addition to beef cattle and sheep, the farm has a small number of pigs, laying hens and meat chickens. The animals are regularly moved, allowing the pastures time to rest and grow back. This encourages deeper rooting plants with more growth and diversity, which is good for the animals and the soil and ultimately contributes to carbon sequestration. The pigs live outside on grass all year round, with the sows and boar coming into pig sties in the wettest part of the winter.



© Romshed Farm

Dairy calves staying with their mothers till the age of 5-6 months: the Ethical Dairy

It is standard practice in the dairy industry to separate calves from their mothers either shortly or immediately after birth. This is done to maximise the amount of milk available for human consumption. The calves are commonly fed for the first few weeks on milk by-products and weaned onto solid food as quickly as possible.

Separating calves from the mother and feeding them on a milk-replacement has detrimental effects on welfare. The calves grow much more slowly and show frequent and obvious signs of the desire to suckle. The separation of calf from mother can be deeply distressing for both of them. Very early separation comes at a cost to the calf's developing social behaviour¹¹⁷. Perhaps most important of all, early separation deprives both calf and mother of fundamental natural behaviours that help to make life worth living.

One farm in Scotland takes an innovative approach to this; the calves stay with their mothers till the age of 5-6 months. The cows are milked during this period, but just once a day. Allowing the calves to stay with their mothers reduces the stress on the animals and leads to improved health. Both the cows and calves are calmer and more confident. Being fed on their mothers' milk, the calves grow very quickly. Details of the farm are at <http://www.creamogalloway.co.uk/finlays-farm-home-ethical-dairy>



© The Ethical Dairy

The farm has substantially reduced lameness, mastitis and digestive disorders compared with the average UK dairy farm. It achieves longer productive lives for the cows and greater biodiversity than the industry average. Compared to that average, it has reduced use of antibiotics and agro-chemicals, lower GHG emissions and less pollution of groundwater.

Moving to a calf-friendly dairy system is expensive during transition as capital is invested and it takes time for cash-flow to come on stream. Subsidies to help during transition could encourage more farmers to move to such a system.

9

Pasture Promise Free Range Dairy

Around 20% of UK dairy cows are zero-grazed i.e. they are kept indoors for all or nearly all of the year.

This trend needs to be halted; cows should be kept on pasture during the grass-growing season except when the weather is too wet. Research shows that pasture-based cows have lower levels of lameness, hoof pathologies, hock lesions, mastitis, uterine disease and mortality than zero-grazed cows.^{118 119} A recent study concludes: “echoing public views on what allows for a good life for cattle, these results show that cows are highly motivated for outdoor access”.¹²⁰

Farmers who are members of the *Free Range Dairy Network* and use the *Pasture Promise* label must graze their cows for at least 180 days a year and during this time the cows must be kept on pasture day and night.



© Free Range Dairy Network

“We need to talk about meat”: Lancet Editorial’s heading, 24 November 2018

It is now widely recognised that high levels of consumption of meat have damaging implications for health, antimicrobial resistance, the environment and climate change.^{121 122}
¹²³ The Lancet editorial highlights the need for “a very public conversation about meat informing a host of measures from deciding the appropriate application of government farming subsidies ... all the way through to slowly changing consumer habits over time, possibly through use of targeted taxation but certainly through an engaging, balanced conversation.”¹²⁴

Governments are apprehensive about addressing meat. Governments of course cannot tell people what to eat. They can, however, inform people about the relationship between diets and climate change, health and the environment and stimulate national debate and highlight the need for action.

As indicated, earlier 47% of UK cereals are used as animal feed. 1.48 million hectares of arable land are used to produce the cereals used to feed animals.¹²⁵ If meat and dairy consumption were reduced by 50%, the amount of arable land needed would be reduced by around 23%¹²⁶ meaning that around 340,000 hectares of arable land – an area about the size of a county like Cornwall - would be saved.¹²⁷

This ‘saved’ land could be used in various ways for example to increase carbon storage through afforestation and to increase UK production of fruit and vegetables. The UK produces just 16% and 57% respectively of the fruit and vegetables that we consume.¹²⁸ Imports of fruit and vegetables are the largest item in our food import bill.¹²⁹ As indicated above, 1.48 million hectares of arable land is currently devoted to cereal production for use as animal feed. However, just 152,000 hectares are used to grow fruit and vegetables.¹³⁰ Just halving the use of cereals as animal feed would provide enough land for the UK to very substantially increase its production of fruit and vegetables. This would produce healthier food and contribute to lowering the UK’s food trade gap.

The reduced need for cereals arising from a decline in meat consumption would also ease the pressure to farm arable land intensively so enabling soils, water and biodiversity to be restored and wildlife to enjoy improved habitats.

The 2018 RISE Foundation report *What is the Safe Operating Space for EU livestock?* indicates that UK farming’s use of nitrogen, which mainly arises from livestock and the production of their feed, is 49% in excess of a safe boundary. It goes on to suggest that UK livestock-related GHG emissions would have to be reduced by 35% by 2030 and 77% by 2050 for the UK to play its part in meeting the Paris targets.¹³¹

The report states that several studies conclude that a 50% reduction in EU consumption of livestock products would make a significant contribution to climate change mitigation and could result in 40% less reactive nitrogen emissions from agriculture, reducing pollution of aquatic environments.

A Chatham House report states that, from the climate viewpoint, there is a “compelling case for shifting diets, and above all for addressing meat consumption. However, governments are trapped in a cycle of inertia: they fear the repercussions of intervention ... This report offers a challenge to the received wisdom that these obstacles are insuperable.... it suggests how the cycle of inertia can be broken and a positive dynamic of government and societal action created”.¹³²

It stresses that “Governments must lead” and that the public “expect[s] government leadership”. It adds that focus groups conducted in four countries - the UK, Brazil, China and the US - “all demonstrated a general belief that it is the role of government to spearhead efforts to address unsustainable consumption of meat”. It concludes that “Governments overestimate the risk of public backlash”.

The report states: “Soft interventions to raise awareness among consumers or ‘nudge’ them towards more sustainable choices, for example by increasing the availability and prominence of alternative options at the point of sale, are likely to be well received. More interventionist – but necessary – approaches such as taxation do risk public resistance, but focus group respondents thought this would be short-lived, particularly if people understood the policy rationale.”

Reductions in meat production and consumption must come from the intensive pig and poultry sectors not from cattle and sheep kept on well-managed grasslands or in rotational integrated crop-livestock systems

A 2018 report by the Committee on Climate Change (CCC) stresses that a substantial reduction in the consumption of meat and dairy is needed if the UK is to meet its climate targets. We are, however, concerned by the report’s conclusion that the reduction should be achieved by a decrease in the production of cattle and sheep while increasing the number of pigs and poultry. This would be a regressive step.

We recognise that ruminants produce more GHG emissions per unit of nutrition produced than pigs and poultry. However, it is important when developing policy on food and farming to take account of all the factors that may be influenced by decisions in this area. At present much research and policy-making is conducted in silos which can lead to the introduction of measures that may benefit one element (such as climate change) but have adverse impacts on other important considerations. *Global Food Security*, a UK cross-government programme, states: “Focussing solely on GHG emissions instead of wider metrics of sustainability could result in the loss of ecosystems and greater social inequality”.¹³³

The switch to pigs and poultry advocated by the CCC could lead to the following problems:

Increased antibiotics use: Replacing beef and sheep with pig production would lead to an increase in the use of antibiotics. Figures produced in 2018 by the Veterinary Medicines Directorate show that antibiotics usage in UK pigs is 131 mg/kg while in beef cattle it is just 19 mg/kg.¹³⁴

Detrimental environmental impacts: Whereas beef cattle and sheep can be raised on pasture alone or with modest amounts of grain and soy, pigs and poultry are dependent on the use of human-edible cereals and soy. The bulk of UK cereals used as animal feed go to the pig and poultry sectors; pasture-fed ruminants use few if any of these cereals. The CCC’s proposal to increase pig and poultry production will lead to increased demand for cereals with a resultant growth in monoculture cereal production with concomitant soil degradation, water pollution and biodiversity loss and the need for an expansion of arable land.

Most of the soymeal utilised as animal feed in the UK and EU is used in the pig and poultry sectors.^{135 136} The expansion of the UK pig and poultry sectors recommended by the CCC would result in increased deforestation in South America as well as further expansion of cropland into other fragile ecosystems.

Reduced food security: Animals' inefficient conversion of cereals into meat and milk undermines food security. However, pasture-based ruminants boost food security as they convert materials we cannot consume into food we can eat.

Poorer animal welfare: Pasture-based ruminant farming has the potential, provided that farmers look after the animals well, for high standards of animal welfare. In contrast, nearly all UK poultry production and much pig production is highly intensive with little potential for acceptable welfare. The CCC's recommendation that a proportion of cattle and sheep be replaced by pigs and poultry will lead to an overall reduction in animal welfare.

Conclusion: The fact that ruminants produce more GHG emissions per unit of meat produced than pigs and poultry is crucial. However, it does not follow that meat production should switch from ruminants to monogastrics as this would result in increased use of antibiotics and arable land and further deforestation. The increased demand for cereals would have a detrimental impact on the quality of soils, water and air and would drive additional biodiversity loss. The proposed switch to pigs and poultry would undermine food security and animal welfare.

The best response to ruminant GHG emissions – while at the same time ensuring that other key factors are not undermined - is to substantially reduce meat consumption but for the bulk of meat production to be extensive ruminants as industrial pig and poultry production is responsible for a very wide range of harms.

Mending our price system

“In contrast to education and information, fiscal incentives and disincentives aimed at consumers, producers, and retailers have more consistent evidence of effectiveness”

Mozaffarian *et al*, 2018 *BMJ*
2018:361:k2426

Olivier De Schutter, former UN Special Rapporteur on the right to food, stresses that “any society where a healthy diet is more expensive than an unhealthy diet is a society that must mend its price system.”¹³⁷ This applies equally to a society where environmentally damaging, low animal welfare food is cheaper than food that respects natural resources and animals' well-being.

Professors Tim Lang and Mike Rayner stress that “low meat and dairy consumption, and more plant-based diets, are the future” and that “many options for how a meat tax might operate require careful exploration”.¹³⁸

Taxes on meat should not apply to all meat but only to that which is produced industrially. It is industrially reared meat that is responsible for most of the sector's adverse environmental impacts and most of its use of antimicrobials and that generally is of lower nutritional quality than free range or pasture-fed meat. Moreover, the industrial livestock sector has inherent severe deficiencies for animal welfare. In contrast, extensive indoor systems and outdoor rearing have the potential, if well-designed and well-managed, to deliver good welfare outcomes. Accordingly, taxes should not be placed on meat from well-managed pasture-based herds, integrated rotational crop-livestock systems or free range or extensive indoor systems.

Revenue raised from taxes placed on industrially produced meat should be used to subsidise healthy foods such as fruit and vegetables, legumes, whole grains and high quality meat as it is crucial from the viewpoint of social equity that the overall price of food does not increase.

Use of fiscal measures to shift to healthy, sustainable modes of food production and consumption

As long ago as 2011 the Foresight report on the future of food and farming said: “There needs to be much greater realisation that market failures exist in the food system that, if not corrected, will lead to irreversible environmental damage and long term threats to the viability of the food system. Moves to internalise the costs of these negative environmental externalities are critical to provide incentives for their reduction.”¹³⁹ This clear advice has consistently been ignored by government.

However, in her 2018 report the Chief Medical Officer, speaking about food, recommends that “those sectors that damage health must pay for their harm or subsidise healthier choices” and calls for “incentives to increase fruit and vegetable consumption”.¹⁴⁰ She has been reported as saying the “sugar tax placed on soft drinks should now be vastly expanded to cover a wide range of unhealthy foods ... with funds raised used to bring down the price of fruit and vegetables”.¹⁴¹ Research shows that a tax on unhealthy foods, combined with the appropriate amount of subsidy on fruits and vegetables, could lead to significant health gains.^{142 143 144}

A 2019 report by UN Environment states that “worldwide emission taxes on foods could save around 1 gigaton of CO₂ equivalent per year in 2020 and result in net health benefits at the global level due to reduced consumption of meat”.¹⁴⁵

Preventing regressivity: Taxes on food must be designed so as to avoid having an unfair impact on poorer people as a tax-related price increase could, if poorly designed, place a greater burden on them than on wealthier consumers. This can be avoided by subsidies on healthy food so that – and this is essential - the overall price of food does not increase; the price of some items will go up while the price of others will decrease.

The WHO points out that for poor socioeconomic groups a food tax may lead to dietary shifts and so to improved dietary health provided that untaxed, healthy alternatives are available; such health gains may contribute to reducing health inequalities.¹⁴⁶ The OECD has concluded that, of all actions to prevent obesity “fiscal measures are the only intervention producing consistently larger health gains in the less well-off” across the countries studied.¹⁴⁷ A 2019 *Lancet* Commission report states that arguments that taxes on nutrient poor foods are regressive are “countered by their progressive effect on health, creating greater health gains for those with less income through larger gains in health-related behaviours, and by strategies that direct tax revenues to community benefits, such as ... subsidising the purchase of healthy foods”.¹⁴⁸

VAT: One way forward would be to reconsider the current VAT arrangements. At present all meat, milk, eggs and ready meals are zero rated.¹⁴⁹ This should be reviewed; only meat, milk and eggs produced to high environmental and animal welfare standards should be zero rated. VAT at the standard rate should be applied to ready meals other than those that are only lightly processed. The VAT raised should be used to subsidise the cost of healthy foods.

Taxes on pesticides and fertilisers: A UNDP (UN Development Programme) paper examines how taxes on pesticides and fertilizers can correct certain market failures (e.g. the failure to incorporate in the price of the pesticide/fertiliser its social and environmental costs) and can forestall increases in the use of the most harmful pesticides and fertilisers.¹⁵⁰ Such taxes can lead to savings in health budgets (including lost productivity) and reduced expenditure in restoration of degraded land and natural resources.

The paper points out that the revenue generated by such taxes could be earmarked to mitigate the environmental impacts of pesticides and fertilisers and adopting more sustainable agriculture practices. It stresses that these taxes are “more appropriate where the objective is to facilitate a smooth transition to more sustainable practices through market mechanisms”.

The UNDP paper states that from an economic perspective, a differentiated tax that takes account of the damage to the environment and human well-being caused by different types of pesticides/ fertilisers is the preferred solution, since it provides more targeted price signals to the market and more adequately reflects marginal damages.

Such taxes should be seen not as a substitute for legislation but as complementing regulations. The UNDP paper states: “an example is seen in France where a combined system is in place in which a reduced tax rate is imposed on pesticides that are allowed in organic farming, while the regular tax rate is imposed on other pesticides, and a total ban is imposed on some widely used pesticides that are considered to harm bees.”

Using fiscal measures positively

Tax measures should not just reflect the cost of negative externalities but the revenue raised should be used to lower the costs of particular farming practices and certain foods. They should be used to make healthy food produced to high environmental and animal welfare standards economically attractive for both farmers and consumers.

Supporting farmers

Farmers producing to high environmental and animal welfare standards could be compensated for the extra costs involved by subsidies and tax breaks. When calculating net profits for tax purposes, more generous capital allowances could be given to investments for high quality farming. Governments already use differential capital allowances to reward activities that they wish to encourage; for example, enhanced capital allowances are given in some countries for businesses that use environmentally beneficial technologies. Moreover, an extra tranche of farmers’ taxable income could be tax-free when they employ specified animal welfare or environmental practices. These tax breaks could be paid for by the revenue raised from placing taxes on the inputs of industrial agriculture such as chemical fertilisers and pesticides.

Supporting consumers

Taxes should be placed on unhealthy, inhumanely produced food with the revenue raised being used to subsidise the price of healthy food produced to high environmental and animal welfare standards.

Impact of tax or charge can go beyond its monetary value

The WHO points out that taxation may result in consumers becoming more aware of the unhealthy properties of certain products because of the price increase, thereby amplifying the effect of the price increase and enhancing the market for healthy products.¹⁵¹

Recommendations as to steps Government should take to help us move to a better food system

Government must **build a new vision** for future food and farming. It must generate and sustain commitment among all sectors of society to realising this vision.

Government must **move away from formulating policy in silos** – it must develop integrated, cohesive policies.

Better information: The government should develop programmes to increase public awareness of the implications of different farming methods and dietary choices for human health, the environment, food security, climate change and animal welfare.

Mandatory labelling of meat and dairy products as to farming method should be introduced.

The use of **misleading labelling** should be ended.

End obfuscation: The Government should not use obfuscations that present certain factors in a better light than is warranted by the reality.

A new food culture must be created which cares about the nutritional quality of food and values farming methods that protect the environment and animals.

Government must rebut the “We’re just giving consumers what they want” myth which is often deployed by food businesses. Much more needs to be done by government to **provide information that counterbalances the food industry’s huge expenditure in persuading people to eat unhealthy food**. In addition, **regulatory actions are needed to control the food industry’s production and promotion of unhealthy diets** as voluntary moves have not been sufficient to tackle diet-related ill-health.

Government must introduce regulations to **prevent the retail environment from manipulating consumers** to buy more of certain unhealthy products by location and price promotions.

Government **social policies should ensure that everyone has sufficient income to purchase, and opportunities to access, nutritious food**. No-one should have to ‘make do’ with unhealthy food.

A growing number of initiatives seek to ensure that **nutritious food is accessible by the most deprived in our society and that healthy, local, sustainable food that provides decent returns to farmers is more widely available**. Government, local authorities and other public bodies should give greater financial support to – and indeed themselves develop – such initiatives.

Public procurement: Public sector bodies should use their buying power to augment the market for food produced to high nutritional, environmental and animal welfare standards. Case studies show that this can be achieved without increasing costs.

Farming livelihoods: Government must encourage food businesses to pay farmers prices that are commensurate with their production costs, provide farmers with decent livelihoods and allow them to provide good environmental and animal welfare standards. If encouragement proves to be insufficient, Government should introduce regulatory measures designed to even out the discrepancies in market power between major retailers and farmers.

Moving to forms of farming that restore soils and biodiversity and minimise water and air pollution: It is not sufficient to adopt measures that simply make the intensive model of farming somewhat less damaging and resource-inefficient. **Government must encourage a wholly fresh approach as to how we grow crops and rear animals**. The role of livestock should be transformed so that they are primarily used to convert inedible materials into meat and milk. The use of monocultures, pesticides and synthetic nitrogen fertilisers should be minimised. We need to move to farming methods that work in harmony with natural processes such as agroecology, circular agriculture and organic farming. The link

between animals and the land should be restored through the use of rotational, integrated crop-livestock systems.

Innovation: Government currently places undue reliance on high-tech to reduce the impact of intensive farming on natural resources. Of course new technologies have a role to play. But in some cases there is a danger that agri-tech will reinforce existing production models that are *inherently* damaging. Government should reorient research and innovation away from ameliorating the detrimental impacts of industrial production and should instead focus on supporting forms of agriculture that are positively beneficial e.g. that enrich soils, enhance biodiversity, capture carbon and provide first-class animal welfare.

Extending the Eatwell Guide to include sustainability: The *Eatwell Guide* should be expanded to include sustainability concerns in its dietary advice.

Gold standard animal welfare: The Government's ambition to "set a global gold standard for animal welfare as we leave the EU" is welcome. To realise its ambition, the Government should look at some of the best standards already in use in the world including in the UK. These are what we need to aim for if we wish to achieve gold standard welfare. Defra should use subsidies and other mechanisms (e.g. tax breaks) to help farmers adopt such systems. It should also make it clear that the Government's vision is for these approaches to become the norm in our livestock sector.

Examples of best welfare standards provided in this report include: French *Label Rouge* broilers, well-designed and well-managed free farrowing or preferably outdoor breeding, intact tails on pigs, the very best of free range systems for egg laying hens, the Dutch *Kipster* farm, low-input rotational systems, the approach of the *Pasture-Fed Livestock Association*, dairy calves staying with their mothers until the age of 5-6 months, and the *Pasture Promise* scheme under which farmers must graze their cows for at least 180 days a year day and night.

The Government should encourage a public conversation about **meat**. The Government should inform people about the relationship between diets and climate change, health, antibiotic resistance and the environment and stimulate national debate and highlight the need for action.

A Chatham House report states that focus groups conducted in four countries - the UK, Brazil, China and the US - "all demonstrated a **general belief that it is the role of government to spearhead efforts to address unsustainable consumption of meat**". The report states: "Soft interventions to raise awareness among consumers or 'nudge' them towards more sustainable choices, for example by increasing the availability and prominence of alternative options at the point of sale, are likely to be well received. More interventionist – but necessary – approaches such as taxation do risk public resistance, but focus group respondents thought this would be short-lived, particularly if people understood the policy rationale."

Reductions in meat production and consumption must come from the intensive pig and poultry sectors not from cattle and sheep kept on well-managed grasslands or in rotational integrated crop-livestock systems. When developing policy on food and farming it is important for Government to take account of all the factors that may be influenced by decisions in this area. Much policy-making is conducted in silos which can lead to the introduction of measures that may benefit one element (such as climate change) but have adverse impacts on other important considerations. Focussing solely on GHG emissions instead of wider metrics of sustainability could result in the loss of ecosystems and greater social inequality.

Those who focus primarily on climate change tend to advocate reductions in extensive ruminants and even an increase in intensive pigs and poultry. However, this would have a damaging effect on many other factors. An increase in intensive pigs and poultry – or intensive cattle - would increase demand for cereals and soy with resulting detrimental impacts on soils, water and biodiversity and further deforestation in South America. Moreover, intensive pigs, poultry and cattle undermine food security as they consume human-edible crops and convert them very inefficiently into meat and milk. Many more people can be fed if these crops are used for direct human consumption.

In addition, the stressful, overcrowded conditions of intensive livestock production fuel the emergence, transmission and amplification of disease which leads to high use of antibiotics. Free-range animals –who consume fresh forage and have higher activity levels – often provide meat of higher nutritional quality than animals that are reared industrially. Pasture-fed beef and free-range chickens have less fat and generally higher proportions of omega-3 fatty acids than grain-fed beef and chickens reared industrially.¹⁵²

Mending our price system: The Government should explore how fiscal measures could properly reflect the environmental and other externalities of industrial livestock production. A tax should be placed on industrially produced meat. The tax should not extend to extensively produced meat from animals raised to high environmental and animal welfare standards.

Revenue raised from taxes placed on industrially produced meat should be used to subsidise healthy foods such as fruit and vegetables, legumes, whole grains and high quality meat as it is crucial from the viewpoint of social equity that the overall price of food does not increase. The tax must be designed so as not to be regressive; it must help those on low incomes to access healthy diets.

Fiscal measures should be used to support farmers who have high animal welfare and environmental standards. Such farmers should benefit from more generous capital allowances when calculating their net profits for tax purposes and from increased tax-free allowances.

A tax should be placed on pesticides and synthetic fertilisers. Such taxes should be seen not as a substitute for legislation but as complementing regulations. The UK should emulate France where a combined system is in place in which a reduced tax rate is imposed on pesticides that are allowed in organic farming, while the regular tax rate is imposed on other pesticides, and a total ban is imposed on some widely used pesticides that are considered to harm bees.”

¹ Faculty of Public Health. Food poverty and health http://www.fph.org.uk/uploads/bs_food_poverty.pdf

² Jones *et al*, 2015. The Growing Price Gap between More and Less Healthy Foods: Analysis of a Novel Longitudinal UK Dataset. PLoS ONE 9(10): e109343. doi:10.1371/journal.pone.0109343

³ Newton *et al*, 2015. Changes in health in England, with analysis by English regions and areas of deprivation, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. The Lancet: Vol 386 December 5, 2015

⁴ Forouzanfar MH, Alexander L, Anderson HR, *et al*. Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks in 188 countries, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet* 2015;**386**:2287–323. doi:10.1016/S0140-6736(15)00128-2

⁵ Natural Capital Committee, 2015. The State of Natural Capital: Third Report. <https://nebula.wsimg.com/17ce16211194bfe53215bb754444686d?AccessKeyId=68F83A8E994328D64D3D&disposition=0&alloworigin=1>

⁶ Edmondson *et al*, 2014. Urban cultivation in allotments maintains soil qualities adversely affected by conventional agriculture. *Journal of Applied Ecology* 2014, 51, 880–889

⁷ Committee on Climate Change, 2015. Progress in preparing for climate change: 2015 Report to Parliament

⁸ Defra, 2017. Agriculture in the United Kingdom, 2017

-
- ⁹ *Ibid*
- ¹⁰ Reversing insect pollinator decline. <http://www.parliament.uk/business/publications/research/briefing-papers/POST-PN-442/reversing-insect-pollinator-decline>
- ¹¹ *Ibid*
- ¹² Committee on Climate Change, 2018. Reducing UK emissions: 2018 progress report to Parliament
- ¹³ Committee on Climate Change, 2018. Land use: reducing emissions and preparing for climate change
- ¹⁴ Defra, 2017. Agriculture in the United Kingdom, 2017
- ¹⁵ <https://www.egginfo.co.uk/egg-facts-and-figures/industry-information/data> Accessed 15 March 2019
- ¹⁶ AHDB Pork, 2017. Real welfare: baseline report 2013-2016 <https://pork.ahdb.org.uk/media/273110/real-welfare-report-2017.pdf>
- ¹⁷ Author's calculation based on AHDB Pork, 2017. Real welfare: baseline report 2013-2016
- ¹⁸ Author's calculation based on Roberts D & March M. Dairy cow housing systems in the UK
- ¹⁹ Food Standards Agency, 2015. Results of the 2013 animal welfare survey in Great Britain
- ²⁰ Farm Animal Welfare Council, 2003. Report on the welfare of farmed animals at slaughter or killing
- ²¹ IPES-Food. 2016. From uniformity to diversity
- ²² Garnett *et al*, 2015. Policies and actions to shift eating patterns: What works? Chatham House and Food Climate Research Network
- ²³ *Ibid*
- ²⁴ **Camilleri *et al*, 2018** Consumers underestimate the emissions associated with food but are aided by labels Nature Climate Change **9**, pages53–58
- ²⁵ British Egg Industry Council, 2018 <https://www.egginfo.co.uk/egg-facts-and-figures/industry-information/data> Accessed 15 March 2019
- ²⁶ House of Commons Environment, Food and Rural Affairs Committee, February 2018. Brexit: trade in food, paragraph 133
- ²⁷ House of Commons Environment, Food and Rural Affairs Committee, February 2018. The future of food, farming and the environment, paragraph 106 and recommendation 16
- ²⁸ The Times, 10 March 2018. Idyllic meat wrappers hide harsh reality of mass modern farming. <https://www.thetimes.co.uk/past-six-days/2018-03-10/news/idyllic-meat-wrappers-hide-harsh-reality-of-modern-mass-farming-8mkfdmtzt>
- ²⁹ Swinburn *et al*, 2019. The Global Syndemic of Obesity, Undernutrition, and Climate Change: *The Lancet* Commission report Published online January 27, 2019 [https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736\(18\)32822-8.pdf](https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(18)32822-8.pdf)
- ³⁰ Roberto C *et al*, 2015. Patchy progress on obesity prevention: emerging examples, entrenched barriers and new thinking. *The Lancet*, 18 February 2015. [http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736\(14\)61744-X.pdf](http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(14)61744-X.pdf)
- ³¹ Swinburn *et al*, 2019. The Global Syndemic of Obesity, Undernutrition, and Climate Change: *The Lancet* Commission report Published online January 27, 2019 [https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736\(18\)32822-8.pdf](https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(18)32822-8.pdf)
- ³² Ralston *et al*, 2018, Time for a new obesity narrative, *Lancet* 392, 1384-5
- ³³ Gordon *et al*, 2018. What Is the Evidence for "Food Addiction?" A Systematic Review. *Nutrients* 2018 Apr 12;10(4) https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/528193/Eatwell_guide_colour.pdf
- ³⁴ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/528193/Eatwell_guide_colour.pdf
- ³⁵ Lobstein *et al*, 2015. Child and adolescent obesity: part of a bigger picture. *Lancet* 2015; 385: 2510–20
- ³⁶ Public Health England, 2015. Sugar reduction: the evidence for action: Annexe 3
- ³⁷ UK Health Forum, 2018. Public health and the food and drinks industry: The governance and ethics of interaction: case study 11
- ³⁸ Caraher, M. & Perry, I., 2017. Sugar, salt, and the limits of self regulation in the food industry. *BMJ* (Online), 357, doi: 10.1136/bmj.j1709
- ³⁹ Mindell *et al*, 2012 All in this together: the corporate capture of public health *BMJ* 2012;345:e8082
- ⁴⁰ Swinburn *et al*, 2019. The Global Syndemic of Obesity, Undernutrition, and Climate Change: *The Lancet* Commission report. Published online January 27, 2019 <https://www.thelancet.com/commissions/global-syndemic>
- ⁴¹ Department of Health and Social Care, 2019. Consultation on restricting promotions of products high in fat, sugar and salt by location and by price https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770704/consultation-on-restricting-price-promotions-of-HFSS-products.pdf
- ⁴² *Ibid*
- ⁴³ *Ibid*
- ⁴⁴ *Ibid*
- ⁴⁵ *Ibid*
- ⁴⁶ Monteiro *et al*, 2017 'Household availability of ultra-processed foods and obesity in nineteen European countries. *Public Health Nutrition*: 21(1), 18–26
- ⁴⁷ Faculty of Public Health. Food poverty and health http://www.fph.org.uk/uploads/bs_food_poverty.pdf
- ⁴⁸ De Schutter O, 2019. Towards a Common Food Policy for the European Union. iPES Food
- ⁴⁹ Scottish Government, 2018. Good Food Nation Programme of Measures <https://www.gov.scot/publications/good-food-nation-programme-of-measures/>
- ⁵⁰ <https://www.foodforlife.org.uk/about-us/transforming-food-culture> Accessed 21 January 2019

- ⁵¹ Jones *et al*, 2015 Pupil survey in local commission areas: Food for Life's impact on primary school children's consumption of fruit and vegetables. UWE Bristol
- ⁵² Orme *et al*, 2010 Food for Life Partnership Evaluation
- ⁵³ https://www.foodforlife.org.uk/~media/files/policyreports/ffl-food-poverty-guidance-for-schools_final_may2015.pdf Accessed 21 January 2019
- ⁵⁴ <http://sustainablefoodcities.org/about> Accessed 21 January 2019
- ⁵⁵ *Ibid*
- ⁵⁶ <http://sustainablefoodcities.org/keyissues/tacklingfoodpovertyandaccesstohealthyfood/cityinitiatives> Accessed 21 January 2019
- ⁵⁷ For example <https://www.cfine.org/community-food-outlets> and http://www.welfehd.co.uk/food_co-op1.pdf Accessed 22 January 2019
- ⁵⁸ <http://www.welfehd.co.uk/about.html> Accessed 22 January 2019
- ⁵⁹ <https://cambridgefoodhub.org/> Accessed 22 January 2019
- ⁶⁰ <https://www.farmdrop.com/our-mission> Accessed 22 January 2019
- ⁶¹ <https://chef.fresh-range.com/> Accessed 23 January 2019
- ⁶² <https://www.riverford.co.uk/> Accessed 22 January 2019
- ⁶³ <https://www.riverford.co.uk/aboutus/employee-ownership> Accessed 22 January 2019
- ⁶⁴ Scottish Government, 2018. Good Food Nation Programme of Measures <https://www.gov.scot/publications/good-food-nation-programme-of-measures/>
- ⁶⁵ <https://www.england.nhs.uk/2015/09/nhs-workplace/> Accessed 30 January 2019
- ⁶⁶ <https://www.foodforlife.org.uk/hospitals/about-us> Accessed 22 January 2019
- ⁶⁷ http://www.bathnes.gov.uk/sites/default/files/public_sector_procurement_from_west_of_england_food_suppliers.pdf Accessed 30 January 2019
- ⁶⁸ <http://www.newcastle-hospitals.org.uk/news/news-item-21825.aspx> and <https://www.foodforlife.org.uk/catering/green-kitchen-standard/case-studies/freeman-hospital-case-study> Accessed 30 January 2019
- ⁶⁹ https://noharm-uscanada.org/sites/default/files/documents-files/3842/Sustainable%20Food%20Purchasing%20in%20Hospitals%20-%20Case%20Studies_0.pdf Accessed 31 January 2019
- ⁷⁰ <https://noharm-uscanada.org/content/us-canada/less-meat-better-meat> Accessed 31 January 2019
- ⁷¹ INNOCAT Good Practice report on sustainable public procurement of school catering services in Europe, 2015 http://www.sustainable-catering.eu/fileadmin/user_upload/enewsletter/Documents/INNOCAT_Catering_Report_FINAL.pdf
- ⁷² *Ibid*
- ⁷³ INNOCAT *Op. Cit.*
- ⁷⁴ <http://www.bathnes.gov.uk/services/environment/sustainability/local-food/healthy-and-sustainable-food-procurement> Accessed 30 January 2019
- ⁷⁵ INNOCAT *Op. Cit.*
- ⁷⁶ <https://www.kbhmadhus.dk/english/ourstory> Accessed 30 January 2019
- ⁷⁷ INNOCAT *Op. Cit.*
- ⁷⁸ <https://international.kk.dk/nyheder/copenhagens-organic-food-revolution> Accessed 30 January 2019
- ⁷⁹ <https://www.theguardian.com/sustainable-business/2014/jun/23/bay-area-hospital-food-healthy-grass-fed-organic> Accessed 27 January 2017
- ⁸⁰ <http://sustainability.ucsf.edu/1.498> Accessed 27 January 2017
- ⁸¹ Jones *et al*, 2016. Food for Life: a Social Return on Investment Analysis of the Locally Commissioned Programme. Full Report. UWE Bristol
- ⁸² https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/418072/gbs-food-catering-march2015.pdf
- ⁸³ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/419245/balanced-scorecard-annotated-march2015.pdf
- ⁸⁴ Michael Gove MP, Secretary of State for Environment, Food and Rural Affairs, 2017. Written Ministerial Statement, 12 December 2017 <https://www.theyworkforyou.com/wms/?id=2017-12-12.HCWS340.h>
- ⁸⁵ <https://www.ciwf.org.uk/news/2011/11/uks-public-sector-awarded-for-contribution-to-animal-welfare> Accessed 22 January 2019
- ⁸⁶ <https://www.compassioninfoodbusiness.com/award-winners/search/?org=§or=Public+Sector&country=&award=> Accessed 22 January 2019
- ⁸⁷ Procurement Reform (Scotland) Act 2014, section 15(5)(c)(ii)
- ⁸⁸ Agriculture in the UK, 2015, Table 6.2
- ⁸⁹ Defra, 2017. Agriculture in the United Kingdom, 2017, Chapter 14
- ⁹⁰ Defra, 2018. Health and Harmony: the future for food, farming and the environment in a Green Brexit
- ⁹¹ Agriculture in the United Kingdom, 2017. Author's calculation based on Tables 7.2-7.4 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/535996/AUK-2015-07jul16.pdf
- ⁹² Lundqvist, J., de Fraiture, C. Molden, D., 2008. Saving Water: From Field to Fork – Curbing Losses and Wastage in the Food Chain. SIWI Policy Brief. SIWI. http://www.siwi.org/documents/Resources/Policy_Briefs/PB_From_Filed_to_Fork_2008.pdf

- ⁹³ Nellemann, C., MacDevette, M., Manders, et al. (2009) *The environmental food crisis – The environment's role in averting future food crises*. A UNEP rapid response assessment. United Nations Environment Programme, GRID-Arendal, www.unep.org/pdf/foodcrisis_lores.pdf
- ⁹⁴ Bailey R *et al*, 2014. *Livestock – Climate Change's Forgotten Sector*. Chatham House.
- ⁹⁵ Parliamentary Office for Science & Technology, 2014. *Diffuse Pollution of Water by Agriculture*: Number 478
- ⁹⁶ Tsiafoulis *et al*, 2015. Intensive agriculture reduces soil biodiversity across Europe. *Global Change Biology* (2015) 21, 973–985, doi: 10.1111/gcb.12752
- ⁹⁷ Edmondson *et al*, 2014. Urban cultivation in allotments maintains soil qualities adversely affected by conventional agriculture. *Journal of Applied Ecology* 2014, 51, 880–889
- ⁹⁸ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/372755/UK_Wild_birds_1970-2013_final_-_revision_2.pdf
- ⁹⁹ Reversing insect pollinator decline. <http://www.parliament.uk/business/publications/research/briefing-papers/POST-PN-442/reversing-insect-pollinator-decline>
- ¹⁰⁰ Lelieveld *et al*, 2015. The contribution of outdoor air pollution sources to premature mortality on a global scale. *Nature*, Vol 525:
http://www.nature.com/articles/nature15371.epdf?referrer_access_token=iF5gqr30t1szp57JiRFtqNRgN0jAjWel9jnR3ZoTv0P7-mtyJ35yzVDTICbqYE-HmpWfKkzyRVYn1vpVPXnMBvMSXCFBNhib1tmNYqxPwBhH4iuV771SpdzIBDOJNB08kKjWzyk_QX4ID7LU26XKSsnKplulipZuS368wPUJmIPhDa2DhAmnAPfoufW0IL-vMldUgBJjocJsxa4rmPr5QxsIXX-r3-i41wAMFKzMthxZNI6wBXPJkAEIbXn8P4Z9WBWnDzgxUkFcDKwHHVFlew%3D%3D&tracking_referrer=www.theguardian.com
- ¹⁰¹ UK roundtable on sustainable soya, Baseline study 2018
- ¹⁰² *Ibid*
- ¹⁰³ *Ibid*
- ¹⁰⁴ Bajželj B. *Et al*, 2014. Importance of food-demand management for climate mitigation. *Nature Climate Change* <http://www.nature.com/doifinder/10.1038/nclimate2353>
- ¹⁰⁵ Schader C *et al*. 2015. Impacts of feeding less food-competing feedstuffs to livestock on global food system sustainability. *J. R. Soc. Interface* 12: 20150891. <http://dx.doi.org/10.1098/rsif.2015.0891>
- ¹⁰⁶ Poux, X., Aubert, P.-M., 2018. An agroecological Europe in 2050: multifunctional agriculture for healthy eating. Findings from the Ten Years For Agroecology (TYFA) modelling exercise, Iddri-AScA, *Study N°09/18*, Paris
- ¹⁰⁷ De Schutter O, 2019. *Towards a Common Food Policy for the European Union*. iPES Food
- ¹⁰⁸ Michael Gove MP, Secretary of State for Environment, Food and Rural Affairs, 2017. Written Ministerial Statement, 12 December 2017 <https://www.theyworkforyou.com/wms/?id=2017-12-12.HCWS340.h>
- ¹⁰⁹ <https://www.itavi.asso.fr/content/les-volailles-de-chair> Accessed 31 January 2019
- ¹¹⁰ Weber *et al*, 2007. Piglet mortality on farms using farrowing systems with or without crates. *Animal Welfare* 16: 277-279
- ¹¹¹ Baxter EM, Lawrence AB, and Edwards SA. Alternative farrowing accommodation: welfare and economic aspects of existing farrowing and lactation systems for pigs. *Animal*. 2012; 6(1):96-117.
- ¹¹² Farm Animal Welfare Council, 2009. *Farm animal welfare in Great Britain: past, present and future*: paragraph 168
- ¹¹³ Berentsen A, 2017. Funding strategies to promote the rearing of pigs with intact tails. For a copy email peter.stevenson@ciwf.org
- ¹¹⁴ <https://www.pastureforlife.org/media/2014/03/PFLA-standards.pdf> Accessed 4 February 2019
- ¹¹⁵ For research on this see *Nutritional benefits of higher welfare animal products* <http://www.ciwf.org.uk/research/food-and-human-health/nutrition/>
- ¹¹⁶ FAO, 2013. Lutter contre le changement climatique grâce à l'élevage. <http://www.fao.org/3/a178d78a-c599-4518-b6f5-778051e422e1/i3437f.pdf>
- ¹¹⁷ Krohn, C.C., Foldager, J. and Mogensen, L., 1999. Long-term effect of colostrum feeding methods on behaviour in female dairy calves. *Acta Agriculturae Scandinavica, Section A-Animal Science*, 49(1), pp.57-64.
- ¹¹⁸ Scientific Opinion of the Panel on Animal Health and Welfare on a request from European Commission on welfare of dairy cows. *The EFSA Journal* (2009) 1143, 1-38.
- ¹¹⁹ Arnott *et al*, 2016. Review: welfare of dairy cows in continuously housed and pasture-based production systems. *Animal* doi:10.1017/S1751731116001336
- ¹²⁰ Keyserlingk *et al*, 2017. Dairy cows value access to pasture as highly as fresh feed. *Scientific Reports* | 7:44953 | DOI: 10.1038/srep44953
- ¹²¹ Springmann M *et al*, 2016. Analysis and valuation of the health and climate change cobenefits of dietary change. *PNAS* vol. 113 no. 15: 4146–4151
- ¹²² RISE Foundation, 2018. What is the Safe Operating Space for EU Livestock? http://www.risefoundation.eu/images/files/2018/2018_RISE_LIVESTOCK_FULL.pdf
- ¹²³ Bailey R. *et al*, 2014. *Livestock – Climate Change's Forgotten Sector*. Chatham House. https://www.chathamhouse.org/sites/files/chathamhouse/field/field_document/20141203LivestockClimateChangeBaileyFroggattWellesley.pdf
- ¹²⁴ *The Lancet*, 2018. We need to talk about meat. Vol 392 November 24, 2018
- ¹²⁵ Agriculture in the UK, 2017, author's calculation based on Tables 7.2- 7.4
- ¹²⁶ Westhoek, H. *et al.*, 2014. Food choices, health and environment: Effects of cutting Europe's meat and dairy intake. *Global Environmental Change*, Vol 26, May 2014 p196-205

-
- ¹²⁷ A 50% reduction in meat and dairy consumption does not lead to a 50% reduction in the use of arable land as additional crops for direct human consumption will be needed to replace the reduced consumption of meat and dairy. However, because animals convert crops very inefficiently into meat and milk, much fewer crops are needed to feed people if they are used for direct human consumption rather than being fed to animals.
- ¹²⁸ Agriculture in the UK, 2017, Tables 7.9 & 7.12
- ¹²⁹ Agriculture in the UK, 2017, Table 13.1
- ¹³⁰ Agriculture in the UK, 2017, Tables 7.9 & 7.12
- ¹³¹ RISE Foundation, 2018 What is the Safe Operating Space for EU livestock?
http://www.risefoundation.eu/images/files/2018/2018_RISE_LIVESTOCK_FULL.pdf
- ¹³² Wellesley *et al*, 2015. Changing climate, changing diets: pathways to lower meat consumption. Royal Institute of International Affairs
- ¹³³ Global Food Security, 2018. Food system approaches to a sustainable future.
<https://www.foodsecurity.ac.uk/publications/>
- ¹³⁴ UK Veterinary Antibiotic Resistance and Sales Surveillance Report UK-VARSS 2017. Veterinary Medicines Directorate, October 2018
- ¹³⁵ Buckwell and Nadeu, 2018. What is a safe operating space for EU livestock? RISE Foundation, 2018
- ¹³⁶ UK roundtable on sustainable soya, Baseline study 2018
- ¹³⁷ Report of the Special Rapporteur on the right to food, Olivier De Schutter. 26 December 2011. A/HRC/19/59
http://www.ohchr.org/Documents/HRBodies/HRCouncil/RegularSession/Session19/A-HRC-19-59_en.pdf
- ¹³⁸ Prof Tim Lang Centre for Food Policy, City, University of London, Prof Mike Rayner Nuffield Department of Population Health, Oxford University, 10 January 2019.. A meat tax need not hit the poor. Letter to The Guardian. <https://www.theguardian.com/environment/2019/jan/10/a-meat-tax-need-not-hit-the-poor>
- ¹³⁹ UK Government Office for Science, 2011. Foresight Report on the Future of Food and Farming
- ¹⁴⁰ Davies S, 2018. Annual report of the Chief Medical Officer, 2018
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/767549/Annual_report_of_the_Chief_Medical_Officer_2018_-_health_2040_-_better_health_within_reach.pdf
- ¹⁴¹ Donnelly L, 21 December 2018. Daily Telegraph <https://www.telegraph.co.uk/news/2018/12/21/call-chief-nanny-want-says-top-doctor-calls-slew-taxes-chocolate/> Accessed 19 January 2019
- ¹⁴² Nnoaham K.E., Sacks G., Rayner M., Mytton O. And Gray A., 2009. Modelling income group differences in the health and economic impacts of targeted food taxes and subsidies. International Journal of Epidemiology, Vol 38, Issue 5: 1324-1333.
- ¹⁴³ Economic nutrition policy tools – useful in the challenge to combat obesity and poor nutrition? Danish Academy of Technical Sciences, ATV. December 2007
- ¹⁴⁴ Romana Khan, Kanishka Misra, Vishal Singh. Will a Fat Tax Work? Marketing Science, 2015; 150720091204005 DOI: [10.1287/mksc.2015.0917](https://doi.org/10.1287/mksc.2015.0917)
- ¹⁴⁵ UN Environment, 2019. Global Environment Outlook
- ¹⁴⁶ World Health Organization Europe, 2015. Using price policies to promote healthier diets
- ¹⁴⁷ Sassi F, 2010 Obesity and the Economics of Prevention, OECD
http://s3.amazonaws.com/zanran_storage/www.eaca.be/ContentPages/956222899.pdf
- ¹⁴⁸ Swinburn *et al*, 2019. *Op. Cit.*
- ¹⁴⁹ <https://www.gov.uk/guidance/food-products-and-vat-notice-70114> Accessed 21 January 2019
- ¹⁵⁰ UNDP, 2017. Taxes on pesticides and chemical fertilizers
<http://www.undp.org/content/sdfinance/en/home/solutions/taxes-pesticides-chemicalfertilizers.html> Accessed 20 August 2017
- ¹⁵¹ World Health Organization Europe, 2015. Using price policies to promote healthier diets
- ¹⁵² Research reviewed in Nutritional benefits of higher welfare animal products, 2012. Compassion in World Farming.
http://www.ciwf.org.uk/includes/documents/cm_docs/2012/n/nutritional_benefits_of_higher_welfare_animal_products_report_june2012.pdf