Farming Tomorrow

Policy Exchange

British agriculture after Brexit

Warwick Lightfoot, Joshua Burke, Nicholas Craig-Harvey, Jonathan Dupont, Richard Howard, Rebecca Lowe, Richard Norrie, Michael Taylor

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Executive Summary

For the first time in over forty years, the British Government has an opportunity to take control of agriculture policy. The right response will give proper emphasis to consumers' interests, address the sector's poor productivity, and transform wider economic and environmental outcomes.

Since 1973, UK farm and food policies have conformed to the rules and objectives of the EU's Common Agricultural Policy (CAP). The objectives of the CAP have focused on the interests of the producers, have been inconsistent, and have created distorted markets. The direct losses of economic welfare to consumers have been significant, while insistence on maintaining agricultural trade protection has indirectly hindered progress on multilateral trade liberalisation. In the long term, the CAP has, at great expense, reduced agricultural productivity by lessening competition and supporting inefficient farmers. Indeed, of the total £3.6 billion income from UK farming, £3.1 billion — or 87 per cent — comes from subsidies.

Following Brexit, our agricultural policies will need to respond to the circumstances of an independent UK, while promoting the interests and maximising the outcomes of consumers, commercially viable producers, and the environment. Reforming and replacing the CAP offers a once in a generation chance to reform Britain's environmental policy. This should include recognition that the primary goal of government intervention in agriculture should be to support public goods, and to preserve high standards for environmental protection, food safety, and animal welfare. The EU's unbalanced Precautionary Principle has hindered the application of evidence-based practice, with regulations used to protect domestic producers based on unsupported assertions of risk rather than reflecting the scientific consensus.

After an overview of the evolution and framework of public policy and intervention in the area, this report outlines opportunities to improve policy by focusing on four main interest groups: consumers, producers, the wider rural economy, and the environment. Particular focus is given to the subsidies and tariffs that shape the current situation and which urgently need to be addressed.

Consumers

The first and most important stakeholder in food and farming is the consumer. In general, consumers want inexpensive, high quality, safe food, which is available in the right quantity at the most convenient time and place. Although sustained productivity improvements have helped bring the cost of food down, tariff barriers and agricultural subsidies have kept prices higher than they need to be.

We suggest:

- After leaving the EU Customs Union, the UK should unilaterally phase out tariffs that increase consumer food prices and complicate new trade deals.
- The Food Standards Agency should be given new powers and resources to collate, commission, and review scientific evidence on food safety and animal welfare.

Producers

British farmers used to be among the most productive in the world. In recent decades, however, their productivity has stagnated, and many farms would not be sustainable without substantial subsidy. The management of the withdrawal of farming support is going to be a central issue for the new domestic policy. But the goal should be to create a highly productive, dynamic farming sector, which is more specialised and capable of competing in global markets.

We suggest:

- The UK should work to phase out direct subsidies for agricultural production and income support. This will free up Government revenue to fund other taxpayer priorities, such as the NHS.
- Any remaining subsides should be redirected towards protection for natural and public goods, and increasing R&D to boost innovation and the sector's long-term productivity.
- The Government should work to identify environmentally suitable freed-up land that can be used for housing or commercial development, sharing the planning uplift with the original farmer.
- Subsidies should be phased out gradually over a five-year period from 2020, with farmers given the option of receiving a final payment as a single one-off payment instead.
- Seeking self-sufficiency in food should not be a goal of agricultural policy.

Rural Economy

The implications of agricultural reforms will be far reaching, going beyond the sector to the wider rural economy. Under the CAP, agriculture has seen decreasing employment, among the lowest productivity out of all the industrial sectors in England, and a failure to facilitate competitiveness and diversity in the wider rural economy. Exiting the EU provides an opportunity to do something more than simply reforming the CAP — a bold new approach to rural development must be taken.

We suggest that that Government works with local areas to develop Industrial Strategies suitable for the rural economy, with a focus on:

- Environment: preserve and enhance the UK's Natural Capital
- Connectivity: enable rural workers and businesses to integrate with the wider economy
- Innovation: use the opportunities from Brexit to become a world leader in AgriTech

Environment

Agriculture dominates land use in the UK, yet it results in many environmental outcomes that are unsustainable. The Government needs to ensure that any new British agriculture and rural policy framework gives an incentive to more sustainable agricultural practices, and increases the ecosystem services that are provided through land management practices to make certain we leave the environment in a better state than we found it.

We suggest:

- Rather than giving production subsidies to farmers under the CAP, all remaining public support should go towards public goods, such as preserving and enhancing the natural environment and the environmental and aesthetic benefits that derive from it.
- This should be achieved using a 'Payments for Ecosystem Services' approach, linked to the Defra 25 Year Environment Plan and the work of the Natural Capital Committee. Payments should be available both to farms and other landowners, creating a competitive market for the provision of ecosystem services.
- As part of Defra's 25 Year Plan for the Environment, Government should consult on the most appropriate mechanisms for commissioning ecosystem services (including consideration of the optimal scale), and explore how they could work alongside tools such as regulation and biodiversity offsetting.
- Develop an integrated land management policy framework, which facilitates the deeper integration of forestry and agriculture. Explore the potential of re-forestation as a cost-effective approach to mitigating carbon emissions.
- Perverse EU rules such as the crop diversification rule should be reformed or abandoned.
- Transpose the key environmental directives that govern the environment — notably the Water Framework Directive, and the Habitats Directives — so that there is no post-Brexit period in which no laws apply.

Introduction

Why now?

For the first time in over forty years, the British Government has an opportunity to take control of agriculture policy, and related policies concerning trade and land management. Following Brexit, these policies will need to respond to the circumstances of an independent UK, while promoting the interests and maximising the outcomes of consumers, commercially viable producers, and the environment. As the Secretary of State has argued, Britain now has a 'once in a lifetime' opportunity to ensure a 'Green Brexit', creating a new system of agricultural support which puts 'environmental protection and enhancement first'.[1]

The agriculture sector has, over the past decades, become smaller, less influential, and less bound to rural communities — yet it remains an area of great significance. The sector has a major impact on the appearance of our countryside, the price of our food, the protection of our environment, and life in our rural communities. British farmers produce 60 per cent of the food we consume, and manage 70 per cent of our land.[2]

Since 1973, UK farm and food policies have conformed to the rules and objectives of the EU's Common Agricultural Policy (CAP). Annually, we receive £3 billion in payments under this programme, and it shapes how we manage our land, look after the environment, and care for our animals. The EU accounts for 70 per cent of our food imports and 62 per cent of our exports[3], but its tariff barriers mean that imports of food from other countries have been more expensive for consumers, while domestic producers have been protected.

Unfortunately, the objectives of the CAP have been inconsistent, and powerful vested interests have often resulted in policy makers creating distorted artificial markets. The direct losses of economic welfare to consumers are significant, while indirectly the insistence on - maintaining agricultural trade protection has hindered progress on multilateral trade liberalisation. Although it is not the only reason for low productivity in Britain's agriculture sector, the CAP has exacerbated the problem by reducing competition and supporting inefficient farmers.

Many people recognised the defects of the CAP within a few years of its construction, yet progress on its reform has been very slow. Although UK governments have repeatedly questioned the validity of EU policy in this area, these concerns have been largely ignored in favour of the interests of producers in other Member States. Policies, therefore, have not been subject to effective interrogation and scrutiny by the UK Governments that administered them, because — for all

1 The Unfrozen Moment – Delivering a Green Brexit, Rt Hon Michael Gov MP, 21 July 2017, https://www.gov.uk/government/speeches/the-unfrozen-moment-delivering-a-green-brexit

2Agriculture in the United Kingdom 2016, DEFRA, 2017

3 Agriculture in the United Kingdom 2016, DEFRA, 2017

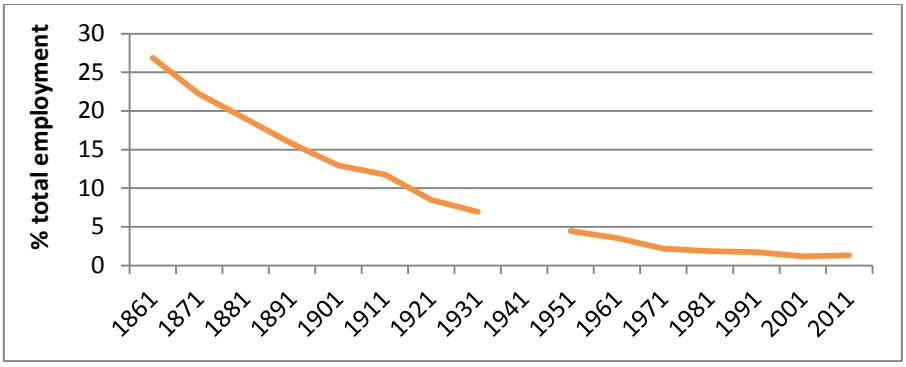
practical purposes — those policies were outside their control.

In the context of UK politics, therefore, agriculture has been a marginal issue, which has been hidden away in Brussels, and — while often criticized — has been seen as an inevitable price for being part of the EU. It is now moving to the centre-ground of the EU debate, and many more people and interest groups will become involved in the discussion, not least as it becomes more apparent that any financial support for those in the agriculture sector comes directly from UK taxpayers. Leaving the European Union allows us to think again about agricultural policy from first principles.

What should agricultural policy do?

Agriculture used to dominate the UK economy. In the pre-industrial world, at least three quarters of the English workforce worked the land, and, as late as the nineteenth century, 80 per cent of household expenditure was on food.[4] Today, by contrast, agriculture makes up only around one per cent of employment, and food makes up 10 per cent of household expenditure.

Figure 1: Agricultural workers



While it may now only be a small part of the economy, many still feel that agriculture is special, and that it should not be treated in the same way as other markets or sectors of the economy.

In the past, three main rationales were given for public intervention in agriculture, food production, and land management:

- **Food.** To ensure security of food supply, prevent price instability, **Farmers.** To protect farming jobs, and assist farming households with low and variable incomes.
- **Public Goods.** To promote beneficial externalities such as environmental objectives, or maintain high standards in safety or animal welfare.

In reality, however — as we will see in this report — there is no evidence that substantial government intervention is needed to guarantee secure and cheap food, the agriculture sector is likely to continue to shrink as a share of the economy, and the current form of the CAP does a poor job of meeting environmental objectives.

4 Economic structure and agricultural productivity in Europe, 1300-1800, Robert C. Allen, 2000; At Home, Bill Bryson, 2010

Over the second half of the twentieth century, spending on food continued to fall — from about 40 per cent of household spending, to around 11 per cent.[5] Historically speaking, food has never been more affordable.

Besides providing more income to spend on other goods, cheaper food has also reduced the impact of price volatility on consumers. It is true that sharp variations in weather or exports can see producers more exposed to price volatility. Price volatility by itself however, is not a market failure. As in any other market, changing prices contain valuable information, incentivising supply to expand or contract to meet demand. Without price guarantees, some farms may organically become bigger or merge into chains to diversify and better hedge better against risk. Alternatively, many farmers already take advantage of commodity future markets to insure against price risks.

Equally, the introduction of significant mechanisation, artificial fertilisers and high-yield varieties has continued to improve agricultural productivity. At the same time, while demand for services is near unlimited, there is only so much we can eat, limiting the room for output growth. The net result is that agriculture has been shrinking as a proportion of UK employment for at least 150 years. Upcoming technological improvements from GM crops to autonomous vehicles suggest this trend may still have some way to play out. Farming is likely to continue to shrink as a proportion of the economy.

While we should not try to maintain farming jobs artificially and prevent the evolution of the economy, this still leaves two remaining visions for agricultural policy:

- **Food security.** Agricultural policy should ensure we are self-sufficient in food, protecting us in the event of an emergency or wartime.
- **Public goods.** Agricultural policy should subsidise positive externalities or public goods such as environmental goods, flood protection, or aesthetic beauty.

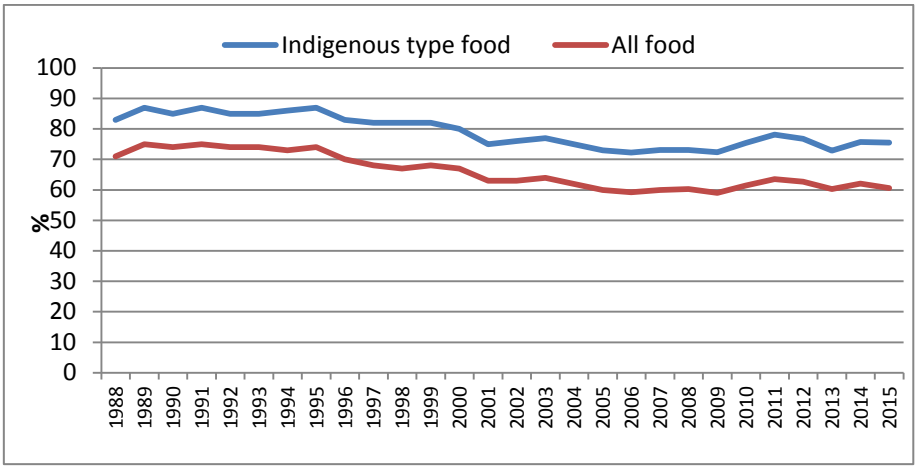
Ultimately, much of the debate over agriculture policy depends on which of these visions you subscribe to.

Should we seek self-sufficiency in food?

While self-sufficiency in food increased in the immediate post-war era with the introduction of subsidies, it has been in decline since the late 1980s, as seen in Figure 2. The food production to supply ratio fell from 71 in 1988 to 61 per cent in 2015 (for all types of food).

5 As proxied by RPI weights, ONS

Figure 2: Food production to supply ratio



Achieving full autonomy in food production would be enormously expensive. It is also worth remembering that Britain did not reach this even during the Second World War — despite the 'Dig for Victory' campaign. Agricultural production relies on complex supply chains, which require energy, animal food supplies, and the components for making fertilizers or machinery.[6] Achieving self-sufficiency would likely involve environmental damage from the intensive use of marginal land, and — in any case — would have to be restricted to the limited range of food products that can be grown here. It is also unclear why the argument for self-sufficiency should be followed for food but not for other critical industries, such as energy, communications, clothes, transport, medicine, and so on. At the limit, this is a recipe for complete autarky, with much higher prices and far less choice for consumers.

Moreover, as the Defra 2009 Food Security Assessment argued, 'self-sufficiency is not the same as food security'.[7] In the UK context, genuine food security comes from a diversity of supply in our trading partners and the transport infrastructure through which food is imported; a strong economy that gives consumers the income to purchase food in a wide range of competing international and home markets; and from an effective defence capability, and network of precisely because of the UK's openness to trade that our food sources are relatively secure, allowing us to overcome disruption to any particular source.

Short of a new world war, it is hard to think of any realistic scenario in which the UK would be completely cut off from all trading partners. While there are genuine concerns about long-term global food security, and the challenges we face in feeding a growing world population, the UK can best contribute to these through seeking to accelerate innovation, rather than shutting itself away from the world.

In other words, for the purposes of this report, we do not believe that seeking self-sufficiency should be a primary goal of peacetime agricultural policy. Significant intervention in prices, whether through tariffs or subsidies, is a relic of mid-twentieth century geopolitics. That in turn, implies substantial changes for how agricultural policy should work.

6 Agriculture after Brexit, Dieter Helm, Oxrep, 2017

7 UK Food Security Assessment, Defra, 2009, http://webarchive.nationalarchives.gov.uk/20130402191240/http://archive.defra.gov.uk/foodfarm/food/pdf/food-assess-approach-0908.pdf

Public goods and environmental protection

The primary goal of government interventions in agriculture should be to support public goods and preserve high standards for environmental protection, food safety, and animal welfare.

Agricultural activity is fundamentally dependent on a sustainable natural environment, and farmers are effectively stewards of large parts of our countryside. In recent years, the CAP system has been moving more towards making payments for environmental protection and enhancement — partly under pressure from the WTO. Some environmentalists fear that Brexit will mean that environmental controls are relaxed. However, there is no reason in principle why that must be the case.

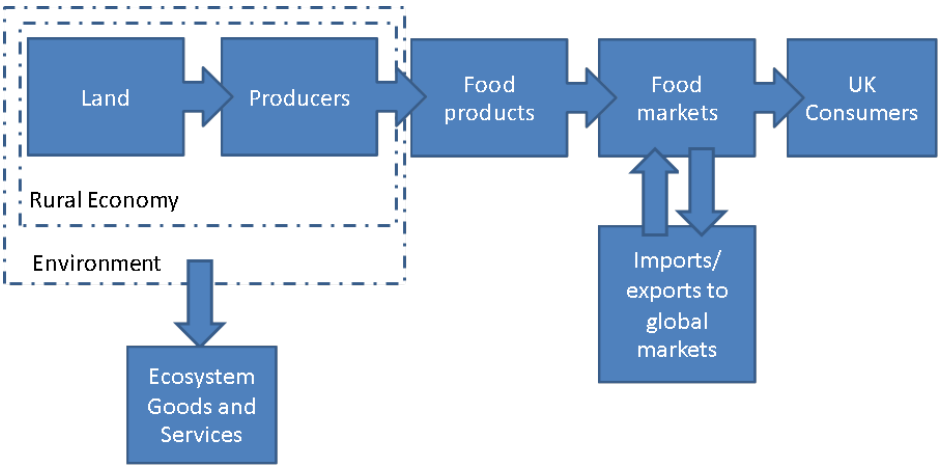
Indeed, following Brexit, there is potential for the UK Government to design a system of incentives that will result in better and more efficient environmental outcomes. We can loosen regulations in areas where the EU's over-reliance on an imbalanced Precautionary Principle has contravened scientific evidence on real risks, but also introduce tighter controls where they are really needed and spend far more on environmental goods. Reform of the CAP offers a once in a generation chance to reform Britain's environmental policy, and ensure that we leave the environment better than we found it.

The structure of this report

Fundamentally, the Government is faced with six challenges:

- To set out a clear vision of what it wants agriculture to achieve economically, environmentally, and socially, after Brexit.
- To justify and commit to any financial or other support that it gives the sector.
- To develop transitional arrangements and appropriate compensation as any new regime is brought in.
- To improve environmental regulations, ensuring that we 'leave the environment better than we found it'.
- To negotiate trade agreements with the EU and the rest of the world, which protect our food supplies, minimise tariffs and UK food prices, and let producers in the UK and overseas compete on a level playing field.
- To reconsider and confirm its approach towards rural communities and rural development.

In this report, we focus on the high level principles of what a new British Agricultural Policy should look like. The ultimate aim of this project is to influence and shape the UK's future farm and agricultural policy in a way that supports the welfare of consumers, producers, the environment, and the rural economy. Each of those groups will be the focus of a chapter of this report, following an overview of Britain's agricultural history. The starting point for policy reform, however, must be the consumer.



Agriculture in Britain: from the Corn Laws to the CAP

Between the passing of the Corn Laws and the outbreak of World War I, British agriculture largely acted as a free market, with little government intervention, subsidy or protection. Declining transport costs in the latter half of the nineteenth century helped to bring about an integrated global food system, cutting food prices and accelerating Britain's industrialisation. Although politicians such as Joseph Chamberlain urged the introduction of new tariffs, many in Britain remained passionately committed to the consumer benefits of low prices, and the 'cheap loaf'. Unlike continental Europe, Britain did not try to protect its agriculture — one reason being that, despite a booming industrial sector, German agricultural productivity lagged substantially far behind Britain's until well into the second half of the twentieth century.[8]

Wartime brought about a new focus on food security and self-sufficiency. Guaranteed prices and minimum wages were introduced temporarily between 1917 and 1921, and then new tariffs from 1931 onwards. After the Second World War, the system was consolidated and made permanent under the Agriculture Act of 1947. Under the new system, annual price reviews set guaranteed prices for key agricultural products (cattle, sheep, milk, eggs, barley, wheat, oats, rye, potatoes, sugar beet, and wool) and 'deficiency payments' were paid to farmers to cover the difference between the guaranteed and market price. However — again in contrast to Europe — Britain still maintained relatively low tariffs for agriculture, preferring to support farmers with direct payments.

Since 1973, UK farm and food policies have conformed to the rules and objectives of the EU's Common Agricultural Policy (CAP), which was established in the early 1960s. From the beginning, the CAP was seen as less than ideal for the UK, with the 1971 White Paper, *The United Kingdom and the European Communities*, warning that 'membership will affect food prices over a period of about six years with an increase of about 2.5 per cent each year'.

The CAP now absorbs almost 40 per cent of the EU budget. It is the principal and oldest policy programme of the EU, having been launched shortly after the establishment of the Common Market, following the signing of the Treaty of Rome in 1957. It swiftly emerged as the most important European policy in terms of the number of people directly affected, its share of the budget, and the extent of powers transferred from national to European level.

The objectives for the CAP set out in the Treaty of Rome remained unchanged in successive treaty revisions. They are to 'increase

8 Economic growth during the long twentieth century, Nicholas Crafts

agriculture productivity by promoting technical progress and by ensuring the rationale development of agricultural production, to ensure a fair standard of living for the agricultural community', to 'stabilise markets', to 'assure the availability of supplies' and to 'ensure that supplies reach consumers at reasonable prices'. The policy reflects the preoccupations of the post-war period. These included a desire for food security, and a commitment to support for low income often small-scale farmers and the wider rural communities, not least because it was a time when people were leaving the land and agriculture to work in better-paid jobs in manufacturing and services in towns and cities.

Three of the original objectives of the CAP were economically based: to increase production, stabilise markets, and ensure availability of food supplies. The mechanisms employed to achieve those objectives did engender increased agricultural production. They brought more intensive agricultural systems, with increased mechanisation and use of chemicals, but with a consequent shedding of labour — which was also driven by the migration of the younger generation to those better-paid jobs in manufacturing and service industries.

The increased agricultural production also helped to stabilise markets and ensure availability of supplies, which led to excess produce in some commodities, with the EU moving from being a net importer to a net exporter. This was to the detriment of the world market, and led to strained international relations as producers elsewhere in the world were denied access to the European market.

This has matured into the CAP's current approach, with its 'three main objectives for the 2014-20 period in CAP history: viable food production, sustainable management of natural resources and climate action, and balanced territorial development'.

CAP: 1960s and 1970s

Originally, the CAP represented a compromise between French and German interests. In the early 1960s, German farms were relatively small, and farmers wanted a guaranteed income for small amounts of output. In contrast, French farmers mostly enjoyed economies of scale and were more efficient, so wanted to be guaranteed the purchase of large amounts of production.

In seeking to establish a common system, the EEC adopted a system of support of guaranteed prices for individual agricultural products, rather than direct payments to farmers. This decision, made at a conference in Stresa in 1958, was given effect through a series of community-wide 'market organisations' or regimes for particular products.

The first of these came into effect in 1962. In 1964, the CAP was applied to beef, veal, and milk; it was applied to olive oil in 1966; to cereals, pork, eggs, poultry, rice, sugar, oils, and fats from 1976; to processed fruit and vegetables from 1968; and to wine, tobacco, flax, and hemp from 1970. The Commission guaranteed a price for each product, and if the farmer could not sell the product for the agreed

price, the unsold produce would be purchased, taken into intervention, and stored for future sale or disposal. If the producer could only sell it abroad at a price below the guaranteed price, the producer was entitled to an export refund to cover the difference. It remains the case that each product is protected by tariffs on competing imports.

The CAP arrangements were at the most interventionist end of the scale of options envisaged. Anthony Teasdale commented in the Penguin Companion to European Union that 'the seeds were sown for what became in effect a miniature planned economy in the agriculture sector'. The Commission swiftly learnt that the repercussions of guaranteed prices were more difficult than it had anticipated.

The result was repeated overproduction of unwanted produce — of so-called 'butter mountains' and 'milk lakes'. The first attempt to address the flaws in the construction of the CAP was the publication of the Mansholt Plan. The Commission recognised that there would be a growing structural surplus in agricultural production, and attempted to reduce the number of people working in agriculture, encouraging the formation of larger farms. The vested agricultural interest that shaped the original construction of the CAP emasculated the principal recommendations in the report, and much of its basic analysis informed later efforts to contain the cost of the CAP.

The compromise was that high prices above world clearing prices were guaranteed to help the German farmers, and, in order to help the French farmers, the price guarantee was extended to large amounts of output, whether there was a demand for it or not. High tariffs excluded agricultural imports from more efficient markets around the world, whilst export subsidies meant that EU producers dumped their output in overseas markets. The principal objective of this policy was to stimulate an increase in domestic output, and this objective was easily achieved.

The consequences were equally clear. There were huge increases in production, and an accumulation of surpluses that could not be disposed of because the normal operation of the price mechanism in a competitive market had been suspended. In a normal market, an excess supply relative to demand would result in a fall in price and a reduction in output, which would restore equilibrium between supply and demand.

Given that prices could not adjust, the Commission had to intervene to buy up the surpluses. The policy ended up attempting to fix both prices and quantities produced. The consequences of the policy were not confined to the EU. High tariffs excluded foreign exports from the Common Market, reducing the incomes of emerging economies where the only comparative advantage was often in agricultural products.

This squeeze on developing economies' trade was further compounded by the application of export subsidies to the surpluses being generated as a result of intervention prices. European consumers paid a price. There was the direct cost that arose from the Common External Tariff, and there was the indirect cost that the taxpayer paid through subsidies to farm businesses. In distributional terms, the policy was regressive: given that food makes up a higher proportion of

the budget of a low-income household, higher food prices placed a disproportionate burden on low-income households.

CAP: 1980s onwards

The CAP has been seen by many as a highly defective policy, yet little progress was made in attempts to reform it in the 1980s and 1990s. The expansion of the EU in 2000 brought in the former socialist economies of central and Eastern Europe. Their economies had large agricultural sectors and poorer farmers, so part of their attraction to the EU was to have access to the subsidy regime of the CAP.

In order to avoid a significant expansion of the farm costs that accounted for about 70 per cent of the total EU budget, spending on agriculture had to be capped. That required significant changes to the way the CAP operated, and the link between production and subsidy was broken. This built on previous attempts to limit production, such as the milk quotas introduced in 1984 or voluntary set aside schemes agreed in 1988.

The reforms to the policy brought in in 1991 by Ray MacSharry — the Irish Commissioner responsible for agriculture — moved away from reliance on price support to direct income payments, which decoupled income support from production. In 1992, support prices for cereals, beef, and butter were cut in exchange for flat rate payments per hectare. These measures included compulsory set aside and schemes to encourage less intense methods of production called 'extensification'.

The logic of the MacSharry reforms was central to Agenda 2000 — an EU action programme aimed at reforming the CAP — which further orientated the objectives of the policy towards income support, and placed much greater emphasis on the environment. Income support became the first pillar of the CAP, and integrated rural development policy became the second. In 2003, the Austrian Commissioner Franz Fischler took things a stage further in the Luxembourg Agreement, when all farm payments were merged into a 'single farm payment' based on land rather than production. This also provided for an automatic part of the CAP payment to be progressively transferred towards rural development, known as 'modulation'.

The current CAP system

CAP payments are made under two 'Pillars' with the majority (three quarters in the UK's case) made under the first pillar:

- Pillar 1 payments are direct income support payments to farmers. To remove any incentive to overproduce, payment is based on the amount of land a farmer owns, not how much they produce. In order to qualify for payment, farmers have to meet certain standards on environmental management, animal welfare standards and traceability. Member States can also apply market support measures in certain conditions.
- Pillar 2 subsidies are for specific rural development and environmental programmes, and require co-financing from

Member States. The EU describes the purposes of this as: fostering the competitiveness of agriculture ensuring the sustainable management of natural resources, combating climate change, creating employment in rural communities.

The Government has promised that any new Pillar 2 subsidies after the Autumn Statement 2016 will be honoured if they provide strong 'value for money and are in line with domestic strategic priorities' – whatever they are. The European Parliament defines the priorities for Pillar 2 payments as:

- Fostering knowledge transfer and innovation;
- Enhancing competitiveness of all types of agriculture and the sustainable management of forests;
- Promoting food chain organisation, including processing and marketing, & risk management;
- Restoring, preserving & enhancing ecosystems;
- Promoting resource efficiency & the transition to a low-carbon economy;
- Promoting social inclusion, poverty reduction and economic development in rural areas.
- Member States will have to spend at least 30% of their rural development funding from the EU budget on certain measures related to land management and the fight against climate change, and at least 5% on the LEADER approach.

The distribution of CAP payments is far from equitable, with 80 per cent of the payments going to 20 per cent of farmers — typically those who are the wealthiest.[9] At the extreme, 39 entities received CAP payments of over £1 million each in 2016, and the top 1 per cent of recipients earned one sixth of all CAP payments.[10] The case for reform to create a more equitable distribution of these payments is therefore strong. For large-scale industrial farmers, the impact of subsidy reform would more likely be on income, but not output,[11] since payments have been decoupled from production.

The CAP money that the UK receives from the EU is paid to applicants by government organisations within each devolved government. In 2015, total CAP payments amounted to £2.5 billion in England, £367 million in Wales, £799 million in Scotland, and £410 million in Northern Ireland. The difference in payments partly reflects the structure of the sector in each region. There is generally a higher degree of dependence on CAP payments in the more livestock-based farming sectors of Scotland, Wales, and North Ireland — where there is also more support for the CAP.

9 The CAP post-2013: more equitable, green and market-oriented? Clementine d'Oultremont, European Policy Brief, 2011, http://aei.pitt.edu/63520/1/EPB5.pdf

10 http://cap-payments.defra.gov.uk/

11 British Agricultural Policy after Brexit, Dieter Helm, September 2016, http://www.dieterhelm.co.uk/natural-capital/environment/agricultural-policy-after-brexit/

The UK agenda of CAP reform

For many years, the UK Government has had a consistent agenda of CAP reform, which has been directed at cutting farm subsidies, ending any links between farm payments and direct agricultural production, and attempting to steer spending within the CAP towards policies intended to improve the environment.

In December 2005, the Treasury published an analysis of the working of the EU's Common Agricultural Policy. It amounted to a devastating indictment of public policy, saying:

> [The CAP] imposes substantial costs on consumers and taxpayers but is inefficient in delivering support to farmers and promoting an attractive rural environment. Indeed, much of the CAP still has a negative impact on the environment.

The report's conclusions claimed that the CAP was:

- Expensive;
- Detrimental for tax payers and consumers, and particularly low-income households;
- Perverse in its distributional consequences — yielding benefits to land owners and above average income farming households, and taking no account of relative wealth, or income of farm households compared to other sectors of society; and
- Bad for the environment.

It set out a proposal for radical change, which would, over ten to fifteen years, remove most subsidies. It would also reduce import tariffs on agricultural products and align them to the much lower level prevailing in other sectors of the economy, and apply competition law to agriculture.

A 2014 OECD monitor report made similar recommendations in terms of its preferred future direction for farming support. It argued for less direct market intervention or connections to production, and using any freed up funds to support education, infrastructure or research.

While CAP has improved since its origin, it remains highly imperfect, with much of this reform agenda still left to implement. Now the UK has a real opportunity to shape this important sector for itself.

Consumers: preferences, standards, and the costs of trade and regulation

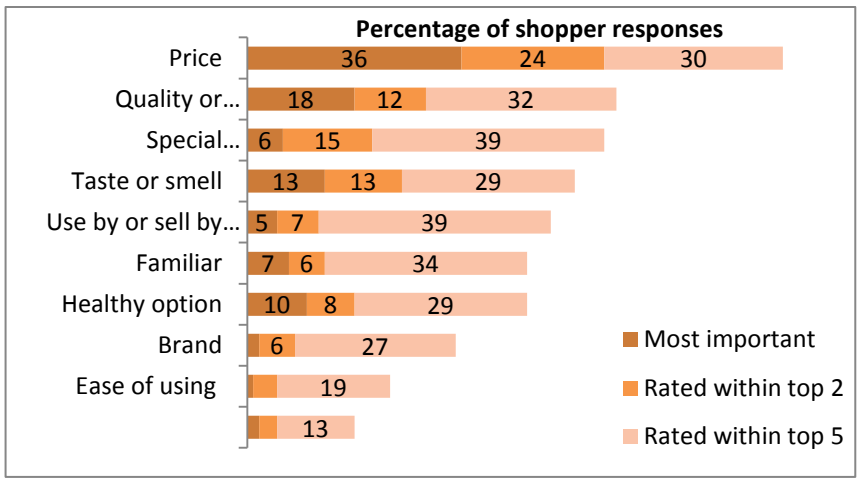
The first and most important stakeholder in food and farming is the consumer. While sustained productivity improvements have helped bring the cost of food down, tariff barriers and agricultural subsidies have kept the price of food higher than it needs to be. In this chapter, we look at what consumers want in food, the potential to lower prices by reducing trade barriers, and how to ensure that doesn't undermine Britain's high standards of food safety or animal welfare.

What the consumer wants

In general, consumers want inexpensive, high-quality, safe food, which is available in the right quantity at the most convenient time and place. These are tough requirements, and the failure of suppliers can lead to public outcry, as has recently been seen in shortages of iceberg lettuces and courgettes.[12]

According to a government survey (see Figure 3), 36 per cent of shoppers named price as the most important factor when choosing what food to buy, and 90 per cent claimed it was within their top five influences. 62 per cent listed quality in the top five, but only 18 per cent considered it to be the most important factor. Familiarity and brand names are also important, with 35 per cent of shoppers naming those in their top five influences.

Figure 3: Factors influencing consumer product choice (Food Statistics Pocketbook 2016)



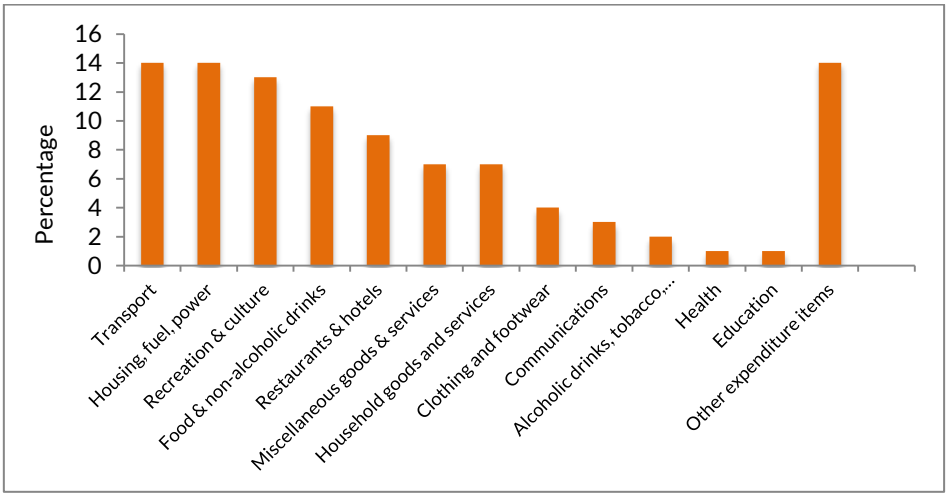
12 Why is there a vegetable shortage?, BBC News, 3 February 2017, http://www.bbc.co.uk/news/uk-38666752

56 per cent of shoppers say they try to buy British food whenever they can, 39 per cent think it tastes better, and 77 per cent agree it is important to support British farmers. However, 45 per cent of people think that British food is more expensive than imported food.

Household spending on food and drink

Over the course of the second half of the twentieth century, spending on food has fallen from about 40 per cent of total household spending to around 11 per cent.[13] However, 'food and non-alcoholic drinks' remains the fifth biggest category of household expenditure, with the average household spending £56.80 a week. In 2016, £1.5 billion was spent in total each week on food and non-alcoholic drinks.

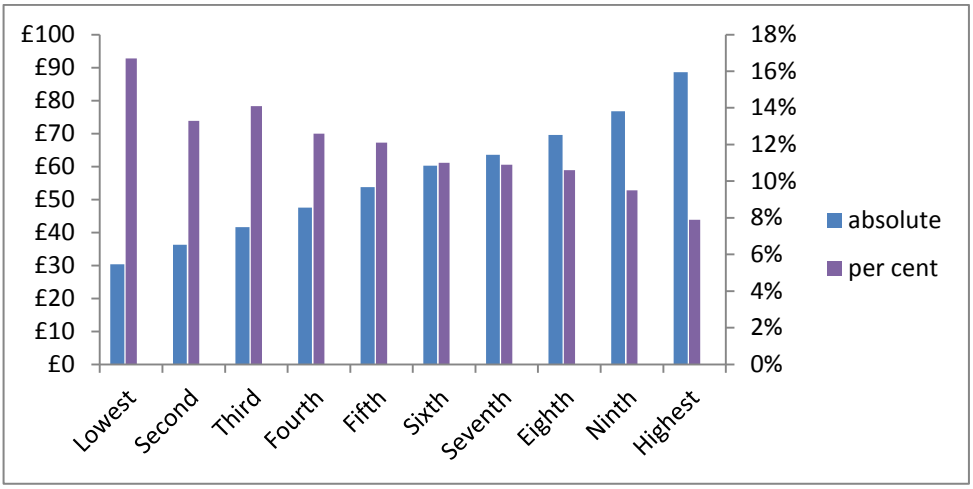
Figure 4: Breakdown of UK total expenditure, financial year ending 2016 (ONS)



Higher-income households spend more on food and non-alcoholic drinks per week than poorer households: in 2016, households in the top income decile spent £88.60 per week on food, compared to the £30.40 spent by households in the lowest income decile. However, as a *share* of total expenditure, the highest-income households spend less: with the top earnings spending only 7.5 per cent of total expenditure on food and non-alcoholic drinks compared to 17.3 per cent for the bottom decile. Breaking that down further, lower-income households spend more of their food budget on basic groceries like bread and milk, while higher-income households spend more on vegetables.

13 As proxied by RPI weights, ONS

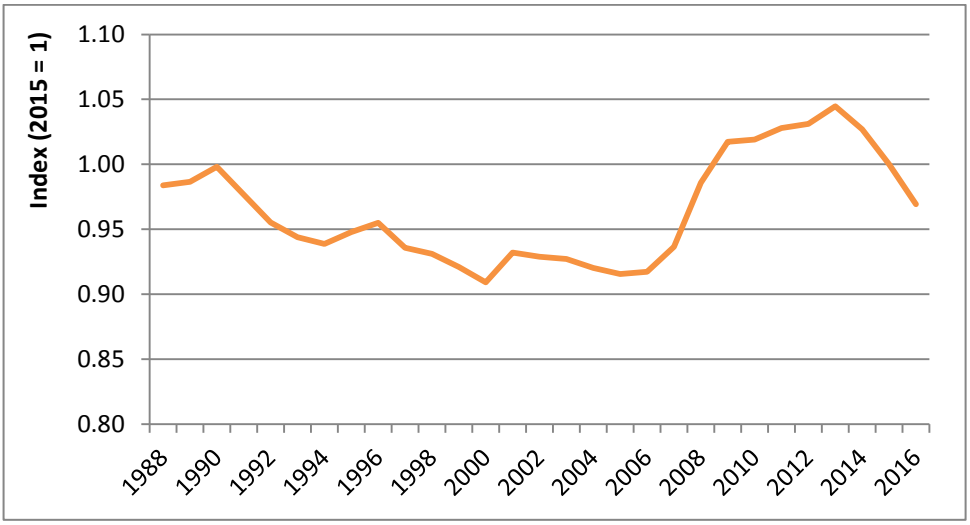
Figure 5: Weekly expenditure on food and non-alcoholic drinks



Food prices and tariffs

In the wake of the global commodity crunch, UK food prices spiked by 14 per cent between 2006 and 2013. However, prices are now falling again, resuming their long downward trend.

Figure 6: UK trend in food prices in real terms (ONS, CPI Index)



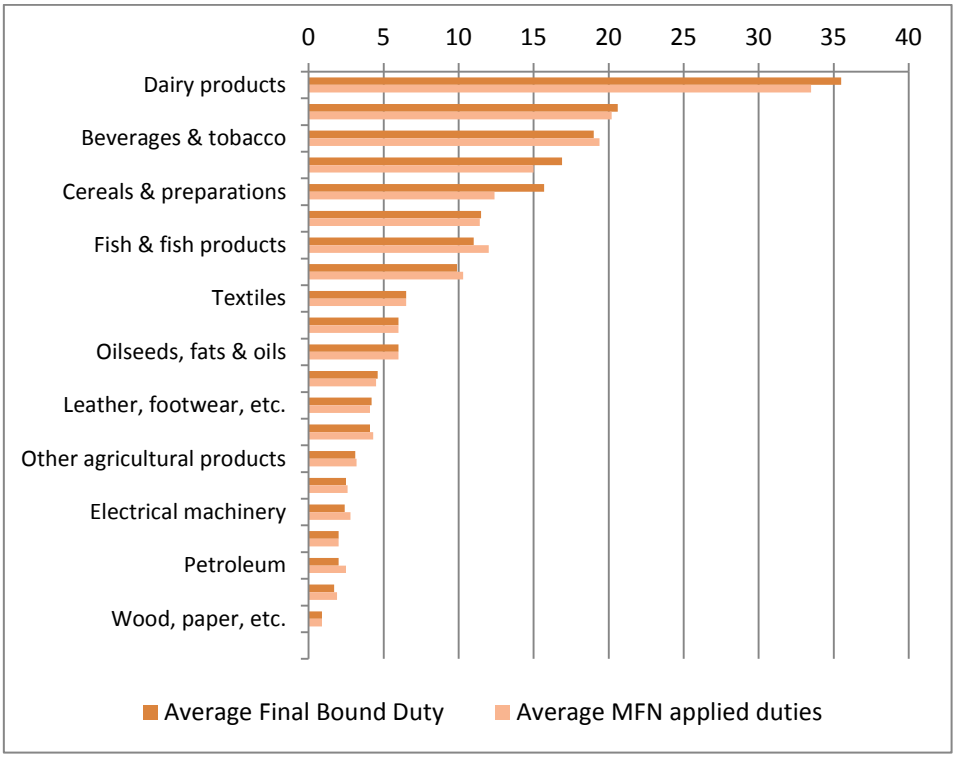
Nevertheless, UK food prices remain higher than those in a pure market.

One potential reason for this is the effect of long-standing competition issues in relation to supermarkets and food retailing. These long-term competition issues have been illustrated by the scope that lower-cost new entrants have demonstrated to cut prices. Moreover, Britain's overly restrictive planning system has both further limited competition and prevented retailers from locating in optimal sites.

One recent paper calculates that since 1980, planning policy has reduced supermarket productivity by as much as 20 per cent.[14]
However, a more significant cause of higher prices has been the combination of tariffs and agricultural support, increasing costs and subsidising inefficient methods of production.

While the average EU tariff is relatively low at 2.7 per cent on a trade-weighted basis, agricultural tariffs are more than three times higher than this at 8.5 per cent. For some product groups tariff barriers can be many multiples of this: 33.5 per cent in dairy, 20.2 per cent on sugar and 15 per cent on animal products.[15] For individual products, tariffs can be higher still: the Agriculture and Horticulture Development Board has calculated that the minimum tariff on processed chicken is 88 per cent .[16]

Figure 7: Tariffs by product group (WTO)



Given the variety of different interventions and products, working out the aggregate impact of tariffs and protections on final consumer prices is not straightforward.

The OECD publishes relatively comprehensive data on the 'producer nominal protection coefficient', or the ratio between the prices received by domestic farmers and world market prices.[17] Over the last thirty years, this has substantially declined to around 6 per cent for the EU as a whole by 2016, but is still higher than the US, Australia and New Zealand.

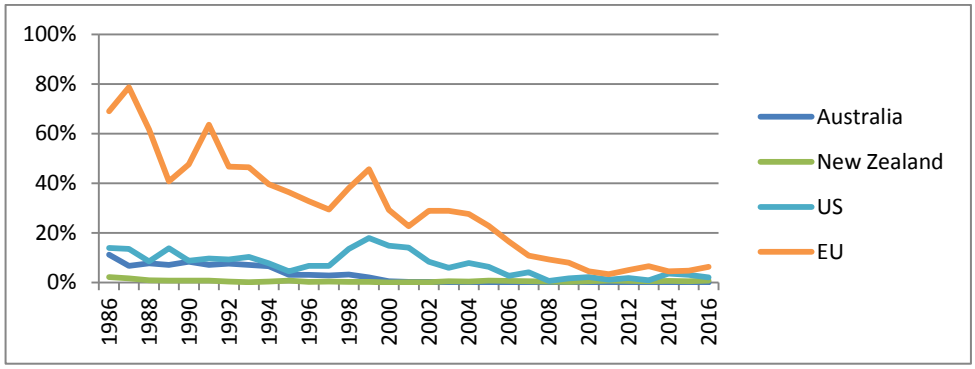
14 Evaluating the Effects of Planning Policies on the Retail Sector: Or do Town Centre First Policies Deliver the Goods?, Paul Cheshire, Christian A. L. Hilber, Ioannis Kaplanis, January 2011, http://www.spatialeconomics.ac.uk/textonly/SERC/publications/download/sercdp0066.pdf

15 WTO Tariff Profiles: European Union, http://stat.wto.org/TariffProfiles/E28_e.htm

16 What might Brexit mean for UK trade in agricultural products? Agriculture & Horticulture Development board, October 2016, http://www.ahdb.org.uk/documents/Horizon_Brexit_Analysis_Report-Oct2016.pdf

17 http://www.oecd.org/agriculture/agricultural-policies/producerandconsumersupportestimatesdatabase.htm

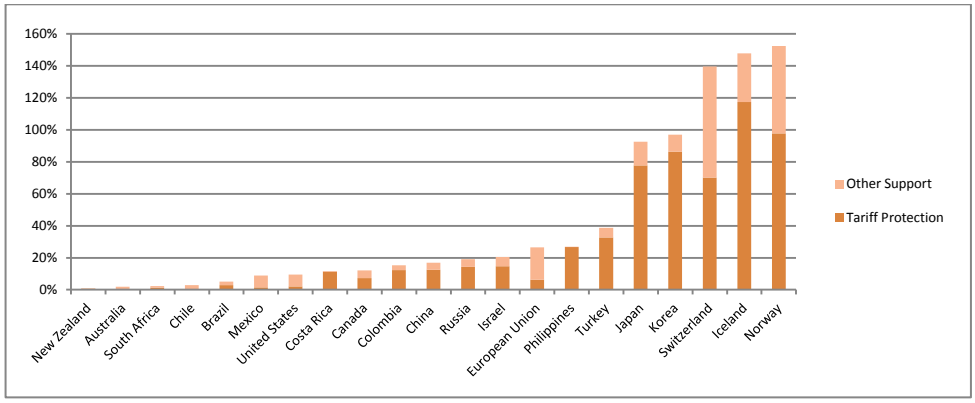
Figure 8: Nominal protection of agriculture (%, OECD)



However, much of this is likely the result of the global commodity price spike. In 2002, the ratio was as high as 29 per cent - but between 2002 and 2011, global food prices increased by 121%. Since that point, global food prices have started to decline – and there is a risk that if this continues then the differential between domestic and world prices will start to re-open.

Beyond direct prices, consumers also pay above the odds for food indirectly through the tax system and wider income support. In the European Union, this is equivalent to another 20 per cent boost to farm prices.

Figure 9: International support of agriculture (OECD)



As well as their direct impact on consumer prices, tariffs and subsidies have a wider impact on international trade negotiations. Disputes around agriculture are often where trade negotiations break down, like the stalled Doha round, with advanced economies led by the EU, Japan, and the US unwilling to open up their agricultural markets.

The Government has argued that after leaving the European Union, Britain should become a 'global champion of free trade'. By maintaining flexibility in agriculture, the UK will significantly simplify the process of securing new trade deals, driving lower prices across the whole range of consumer goods.

As Policy Exchange has argued in our report *Global Britain, Global Challenges*, liberalising our agricultural markets will also

open up new opportunities to help many of the poorest developing countries, allowing them to trade their way out of poverty. The UK currently imports £34 billion a year in goods and services from developing countries, or three times the amount spent each year on aid. [18]

BOX: The Impact of Brexit on Agriculture in Ireland and Northern Ireland

A study in Ireland put the effects of Brexit on trade as only €150m to €800 million but it is politically sensitive, since it affects "food". Ireland is our largest trading partner for food and drink: the UK exports £3 billion to Ireland and £4 billion imports from Eire. 43% of Ireland's total food exports of £8 billion go to the UK including more than half of the country's exports of poultry, pork and beef, and 30 per cent of Irish dairy exports. Imported milk was equivalent to 26 per cent of Northern Ireland's annual milk supply in 2015.

Agriculture is important to Northern Ireland's economy but it mainly trades with the rest of the UK. Northern Irish farms are the smallest in the UK and will be very affected by changes in subsidies, but that can be reduced by making it a Less Favoured Area. Northern Irish farms stand to face worse effects from customs controls since 65 per cent of the country's agricultural exports go to Ireland, while less than 5 per cent of Ireland's agricultural exports are sent to the North.

Policy Exchange's report *After Brexit: Will Ireland be next to exit?* looks in greater detail at the options for Irish trade policy, post Brexit.

Post Brexit trade options

There are three broad options for Britain's post Brexit trading arrangements:

- Remain in the Single Market & Customs Union
- Replicate the EU's tariffs as part of the WTO and seek new Free Trade Agreements (FTAs)
- Unilaterally lower British tariffs

While remaining in the Customs Union would present the least short-term disruption, as our paper *Clean Brexit* argued, in the long run it would offer the worst of all worlds. The UK would remain subject to the EU Common External Tariff, but would not have any say in EU27 trade policy and would not be able to sign FTAs with third parties.

After leaving the Customs Union, the UK will be a member of the WTO in its own right (as it is now), but will need to negotiate a schedule of tariffs for trade in goods and services.

Under WTO rules, the EU is permitted to apply subsidies and use tariff rate quotas (TRQs) to support its agricultural sector up to a

18 Beyond Brexit: Four Steps to Make Britain a Global Leader on Trade for Development, Lee Crawfund, Ian Mitchell and Michael Anderson, Center for Global Development, January 2017, https://www.cgdev.org/sites/default/files/beyond-brexit-britain-global-leader-trade.pdf

specified upper limit, called the Aggregate Measure of Support (AMS). Subsidies are classified by colour:

- **Green Boxes**: to qualify for Green Box status, subsidies must, at most, distort trade to a minimal degree. They have to be government funded, and must not include price support. They include the direct income support that is not related to current production levels or prices, and may also include environmental policies. Green Box subsidies are allowed without limit.
- **Amber Boxes**: these subsidies do distort trade by making products of a particular country cheaper than similar products in another country, thereby encouraging excessive production. Examples include subsidies for certain inputs e.g. electricity, seeds, and fertilizers. Market support price subsidies also qualify under this box. Amber Box subsidies are limited to 5 per cent of the value of the production of a given product.

Agricultural support will be included in the UK's goods schedule, but we cannot assume that whatever apportionment of the EU28's current AMS is agreed between the UK and EU27 will automatically be accepted by WTO members. The WTO Secretariat will probably seek to steer the membership towards accepting the EU's goods and services schedules as applying to the UK to avoid a protracted negotiation, but it may not succeed.

But even if it succeeds in doing so, the AMS issue could still be a sticking point. The EU's own schedule is not settled either: it has not been able to update it to include new Member States in recent years so the schedules that currently apply are for EU23. The UK might possibly be able to operate on the basis of similar 'creative ambiguity' until such time as it can have its schedules of commitments accepted by the full WTO membership.

Outside the Customs Union, the UK would be free to conclude FTAs with as many partners as it wished and for which it had the negotiating resources. Agriculture would need to be included in such negotiations, as the WTO requires (Article XXIV) that FTAs cover 'substantially all trade'. The depth of coverage, however, would vary from agreement to agreement.

As the UK will have legally available subsidies and TRQs, it may want to have recourse to these for a 'transition period'. While some negotiating parties will be aggressive on agriculture and seek to have this negotiated away in the FTA, it is very common for FTAs both to contain implementation periods (during which tariffs and other support are phased out) and a small number of product-specific exclusions (usually for some politically highly sensitive products).

It is also common for FTAs to have 'safeguard agreements' through which tariffs or other trade measures can be used to control imports if surges occur that might disrupt an industry. Usually these agreed measures are triggered when the value of imports of a product from a trading partner exceeds a certain quantitative threshold. The measures are permitted to be imposed for a defined period of time until trade

resumes to 'normal' levels. In the case of tariffs, this safeguard measure is known as 'snap back'.

In the case of a UK/EU FTA, assuming it is the wish of EU27 to reach an agreement with the UK, then negotiating an FTA should be straightforward. The UK and EU are deeply integrated with completely free trade as the starting point, and the UK's rules and regulations are currently based on the EU acquis.

While maintaining the EU's high tariff barriers is one option, it is not obligatory.

A more radical alternative would be for the UK to work to unilaterally lower and ultimately eliminate tariffs. The direct fiscal consequences of this would be relatively modest — tariffs only bring in around £2.5 billion to the Exchequer a year — and it would require no complicated negotiations to implement. Both New Zealand and Australia are near this, applying the equivalent of only a 0.4 per cent tariff to agriculture, or 1.3 per cent including subsidies.

The historical evidence of the twentieth century suggests that while tariff barriers may increase the domestic size of a sector, they do so at the cost of low productivity and high prices, disproportionately hurting the poor. Even if you want to continue substantial public support for farming, this is far more efficient and less distorting if implemented through direct subsidies rather than seeking to control prices.

The main argument for maintaining tariffs is a pragmatic belief that they can be used as a bargaining chip in future trade negotiations to achieve other UK goals. In reality, however, given their current low level, potential reductions to tariffs only offer limited leverage — and especially when any negotiating partner will know we already want to cut them.

Beyond its direct effects, unilateral liberalisation by Britain would be massively symbolic, demonstrating that Britain was serious in its ambition to become a global champion of free trade and resetting the stalled current conversation on multilateral trade liberalisation. Just as Britain's unilateral lowering of tariffs in the nineteenth century indirectly inspired other countries such as the United States to follow suit, making such a move now would have the potential to create momentum behind a new coalition of liberalising countries like Australia, New Zealand and Singapore.

Britain should use the opportunity from leaving the European Union and the Customs Union to phase out all tariffs protecting agriculture, relying instead on direct subsidies to achieve economic and environmental goals. This would lower prices for consumers, increase producer productivity and enable new trade deals both for Britain and the developing world.

Maintaining standards

Many people fear that lower prices will come at the cost of lowering standards for British food. While other countries' producers may be nominally more efficient, they argue, this is only because they do not have to achieve as high levels of food safety or animal welfare.

At the same time, domestic suppliers have often used unnecessary standards to keep out cheaper competitors and maintain their market share.

Moving forward, Britain should base its food standards on three key principles:

- **The UK should never compromise on public safety, but ensure that food safety regulation is based on the best scientific advice.** Unfortunately, under the EU, regulation has not always kept up with the latest scientific evidence.
- **Britain should be a world leader in animal welfare, and look to inspire other countries to follow its example.** The Government has promised to make CCTV recording in slaughterhouses mandatory, while leaving the EU allows Britain to move faster on measures such as banning the export of live farm animals for slaughter.
- **Maximum transparency and the use of clear labelling should allow consumers to make their own choices.** Kitemarks like Fairtrade or the Red Tractor allow the public to make their own decisions about what matters to them.

Under the current WTO rules and the 1995 Agreement on Sanitary and Phytosanitary Measures, global food quality standards are set by three international bodies: the Codex Alimentarius Commission for food, the International Plant Protection Convention and the World Organisation for Animal Health. Individual states are allowed to set higher safety standards for imports only if they can be shown to have a scientific justification.

In the European Union, the relevant body for setting any higher standards is the European Food Standard Agency. Unlike the international bodies that focus on evidence of demonstrated harm, the EU has traditionally followed a much restrictive approach justified by an appeal to the so-called Precautionary Principle.

This has led to significant divergences in allowed practices between EU and foreign producers, with three that are particularly notable:

- **Chlorinated chicken and acid-washed meat.** In the United States, the practice of washing chicken in chlorinated water is widespread, eliminating harmful bacteria at the end of the production chain rather than following the EU's more expensive 'farm to fork' strategy of seeking to control hygiene at all stages. While there is little evidence that chlorinated chicken is by itself unsafe[19], the European Union argues that it might encourage unsafe practices elsewhere.

19 Chlorinated Chicken, Peter Spence, Adam Smith Institute, July 2017, https://static1.squarespace.com/static/56eddde762cd9413e151ac92/t/59752c052994ca0d03c92a8a/1500851205949/Chlorinated+Chicken.pdf

- **Hormone-treated beef.** In 1989, the EU banned the imports of meat containing artificial growth hormones, arguing that there is insufficient information to fully understand potential harm to humans such as an increased risk of cancer or early onset of puberty. The US disputes this, arguing that there is substantial evidence of safety from decades of use – and the WTO has sided with them, judging the EU's decision not to be based on scientific evidence.

- **Genetically Modified and genetically edited food.** GM foods are not grown commercially in the UK and the only varieties of GM foods that are allowed to be imported into the EU are oilseed rape, soybean, cotton-seed oil, maize and sugar beet. This is despite the safety of GM crops being recognised by many literature reviews, the Royal Society of Medicine, the US National Academy of Science and even the Chief Scientific Advisor to the European Commission.[20] Recent polling suggest that two thirds of the population would be in favour of GM food as long as it does not harm public health or the environment.[21] At the same time, new more precise gene editing techniques based on CRISPR-Cas9 create changes that are indistinguishable from natural mutations. While the US does not consider such crops to be GM products, the European Commission has asked member states not to give their approval while it makes its own mind up.[22]

After leaving the European Union, the UK's Food Standards Agency should be given new powers to collate, commission and review scientific evidence on food safety and animal welfare, operating under the supervision of the What Works network. The What Works network is a collection of 7 independent centres designed to empirically aggregate the state of the current literature on policy effectiveness, and which together cover topics from health to local economic growth.

Wherever possible, the Food Standards Agency should adopt Mutual Recognition or accept the Equivalence of other country's standards rather than try and create additional regulatory standards. It should use new technology such as big data to better understand, track and control pathogens, allowing resources to be mobilised to shut down outbreaks more quickly than in the past.

Present agricultural supplies are heavily integrated with European markets, implying that in practice British farmers will have to continue to meet European standards if they wish to sell into the Single Market. Given that the UK is initially domesticating all European regulation through the Great Repeal Bill, the UK starts from a position of full compliance with EU regulation, easing the way for an FTA.

Nevertheless, if Britain is to take full opportunity of leaving the EU and base its standards on science rather than protection, some regulatory divergence is probably inevitable. While the UK should not impose non-tariff barriers on the EU, we should allow individual farmers to decide whether they wish to meet the standards needed to export to the EU, or instead follow the UK's own standards and target

20 The Evidence on GMO Safety. Ramez Naan, 2013, http://rameznaam.com/2013/04/28/the-evidence-on-gmo-safety/

21 Two thirds of public would back growing GM crops, study claims, Oliver Moody, The Times, November 5 2016, https://www.thetimes.co.uk/article/two-thirds-of-public-would-back-growing-gm-crops-study-claims-3wzgphgtf

22 Gene editing in legal limbo in Europe, Nature, 22nd February 2017, http://www.nature.com/news/gene-editing-in-legal-limbo-in-europe-1.21515?WT.mc_id=FBK_NatureNews

international markets. This is not unprecedented. Australia, for example, allows the use of growth promoting hormones in beef, but uses a compulsory tracking system to ensure that such hormones are not used in beef exported to the EU. While some farmers take advantage of the quicker fattening processes offered by hormones, others choose to target the higher prices offered by the EU market.

Beyond scientifically determined standards, we should follow a philosophy of consumer and producer choice. Clear labelling and kitemarks allow companies and individuals to make their own choices. Regulation should err on the side of increasing transparency and traceability across the supply chain. GM crops may be perfectly safe to eat, but you should still be given the choice to avoid them if you want to.

A kitemark is a quality mark administered by a standard setting body such as the British Standards Industry (BSI). It is a widely recognised symbol that ensures quality control measures have been adhered to and is a key piece of certification that enables access to EU and global markets. A notable example in the UK is the Red Tractor, which 'confirms food has been independently checked and meets standards on traceability, safety and hygiene, animal welfare and environmental protection'.[23] It also unifies a number of different standards under a single umbrella and appears on meat, dairy, cereals, flour, fruit, vegetables and sugar.

Recommendations

- After leaving the Customs Union, the UK should unilaterally phase out tariffs that increase consumer food prices and complicate new trade deals.
- The Food Standards Agency should be given new powers to collate, commission, and review scientific evidence on food safety and animal welfare, operating under the supervision of the What Works network.

23 https://www.redtractor.org.uk/

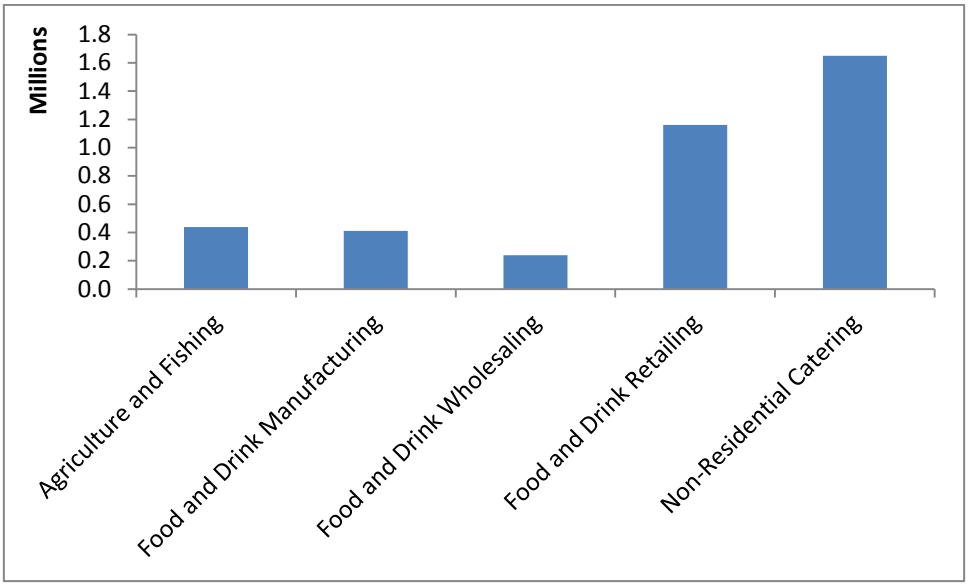
Producers: the sector, subsidies, and governance

British farmers used to be among the most productive in the world. In recent decades, however, productivity has disappointed, and many farms would not be sustainable without substantial subsidy. In this chapter, we look at the current state of the British agriculture sector, how it compares to its international peers, and the options for transitioning to a subsidy-free system.

The workforce

In total, the British agri-food sector employs around 3.9 million people, but only around 10 per cent of those people work within agriculture and fishing.

Figure 10: Numbers of employees in the agri-food sector



In 2016, the total agricultural labour force was around 466,000, with around 30 per cent of these full time farmers, business partners, directors or their spouses, and another 30 per cent working part-time. On top of the farmers themselves, there are also around 115,000 regular employees and a further 70,000 seasonal workers, who come mainly from the EU, and whose status could change following Brexit. It has proved difficult to persuade British people to take on this work, which often has difficult hours and does not offer the possibility of long-term employment.

One of the most striking features of the agricultural workforce is its age. The median age of farmers is 59, compared to around 40 for the workforce as a whole. A third of all farm holders are over 65, while only 3 per cent aged less than 35. Compared to France or Germany, UK farmers are relatively old, but are by no means an outlier compared to many other European countries such as Spain, Italy or Sweden.[24] Farming is often a multi-generational business, where older owners work their younger son or daughter. Nevertheless, there is little doubt that the agricultural workforce is ageing. Bringing young people into farming is challenging for various reasons, including the high cost of buying or renting land, and the view that in some rural areas housing can be expensive and infrastructure provision can be poor.

One of the explicit objectives of the CAP is "the creation and maintenance of employment" in agriculture and the wider rural economy. Whether or not this is a sensible objective, you might expect a heavily subsidised sector to protect jobs. In practice, however, the reverse has taken place. Despite ongoing protection and subsidisation, UK employment in agriculture has fallen dramatically as a share of total employment from over 3% in the 1960s to just over 1 per cent today.[25] Neither is this phenomenon restricted to CAP, with agricultural employment declining faster worldwide in countries which subsidise agriculture more.[26]

There are several explanations for this puzzle. Subsidies enable farmers to invest and mechanise, substituting capital for labour, and reducing the number of employees on farms. CAP support goes to larger farms, which grow more rapidly at the expense of smaller farms and typically require less labour because they have the means to mechanise. Across Europe, labour intensity becomes smaller as the size of land holdings increases.

One further explanation as to why subsidies decrease farm labour is given by Berlinschi et al (2011): they argue that subsidies increase the education levels of farmers' children. In a capital constrained world, farmers do not have the financial ability to invest in their children's education. By increasing support payments and subsequent revenues, there is a greater ability to invest in education. Berlinschi found evidence to suggest that more educated children are less likely to become farmers, therefore reducing labour supply in the long term. [27]

Farmland and farm outputs

About 70 per cent of the UK's land area is farmed, of which a third is arable, and the rest is grassland, rough grazing, and woodland. Some of it is marginal land, which is usually owned in small blocks, such as the livestock farms in the hills; other parts consist of very productive larger units, such as the arable farms of East Anglia. 83 per cent of farms in the UK are smaller than 100 hectares, and the remaining 17 per cent cover 66 per cent of the croppable area. Since 2005, the number of smaller farms has shrunk, leading the average size of a farm holding to increase from 69 to 80 hectares. Generally, the larger farms are arable, and the smaller farms keep livestock. As technology and machinery get more expensive, there is pressure on the larger farms to reduce their

24 Farm structure survey, European Commission, 2013

25 The CAP and agricultural employment, Alan Matthews, March 18 2017, http://capreform.eu/the-cap-and-agricultural-employment/

26 Farm Subsidies and Agricultural Employment: The Education Channel, Ruxanda Berlinshi, Kristine Van Herck and Johan Swinnen, 2011, https://www.researchgate.net/publication/254386798_Farm_Subsidies_and_Agricultural_Employment_The_Education_Channel

27 Farm Subsidies and Agricultural Employment: The Education Channel, Ruxanda Berlinshi, Kristine Van Herck and Johan Swinnen, 2011, https://www.researchgate.net/publication/254386798_Farm_Subsidies_and_Agricultural_Employment_The_Education_Channel

use of labour, and to grow in order to spread their costs. Currently, the smaller farms in more marginal areas have neither the capital nor the opportunity to take on more land.

Cereals such as wheat and barley account for a significant portion of the UK's total agricultural produce by tonnage, exceeded only by the production of milk and eggs (Figure 12). The UK's production of eggs, in fact, is more than equivalent in weight to all other outputs put together. Measured by value, however, Britain's agricultural outputs are much more evenly spread, with no sector dominating (Figure 13).

Figure 11: Production by weight (Agriculture in the UK, 2016)

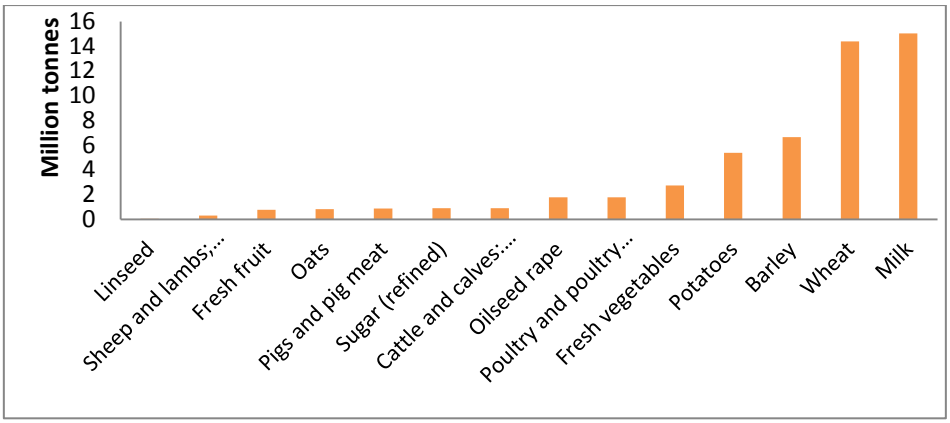
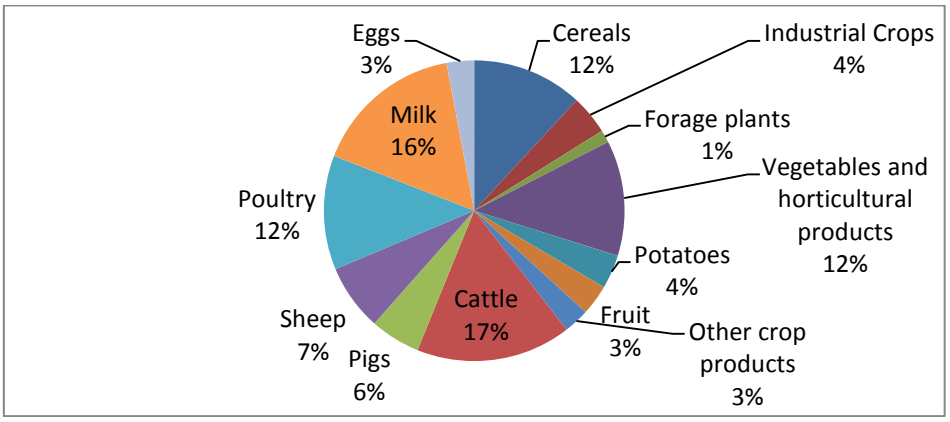
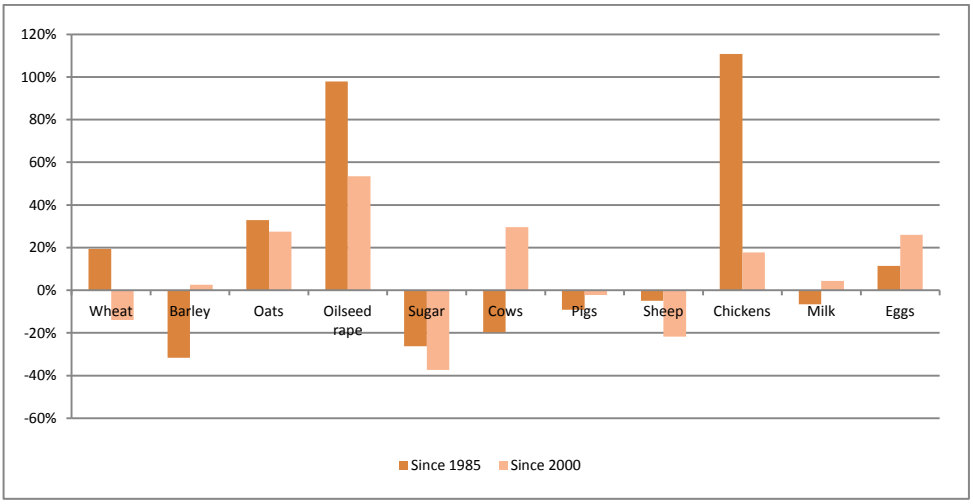


Figure 12: Production by value (2016)



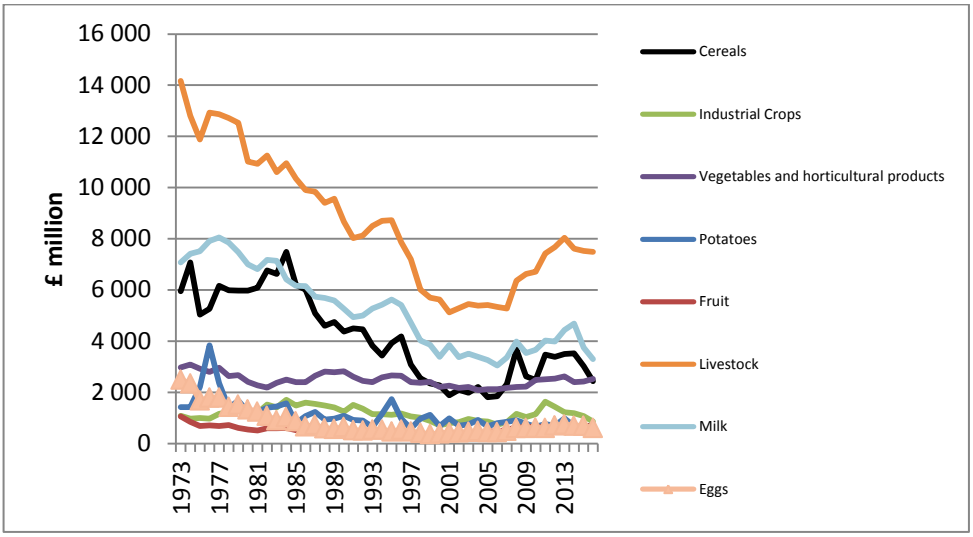
Measured by volume, many sectors have seen declines in production over the last few decades.

Figure 13: Changes in volume of production, 1985-2016



This trend is still clearer when you measure production by value. Over the last forty years, almost every sector has seen significant declines in real terms, with output in cereals falling 54 per cent, livestock 42 per cent, milk 58 per cent, eggs 66 per cent, potatoes 81 per cent, and industrial crops 12 per cent.

Figure 14: Real value of UK agricultural output (DEFRA)



Exports and Imports

For centuries, Britain has imported more food than it has exported, although today the country still produces 60 per cent of its domestic requirements. Our exports total £20 billion, while imports amount to £43 billion, implying a trade deficit of £23 billion.

The markets of the EU take 60 per cent of Britain's exports and supply 70 per cent of its imports, but those amounts range widely across products. The UK's three biggest export markets are the Irish Republic (£3 billion), the US (£2 billion), and France (£2 billion) – although we import much less from the US.

Table 1: Trade in food, feed and drink (2016, millions):

	Exports	% of total		Imports	% of total
Irish Republic	3,333	17%	Irish Republic	4,034	10%
U.S.A.	2,145	11%	U.S.A.	1,340	3.1%
France	2,114	11%	France	4,032	10%
Netherlands	1,295	6.5%	Netherlands	5,070	12%
Germany	1,271	6.3%	Germany	3,953	9.3%
Spain	986	4.9%	Spain	3,035	7.1%
Italy	520	2.6%	Italy	2,568	6.0%
Belgium	516	2.6%	Belgium	2,267	5.3%
Total exports	20,066	100%	**Total imports**	42,584	100%

Our largest export market is beverages, worth £6.8 billion, of which £4 billion comes from exporting whisky. By contrast, our largest import market is fruit and vegetables, worth around £10.3 billion:

Table 2: Value of trade in food, feed and drink (2016, £ million)

	Exports	Imports
Drink	6,824	5,479
Cereals	2,293	3,304
Misc.	1,823	3,207
Fish	1,639	3,078
Meat	1,573	6,215
Dairy	1,371	2,762
Coffee, tea, etc.	1,366	3,419
Animal feed	1,121	1,993
Fruit and Veg	1,119	10,318
Oils	553	1,650
Sugar	386	1,159
Total	20,069	42,584

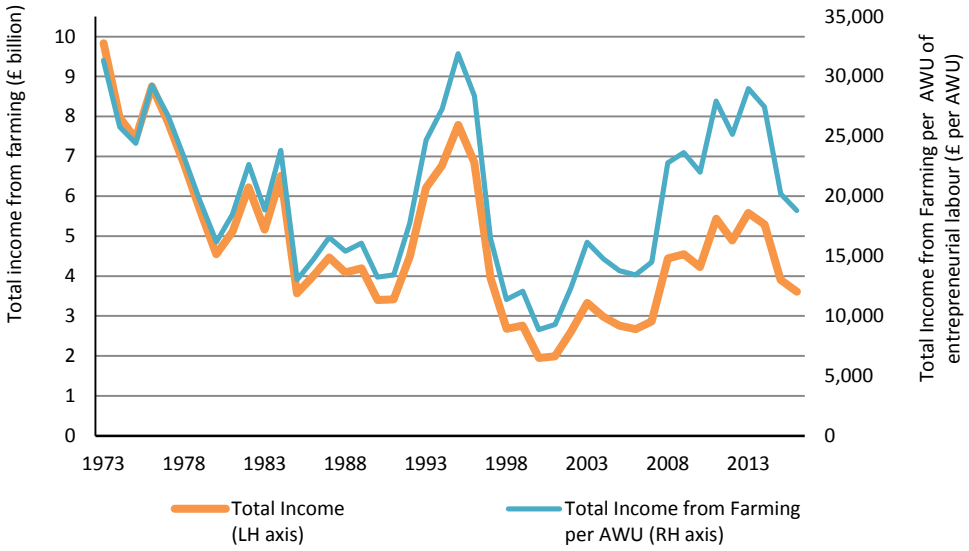
Arable farming is an international market, with prices of corn often set in places thousands of miles away. The volatility of prices is a major issue for farmers, who would be attracted to the forms of insurance that are available in other countries such as the USA and Canada. By contrast, livestock farming is more local, with prices set in the markets in which products are sold.

The financial situation

Overall income from UK farms stood at £3.6 billion in 2016, a fall of 35 per cent since 2013 as global commodity prices fell back from their peak. In 2015/16, over half of farms earned less than £20,000 per year and a quarter earned no positive income at all. Using a narrower measure that takes account of imputed rent and unpaid labour, 42 per cent of farms in the UK did not make a profit.

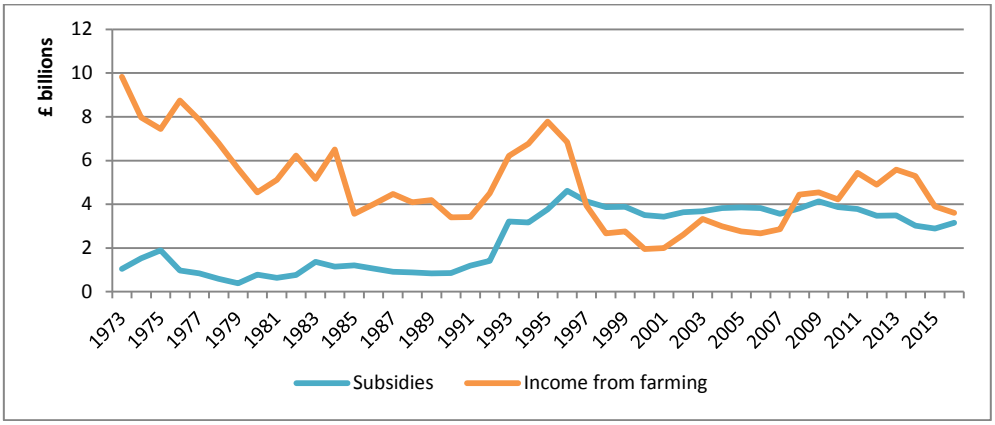
Over the last twenty years, per capita incomes — measured by income per 'average worker unit' — have done slightly better than gross incomes as the number of workers has shrunk. Nevertheless, income per full time worker remains only the equivalent of £19,000 a year.

Figure 15: Total income from farming (Defr



While total income from UK farming is £3.6 billion, this includes subsidies of £3.1 billion, or 87 per cent of total income. In other words, if we put subsidies to one side, then UK farms made a profit of just £500 million in 2016. While in the 1970s and 1980s the majority of agricultural subsidies came through market support and maintaining higher prices, since 1992 farmers have received the majority of their subsidies through direct income support instead. For ten years, from 1997 to 2007, total farming incomes were actually below the amount of subsidies given, suggesting the sector as a whole was creating negative value to the UK economy. It should be noted that while direct payments are often said to make up half of total incomes by farming, this number only includes Pillar 1 payments and excludes other agri-environment schemes.

Figure 16: Total real income from farming



Productivity

For much of the twentieth century, the UK's agriculture sector had relatively high productivity compared to its peers or Britain's other industries. In 1974, West German productivity in manufacturing or

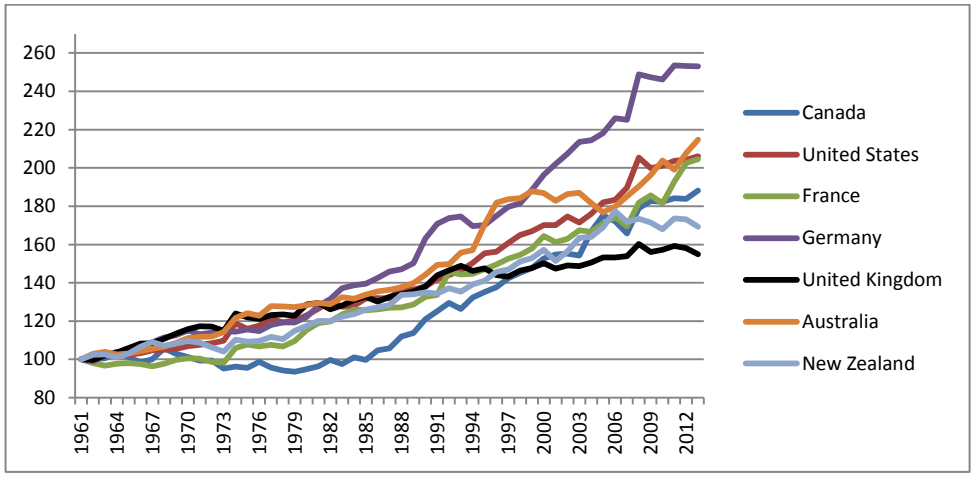
28 Britain's Twentieth Century Productivity Performance in International Perspective, Stephen Broadberry and Mary O'Mahony, 2005, http://www2.warwick.ac.uk/fac/soc/economics/staff/sbroadberry/wp/labmkt5.pdf

services was around 20% higher than that in Britain — but our agricultural workers were twice as productive as in Germany.[28]

Measuring productivity is not straightforward, and different estimates tell slightly different stories. However, the big picture is that agriculture sees very low levels of productivity compared to other sectors, and that average British agricultural productivity is probably now below that seen in many other countries.

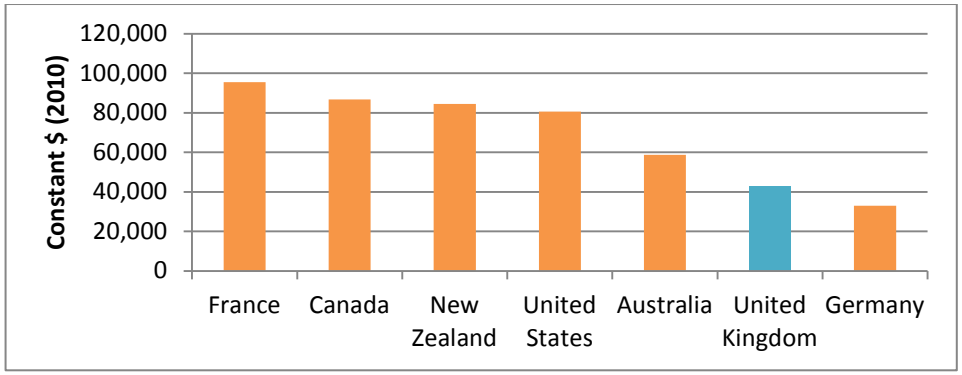
While imperfect, according to the best internationally comparable source of data from the US Department for Agriculture, UK agricultural productivity has grown much more slowly than its peers over the last twenty years.

Figure 17: Agriculture Total Factor Productivity Growth (1961 = 100, USDA)



Similarly, the OECD calculates that in aggregate looking more narrowly at labour productivity, the value added per agricultural worker in the UK (£42,800) is now considerably lower than that in other advanced economies like France, Canada, New Zealand, the US or Australia. Other studies find that the UK has particularly low productivity in livestock (cattle and sheep), and significantly higher costs for dairy than in the US or New Zealand.[29]

Figure 18: Agriculture value added per worker in 2015 (constant 2010 US$) (World Bank)

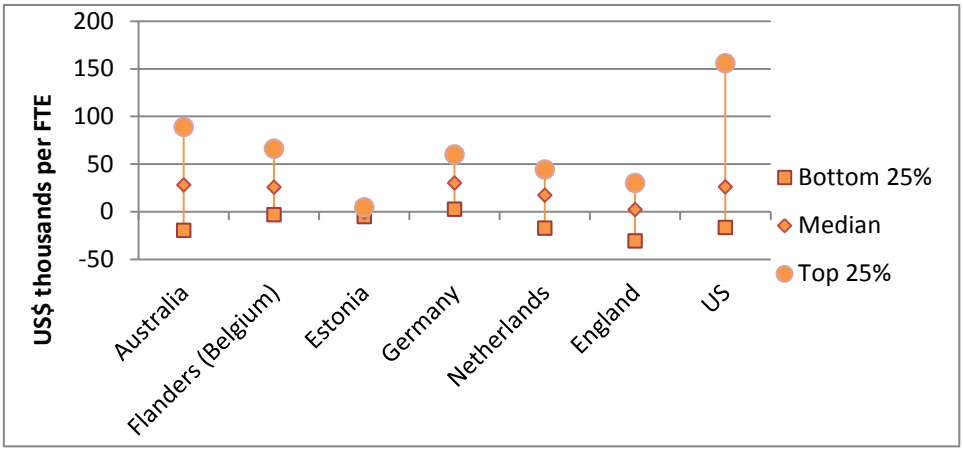


29 The Best British Farmers: What gives them the edge?, Andersons, Oxfard Farming Conference Report, 2015, https://www.ofc.org.uk/sites/ofc/files/research/ofcreport2015.pdf

30 Cross Country Analysis of Farm Economic Performance, Shingo Kimura, Christine Le Thi, 2013, http://www.oecd-ilibrary.org/docserver/download/5k46ds9ljxkj-en.pdf?expires=1500047471&id=id&accname=guest&checksum=4A585F2CC27BF86F926483DDE034DDB7

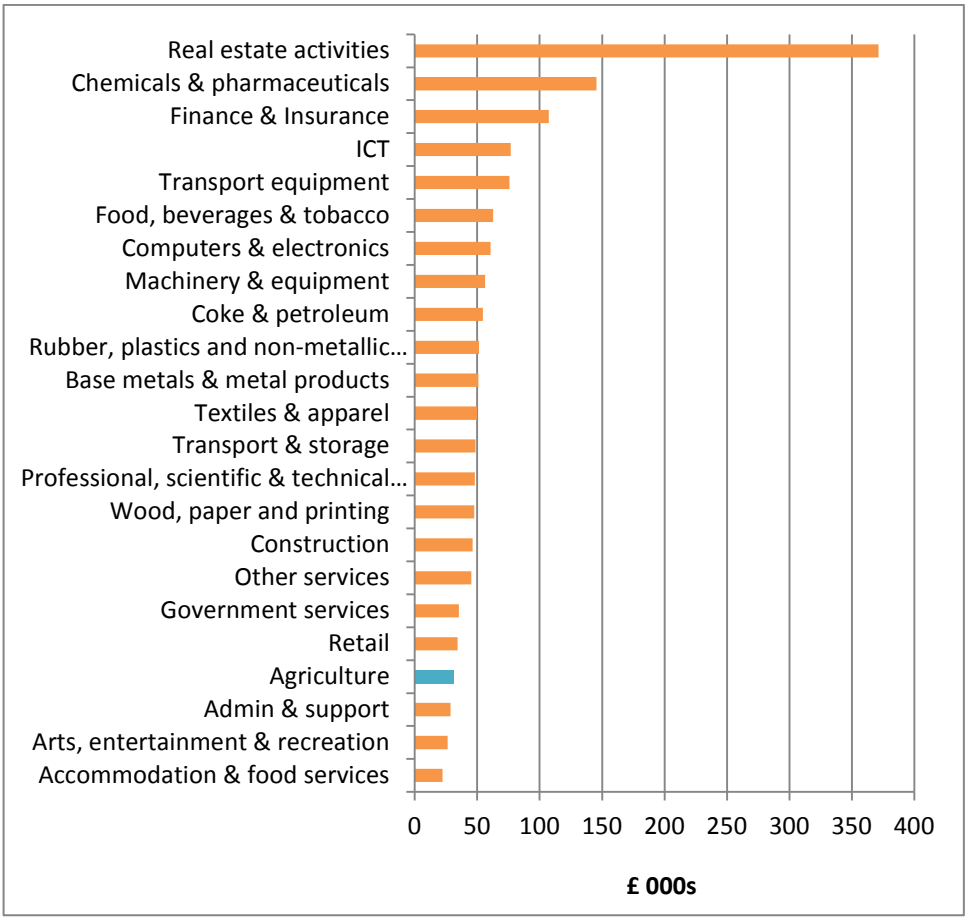
As well as a wide distribution of productivity across countries, there is also a wide distribution within countries. While the bottom quartile of farms is actually value destructive in many countries, the US in particular has very high productivity in its best farms.[30]

Figure 19: International distribution of labour productivity OECD, 2009)



The UK does poorly in productivity comparisons in many industries, but even just within the UK, agriculture has one of the lowest levels of productivity of any sector. Agriculture productivity is a long way below every other form of physical production, and generally around 50 to 60 per cent of the levels seen in other manufacturing sectors.

Figure 20: Output per job, 2013



Reforming subsidies

The low productivity of British agriculture cannot be blamed entirely on the CAP. Other European countries such as France and the Netherlands have seen better productivity performance, despite the negative incentives created by the CAP regime. UK agriculture has not been helped by cuts to R&D investment, high land prices, energy costs, and an ageing and non-specialist workforce.[31]

Nevertheless, the big picture remains that over the last twenty years UK farming has not made a profit from either growing crops or livestock.[32] The current policy regime is failing to produce a thriving or sustainable sector — and leaving it on life support with permanent subsidies is fair neither to the taxpayer nor to the next generation of agricultural workers. In order to compete in the global economy, the sector will need significant structural changes.

Brexit offers a once in a generation opportunity to reset British farming policy, and help the industry transition to where its long-term sustainable comparative advantage lies. The UK should work to phase out direct subsidies and tariff protection for production, and instead look to create a more productive, innovative and ultimately sustainable sector.

31 Dig for victory!, The Economist, February 5th 2015, https://www.economist.com/news/britain/21642157-why-british-farmers-are-less-productive-their-international-competitors-dig-victory

32 Andersons Outlook 2017, https://theandersonscentre.co.uk/uploads/Downloads/Outlook2017.pdf

CAP subsides should be redirected to:

- **Protection for natural and public goods.** Subsidies should be refocused on supporting a diverse range of ecosystem services from carbon sequestration to cultural heritage.
- **Increased R&D to boost innovation and the sector's long-term productivity.** The Government should reverse the cuts to public funded R&D, which some estimates suggest explain as much as over half of the TFP slowdown seen in the 1980s.[33]
- **Other taxpayer priorities.** Total subsidies will probably fall from today's £3 billion, freeing up resources to spend on other pressing needs such as social care or retraining.

While this may lead to a medium shrinking of output, even this is not inevitable. After dropping its subsidies and tariffs in the mid 1980s, New Zealand actually saw agriculture increase as a share of its economy, as structural change and competition led to productivity increasing 67% in twenty years.

Case study: Agricultural Reform in New Zealand

New Zealand is a prime example of a country where the removal of subsidies and tariffs has resulted in a more successful and dynamic farming sector. For a decade leading up to 1985, New Zealand farms had enjoyed increasing protection, and subsidies that were among the most generous in the world. These included guaranteed prices for most products, with purchases made through a number of marketing boards. The declared intention was to stabilise farm incomes, and insulate them from the volatility caused by fluctuations in world commodity prices.

There was also a range of direct subsidies paid to farmers for inputs such as fertiliser and irrigation. Subsidies — as well as soft loans and tax concessions — were used to encourage investment in land and machinery. The scale of government intervention was remarkable. Between 1980 and 1984 — the peak years of support — government assistance averaged 32 per cent of farm GDP or 4 per cent of total GDP. The result was a farming sector that produced far too much in some areas (lamb) and too little in others (beef), lacked entrepreneurship, and responded to government rather than to market signals.

Weak GDP growth, double-digit inflation, and a growing debt burden meant that reform became inevitable. By the mid-1980s, farm support accounted for 40 per cent of the budget deficit, which reached 9 per cent of GDP in 1984. Substantial reform occurred in 1984 and 1985, with the withdrawal of all price guarantees and the removal of virtually all input subsidies. Between 1983 and 1987, government support fell from 35 per cent of farm GDP to 13 per cent. By 1994, it was just 2 per cent. The immediate effect was a fall in farm income (60 per cent for sheep farmers) and land prices (up to 50 per cent).

The Government offered transitional support to farmers, mainly through debt-write offs. To those farming marginal land that was no longer viable, financial packages were offered so they could leave the industry altogether. In the short term, farms cut costs, increased revenue from other activities such as tourism, and restructured debt. Over the long term, farms diversified away from less profitable sheep farming and into areas such as dairy, deer, forestry, horticulture, and wine.

33 Agricultural Productivity in the United Kingdom, Jenifer Piesse and Colin Thirtle, 2010, https://pdfs.semanticscholar.org/6616/7b20bfc63a1b96141c196c77e2cdd883b045.pdf

Exposure to foreign competition, the growth of China and market forces boosted productivity growth and incomes. Annual productivity growth increased from 1.5 per cent with subsidies to 2.5 per cent without. The long-term improvements in productivity triggered by the removal of state support ultimately resulted in an increase in the significance of the farm sector — from under 6 per cent of GDP in 1987 to over 7.5 per cent by 2002.

Timing and transition

The management of the withdrawal of farming support is going to be a central issue for the new domestic policy. To end subsidy payments abruptly would cause significant economic loss including farm bankruptcies and damage to those rural communities that depend on farming. It is essential, therefore, that the transitional arrangements that are put in place allow for a gradual adjustment to the new regime over a number of years.

In some cases, this will involve the withdrawal of marginal land from farming altogether. There should be compensation payments to those adversely affected and help with retraining. One silver lining of the high median age of the farming community is that, given enough notice, many current farmers will be able to directly retire rather than need to retrain.

Where appropriate, the Government should work to unlock the value from freed up land, identifying areas where planning permission can be granted for industrial and housing development – and sharing a proportion of the uplift in value with the original farmer. While the average value of an acre of farm land is only £7,300[34], plots with planning permission for housing near cities can see values up to fifty times higher, selling at between £500,000 to £1 million an acre.[35]

For those remaining in farming, responses are likely to include diversifying into other sources of income, reducing costs and improving productivity. It is important that essentially viable farms are given the breathing space to make these adjustments that will ensure their long-term survival.

The Government has already committed to maintain current CAP spending commitments to 2022. The exact timetable after that will depend on the decisions the UK makes around tariffs, the other key form of farming support. If the UK adopts unilateral free trade and abolishes all import tariffs on agriculture then more prolonged subsidy support may be justified, but if tariff protection remains much as it is today then subsidies can be phased out more quickly. However, assuming the UK simultaneously works to reduce its tariff barriers, we believe it would be reasonable to phase out all subsidies for production by 2025, giving farmers eight years notice from now.

As an alternative to a gradual transition, farmers should also be given the option to receive their remaining subsidies as an up-front lump sum (e.g. in 2020). This would make it easier to fund investments to improve productivity, or alternatively could act as a down payment for retirement. One way of doing this would be the creation of a 'CAP bond', which would either provide a stream of diminishing payments in replacement for subsidies, or be able to be sold on the open market.

34 Farmland Index Q2 2017, Knight Frank, https://kfcontent.blob.core.windows.net/research/157/documents/en/english-farmland-index-q2-2017-4813.pdf

35 Farmland hits £1m/acre for housing, Farmers Weekly, 23rd January 2015, http://www.fwi.co.uk/business/farmland-hits-1m-acre-for-housing.htm

Recommendations

- The UK should work to phase out direct subsidies and tariff protection for production. This will free up funding for other taxpayer priorities, such as the NHS.
- Any remaining CAP subsides should be redirected to:
    - Protection for natural and public goods
    - Increased R&D to boost innovation and the sector's long term productivity
    - Other taxpayer priorities
- The Government should work to identify environmentally suitable freed up land that can be used for housing or commercial development, sharing the planning uplift with the original farmer.
- Subsidies should be phased out gradually over a five-year period from 2020, with farmers given the option to receive a final payment as a single one-off payment.

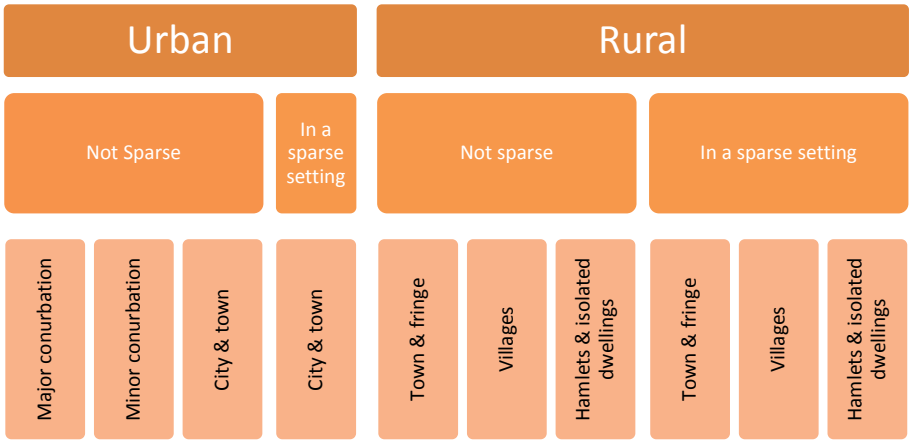
The Rural Economy

This report has already examined the opportunity that Brexit offers to reform agricultural policies in the UK, delivering benefits to both consumers and taxpayers. The implications of such reforms will be far reaching, going beyond the agricultural sector to the wider rural economy.

Supporting the rural economy is one of the six stated objectives of the CAP, as defined by the European Commission, to 'encourage a vibrant rural economy by fostering growth and jobs in rural areas and encouraging generational renewal'.[36]

There is no uniform definition for the 'rural economy'. A common misconception is that it comprises solely farmers, when in reality, it is home to an increasingly diverse range of industries, such as renewable energy, professional, scientific, and technical services. One useful way of defining the typology of rural and urban areas is the Rural-Urban Classification (RUC), used in England. This system was developed by a combination of government departments, with the aim of applying a uniform definition across government to facilitate a more targeted approach to communities.[37] Central to this is the population size of settlements: in statistical reporting, the Office of National Statistics (ONS) classifies settlements with a population of 10,000 or less as 'rural'. Anything larger is classed as 'urban'. Within the definition of 'rural', a further six categories exist where data is available from the 2001 and 2011 censuses. Those labelled 'in a sparse setting' reflect areas where the wider area is remotely populated.[38] For the purposes of this report, references to the 'rural economy' will be made in the context of the RUC, as in the diagram below.

Figure 21: Rural Urban Classification[39]



36 Communication on Modernising and Simplifying the Common Agricultural Policy, European Commission, http://ec.europa.eu/smart-regulation/roadmaps/docs/2017_agri_001_cap_modernisation_en.pdf

37 The Role of Agriculture and Farm Household Diversification in the Rural Economy of the United Kingdom, OECD, 2009, https://www.oecd.org/tad/agricultural-policies/43245616.pdf

38 Urban and Rural Area Definitions for Policy Purposes in England and Wales Methodology (v1.0), Peter Bibby and Paul Brindley, Government Statistical Service, 2013, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/239477/RUC11methodologypaperaug_28_Aug.pdf

39 Defining rural areas, 2017, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/597751/Defining_rural_areas__Mar_2017_.pdf

To establish the relative significance of rural areas in comparison to urban areas, it is useful to compare specific metrics across a number of dimensions. Table 1 below indicates the importance of rural areas across four key dimensions: share of rural areas in total population, employment, Gross Value Added (GVA), and land. Whilst rural areas make up the vast majority of land area in England (85%), they only contribute around one-sixth of the GVA, employment and population — but this is not the whole story. For instance, it is important to note that the rural GVA per capita and per employee of rural areas are roughly equivalent to those of urban areas. These dimensions provide a useful framework to assess the significance of agriculture to the rural economy and the rural economy to the national economy.

Figure 22: Urban and Rural Areas in England[40]

	Rural	Urban	Total
Population (millions)	**9.3**	**45.1**	**54.3**
%	17%	83%	
Employment (millions)	**3.9**	**21.5**	**25.4**
%	15%	85%	
Gross Value Added (£billions)	**237**	**1,196**	**1,433**
%	16%	84%	
Land area (%)	**85%**	**15%**	

Role of agriculture in the rural economy

As well as considering the significance of the rural economy as part of the national economy, it is also informative to consider the significance of agriculture *within* the rural economy.

Looking at businesses by sector, agriculture is the dominant industry in rural areas (with 15.3 per cent of all rural businesses attributable to 'agriculture, forestry, and fishing'). Agriculture, forestry, and fishing are even more dominant in areas classified as 'hamlets and isolated dwellings' (as per the RUC classification) where these industries account for 27.2 per cent of all businesses. This is due to the large number of farms employing a small number of people.

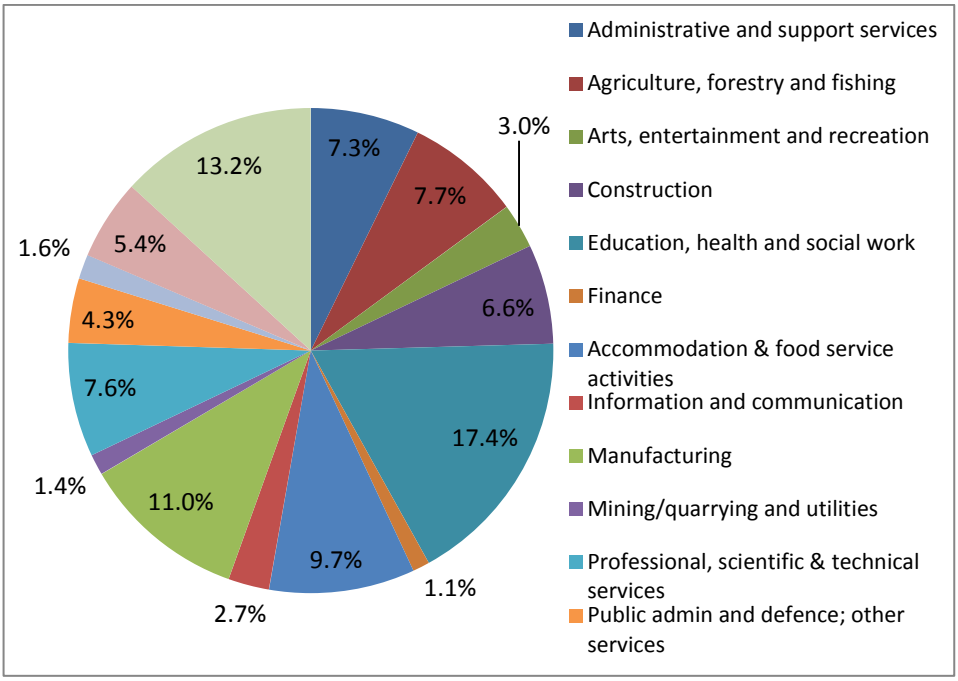
There are obvious synergies between the agricultural and rural economies, which is why agriculture and its value chains remain an important contributor to rural employment. Only in the rural 'towns and fringes' classification is agriculture not the dominant industry — understandably, as this is not as rural. Construction, education, health and social care, and scientific services have the largest percentage of registered businesses.[41]

Although agriculture is the dominant business type in rural areas, it is not the greatest employer of people in rural areas. Agriculture accounts directly for only 7.6 per cent of employment in rural areas, whilst larger sectors include education, health and social work (17.6 per cent), wholesale, retail and vehicle repair (13.2 per cent) and manufacturing (11 per cent).

40 Rural businesses, Defra, March 2017, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/597754/Businesses_Final_Mar_2017_Digest.pdf ; Rural population 2014/15, Defra, November 2016 https://www.gov.uk/government/publications/rural-population-and-migration/rural-population-201415; FOI request: Urban Areas in the UK, ONS, 2016 http://webarchive.nationalarchives.gov.uk/20160105160709/http:/www.ons.gov.uk/ons/about-ons/business-transparency/freedom-of-information/what-can-i-request/previous-foi-requests/people-and-places/urban-areas-in-the-uk/index.html

41 Rural businesses, Defra, March 2017, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/597754/Businesses_Final_Mar_2017_Digest.pdf

Figure 23: Employment in rural areas by sector[42]

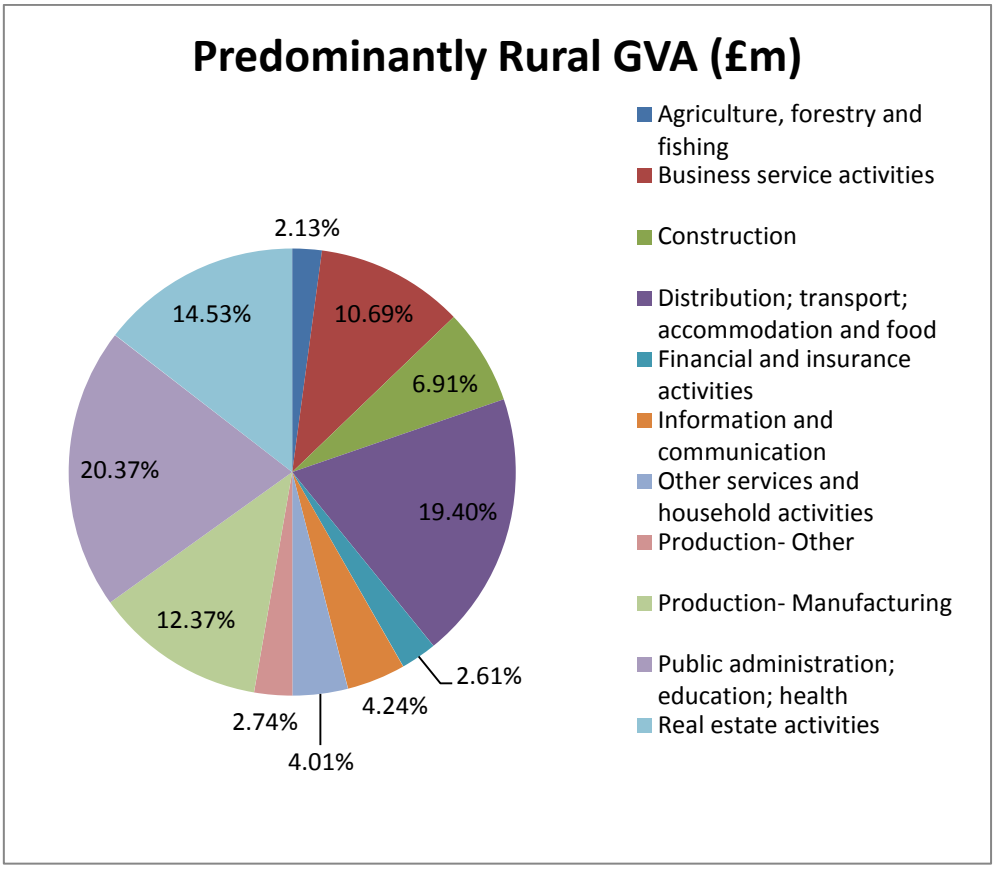


In terms of Gross Value Added, agriculture, forestry, and fishing represent just two per cent of the overall economy in rural areas — by far the smallest contribution out of all the sectors. This is in stark contrast with the accepted wisdom that agriculture is a core part of the rural economy. Rather, the majority of the GVA comes from 'public administration, education and health' and 'distribution, transport, accommodation and food', which contribute 20 per cent and 19 per cent respectively. Despite small figures for GVA, the share of agriculture in rural employment is disproportionately high.

(Note: data is only available at county level, and so a broad rural-urban classification is applied — in this case 'Predominantly Rural' is used. These areas are those with at least half of their population living in rural settlements or large market towns.)

42 Rural businesses, Defra, March 2017, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/597754/Businesses_Final_Mar_2017_Digest.pdf

Figure 24: Rural GVA contribution by sector[43]



Whilst the agricultural sector employs eight per cent of people in 'all rural' areas, it only contributes two per cent of GVA in 'predominantly rural' areas. Other sectors of the rural economy are far more productive: for example, real estate employs two per cent of people in rural areas, but generates 16 per cent of total GVA. Manufacturing and financial services are also relatively healthy sectors within the rural economy.

These trends mirror the pattern at national level, where agriculture, forestry and fishing accounts for just 1.35 per cent of total employment and just 0.55 per cent of total GVA.

CAP and the rural economy

The CAP has sought to offer a holistic and integrated approach for the promotion of food production, sustainable agricultural practices, and development of the rural economy. The remit of the CAP, at least in theory, extends beyond direct agricultural activity with the architecture of payments targeting this approach. Pillar 1 has a single policy instrument in the form of direct payments, while Pillar 2 promotes rural development.

43 Rural businesses, Defra, March 2017, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/597754/Businesses_Final_Mar_2017_Digest.pdf

Under the structure of Pillar 2, there are three main axes that cover rural development:

- Axis 1: Improving the competitiveness of the agricultural and forestry sector
- Axis 2: Improving the environment and the countryside
- Axis 3: Improving the quality of life in rural areas, and encouraging diversification of the rural economy

The allocation of payments across these axes indicates a clear hierarchy, with Axes 1, 2, and 3 receiving 35 per cent, 44 per cent and 19 per cent respectively.[44] Whilst, to some degree, competitiveness was achieved, this was done by over-subsidising farmers, predominantly via Pillar 1 and Pillar 2 Axis 1 payments, and blocking out external competitors with protectionist measures.

The focus for Axes 2 and 3 is improving the environment and quality of life; Axis 2 receives the most financial support in return for environmental stewardship. On face value, Axis 1 is concerned only with agriculture and forestry. This means — in practice, and indeed as the weighting of payments indicates — that little is being done to improve the competitiveness of the wider rural economy. The crux of the matter is that CAP Pillar 2 has been incentivising the wrong things altogether.

Exiting the EU provides an opportunity to do something more than simply reforming the CAP. Changes could be made to Pillar 1 and 2 within the existing CAP framework, and that might achieve some desired outcomes, but a bold new approach to rural development should be taken.

Under the CAP, achieving the objectives of Pillar 1 and 2 fell under the auspices of those policies focused on farmers and the agricultural community. There is now an opportunity to shift the emphasis towards a more diverse set of rural custodians, such as community groups, conservation groups, local authorities, and other local user groups that better reflect the needs of the rural economy.

Under the CAP, agriculture has seen decreasing employment despite increasing payments, one of the lowest rates of productivity f all the industrial sectors in England, and a failure to facilitate competition and diversity in the wider rural economy.

How can we turn this around?

An Industrial Strategy for the Rural Economy

A central objective for the Government is the creation of a modern Industrial Strategy in order to 'improve living standards and economic growth by increasing productivity and driving growth across the whole country'. Productivity per worker in predominantly rural areas is around 89 per cent of the English average — or around the same level as England's urban areas outside London.[45] Is there anything a new

44 Second Pillar, Reform the Cap, http://www.reformthecap.eu/issues/policy-instruments/second-pillar

45 Productivity 2015, Defra, 2017, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/579898/Productivity_2015_data_final.pdf

Industrial Strategy could do to help close the gap between the UK's rural areas and London?

In agriculture, there appear to be significant upcoming opportunities for productivity improving innovations, such as:

- Automation and data through precision agriculture, agricultural big data ('agrimetrics'), and unmanned aerial systems
- Higher yield crops, and the utilisation of more precise GM techniques
- Business model disruption from indoor vertical farming, utilising precise control of the environment in order to increase yields

As powerful as any new particular technology, however, will be the liberalisation of Britain's trade barriers, exposing the domestic industry to greater foreign competition. Historically, we know that countries that have heavily protected their farming industry such as early twentieth-century Germany have seen relatively low productivity. By contrast, the lowering of tariffs and reductions of subsidies in 1970s' Australia led to a significant improvement in agricultural productivity.[46]

Overall, however, agriculture is only a small part of the story of the rural economy. It is increasingly the case that 'rural' is no longer synonymous with 'agriculture', and that 'agriculture' is no longer synonymous with 'rural'.

The fundamental productivity challenge in rural economies is that they do not share in the agglomeration effects enjoyed by cities. The dense concentration of workers, ideas, and businesses in a city can create significant positive spillover effects, with every doubling of city size estimated to increase productivity by 3 to 8 per cent. Although digital communication may reduce future needs to concentrate, there is little evidence so far to show that the invention of the telegraph, telephone, Internet, smartphone, or broadband have brought about the long-awaited 'death of distance.'

That does not mean, however, that many highly talented individuals and businesses will not choose to locate themselves in rural areas, or to escape the high house and office prices of constrained cities. It is still possible that it really is different this time, and that we are seeing a structural shift away from physical concentration. After all, rural areas are at the forefront of the home-working trend, with 33 per cent of workers in rural hamlets and dispersed areas working from home, compared to 12 per cent in urban areas. The shift towards flexible working is only likely to accelerate as the workforce ages and the digitalisation of the economy increases.

Nevertheless, at the big picture level, rural productivity — at least as it is measured by the market — is likely to remain, on average, below the productivity of the UK's major cities.

Although the details will vary from place to place, we suggest an Industrial Strategy for rural areas based around three main themes:

46 Australian agricultural productivity growth, Emily M Gray, Max Oss-Emer and Yu Sheng, 2014, https://www.oecd.org/tad/events/Mr.%20Merrilees_Agricultural%20productivity%20growth%20reforms%20opportunities.pdf

1) Environment: Preserve and enhance the UK's natural capital

Conventional economic statistics only capture a limited proportion of the value created by rural areas, much of which takes the form of positive externalities. The ONS's preliminary work on natural capital identifies as many as 29 separate mechanisms by which the natural environment can create value, including: agricultural production, timber, wind power, wildlife, air pollution removal, waste water cleaning, flood protection, scientific, and scientific and educational interactions. The recreational value of day trips alone to the natural environment was estimated to be £6.5 billion — not far below the entire GVA of agriculture.[47]

In other words, nobody really expects areas like Dartmoor, the Lake District, or the New Forest to be highly productive from a narrow economic point of view. Greater productivity of agriculture allows it to operate in a more intensive fashion, freeing up significant land areas for managed re-wilding, increasing biodiversity, and preserving many of Britain's most beautiful landscapes. As science writer Matt Ridley has argued:

> Post-Brexit environment policy should be one of gardening: managing for a diversity of outcomes in different places. Productive farms here, deep forests there, wild moorlands elsewhere. Freed from the one-size-fits-all shackles of the EU, we should localise our policies, and host as many habitats and species as the climate will support.[48]

Beyond its intrinsic value, a focus on the environment can also have spillover effects on the local economy. Alongside the direct impact on local agriculture, recreation and tourism, an enhanced environment can offer significant amenity value, attracting skilled workers and businesses that prefer to be located outside cities.

In other words, while we should phase out subsidies purely for food production, there is a good case for maintaining subsidies for both environmental and aesthetic goals. Given the importance of heritage and tourism to local economies, even when considered on more narrow economic grounds, it can be cost effective to keep going ongoing subsidies to maintain and manage local landscapes. Many agricultural workers could become, in effect, gardeners. In the next chapter, we will explore more how these Payment for Ecosystem Services subsidies should work.

2) Connectivity: Enable rural workers and businesses to integrate with the wider economy

The UK is fortunate in its relatively dense geography. As long as you have access to a car, it is very hard to be completely cut off from major employment centres, and those living in much of England can feasibly make a day business trip to London or other major cities. On average, rural areas are within 25 minutes of a centre of employment — which is classed as a place with more than 5,000 jobs — and even those areas that fall within the category of 'rural village in a spare setting' are a still

47 UK natural capital: monetary estimates, 2016, ONS

48 British Environmental Policy after Brexit, Matt Ridley, The Times, http://www.rationaloptimist.com/blog/uk-environmental-policy/

commutable 48 minutes away. Although lack of density makes public transport more difficult, autonomous vehicles offer the potential to improve connectivity in rural areas significantly in future decades.

As important as physical connectivity, however, is digital connectivity, which will increasingly act as a core enabler for many other types of businesses, from agri-tech to independent freelancers. Capital investment has been lower in rural than urban areas, leading to lagging adoption of faster broadband speed: in 2014, average broadband speed in rural areas was half that of urban areas. Nevertheless, the current speed is already fast enough for many businesses, with the reliability of phone and data coverage more likely acting as a bigger barrier.

From now on, rural areas should work to map out travel times into both local employment cities and to the UK's core cities. They should also work against falling behind in the adoption of 5G, which is likely to be at least as important in rural areas as urban.

3) **Innovation: Use the opportunities from Brexit to become a world leader in AgriTech**

The UK has many strengths that it can build upon to become a world leader in AgriTech, including: significant pre-existing strengths in agricultural sciences, in facilities like the John Innes Centre or the Roslin Institute; global links through our international aid budget; and world-leading expertise in machine learning and the application of big data. Leaving the European Union will allow the UK to further liberalise the many regulations in life sciences that have held back sectors, as exemplified by the issue of GM crops. Also, the Government has set an aspiration to raise R&D in the UK to match the OECD average. The UK already spends around £500 million a year on agricultural or food R&D, while in 2013, agri-tech contributed £14 billion to UK GVA.[49]

AgriTech was one of first industries to receive a sector specific Industrial Strategy from the Government, when the Government created a new Agri-Tech Leadership Council, an Agri-Tech Catalyst, a Centre for Agricultural Informatics, and new Centres for Agricultural Innovation. As the Government's own 2013 strategy recognised, however,

> In some areas, EU regulations are acting as barriers to innovation […] The EU regulatory pipeline for genetically modified (GM) crops remains blocked. This is despite European Commission reports finding no scientific evidence associating GM organisms with higher risks for the environment or food and feed safety. [50]

The UK is already gaining an international reputation for regulatory friendliness towards disruptive innovations, giving it a real comparative advantage in emerging fields like FinTech and Unmanned Autonomous Vehicles. Leaving the European Union offers the opportunity to extend the success of this approach into the life sciences and AgriTech, with

49 Three things you need to know about the UK agri-tech sector, Akshay Paonaskar, Agri-Tech Strategy, https://agritech.blog.gov.uk/2016/07/21/three-things-you-need-to-know-about-the-uk-agri-tech-sector/

50 A UK Strategy for Agricultural Technologies, 2013, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/227259/9643-BIS-UK_Agri_Tech_Strategy_Accessible.pdf

the UK becoming a world leader in CRISPR gene editing and automated farming. The UK should complement the Precautionary Principle with an 'innovation principle', ensuring that new regulations are brought in without considering their wider impact on innovation.[51] Current regulations should be audited to ensure that they are fully based on evidence and up-to-date scientific advice. Over the next few months, Policy Exchange will build on the work in its report *The New Industrial Strategy* to consider how Britain can fully take advantage of the opportunities from Brexit to accelerate innovation.

Recommendations

- Work with local areas to develop Industrial Strategies suitable for the rural economy, with a focus on:
    - Environment: Preserve and Enhance the UK's Natural Capital
    - Connectivity: Enable rural workers and businesses to integrate with the wider economy
      Innovation: Use the opportunities from Brexit to become a world leader in AgriTech

51 How can Government and regulators keep up with disruptive innovation?, Richard Howard & Jonathan Dupont, Policy Exchange, July 12 2017, https://policyexchange.org.uk/how-can-government-and-regulators-keep-up-with-disruptive-innovation/

Environment

Exiting the EU provides an opportunity for Britain to rethink agricultural policy, with a renewed focus on how to improve the sustainability of food production. Farmers and agricultural workers are the principal custodians of our rural land, and therefore have the ability to shape — positively or negatively — the environmental costs and benefits that are derived from land management.

Despite agriculture only playing a small part in the UK economy — accounting for 0.6 per cent of UK GDP, and less than 2 per cent of UK employment — it accounts for over 70 per cent of land use. Its environmental impact is both considerable and disproportionate relative to its economic importance. This chapter describes how the Common Agricultural Policy has sought to manage environmental issues associated with agriculture — identifying both successes and failures.

The Government needs to ensure that any new British agriculture and rural policy framework gives an incentive to more sustainable agricultural practices and increases ecosystem services that are provided through land management practices, in order to achieve the Government's manifesto pledge to 'be the first generation to leave the environment in a better state than we inherited it'.

The environmental impact of agriculture in the UK

Agriculture was originally conceived as a form of land management practice to divert the productivity of terrestrial ecosystems to serve human needs. Unfortunately, this has the potential to damage non-crop ecosystems and species, presenting a fundamental tension between the management of land to maximise agricultural output and the minimising of wider environmental costs.

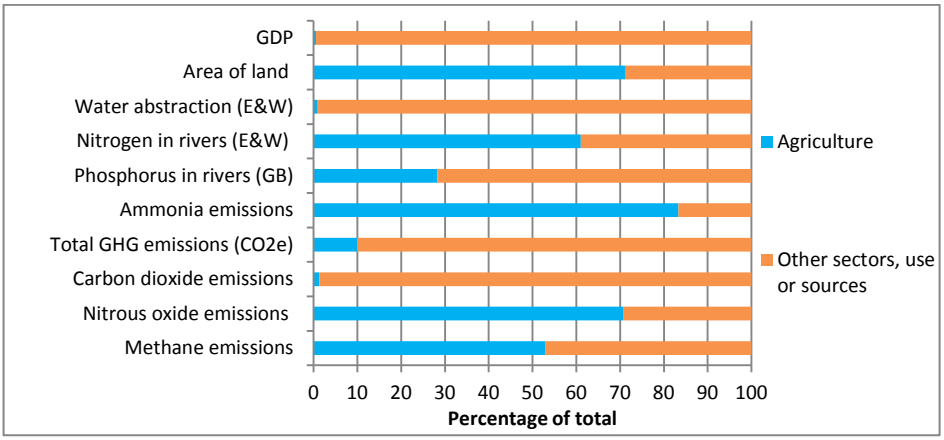
Agriculture dominates land use in the UK, yet it results in many environmental outcomes that are unsustainable. The impact of agriculture on the environment largely relates to three variables: the quantity of agricultural production, the incentives and disincentives facing farming, and the types of management practices that farmers adopt (OECD, 2001). The challenge is to decouple agricultural production from environmental degradation, so that agriculture can continue to meet increasing demand for food without putting undue pressure on natural resources.

The main environmental impacts of agriculture in the United Kingdom are associated with water pollution, air pollution, soil degradation, and the impact on biodiversity.[52] Figure 24 provides a useful benchmark of the agriculture sector's environmental footprint relative to its GDP across a number of these dimensions.

52 An Overview of the Environmental Impact of Agriculture in the UK, J A Skinner, K A Lewis, K S Bardon, P Tucker, J A Catt, B J Chambers, 1997 http://www.sciencedirect.com/science/article/pii/S0301479796901036

Agriculture clearly has a big impact on the nitrogen in rivers, as well as emissions of ammonia, nitrous oxide, and methane.

Figure 25: Agriculture's relative contribution to the economy and the environment



Water Pollution

One of the biggest impacts associated with agriculture is on water quality. The quality of the UK's surface and groundwater is affected by numerous factors, and it can be difficult to isolate the causes and origins of water pollution. Point sources of pollution, such as industrial premises, are relatively straightforward to identify, but, arguably, the bigger problem comes with diffuse sources of pollution, such as agriculture.

Everyday farming activities can have an impact on water quality, including the ploughing of land, the spreading of manure, and the use of pesticides and soluble fertilisers. Soluble fertilisers have often been a significant source of pollution, as rainfall and subsequent run-off from agricultural land creates a pathway for the contamination of surface waters and groundwater. In the UK, it is thought that around 60 per cent of nitrates and 25 per cent of phosphorus in water bodies are derived from farming, and that 75 per cent of sediments polluting water bodies also originate from farming.[53]

The decrease in effluent from industrial sources over the last century means that the share of water pollution coming from agriculture has substantially increased.[54] It has been estimated that the costs of eutrophication could be as high as £100 million per year, owing to the increased cost of water treatment for public supply and the loss of biodiversity.[55] The impact of eutrophication is particularly acute in the lowlands, where there are higher uses of fertilisers.

Policy mechanisms such as the Water Framework Directive have been implemented at the EU level to deal with this issue, and will be considered later in this paper.

53 Agriculture's impacts on water quality, The UK Water Partnership & Global Food Security, 2015, http://www.foodsecurity.ac.uk/assets/pdfs/agriculture-water-quality-report.pdf

54 Water Quality and Agriculture, Nick Haigh, OECD, https://www.oecd.org/environment/resources/England-case-study-water-quality-and-agriculture-diffuse-pollution.pdf

55 Agriculture, community, river eutrophication and the Water Framework Directive, Colin Neal & Helen P. Jarvie, 2005, http://onlinelibrary.wiley.com/doi/10.1002/hyp.5903/full

Air Pollution and Climate Change

As shown in Figure 24, agriculture accounts for roughly 10 per cent of total greenhouse gas emissions in the UK — far greater than its share of UK GDP. Agriculture makes a relatively low contribution to carbon dioxide emissions (1 per cent), but is the dominant source of methane and nitrous oxide emissions (50 and 80 per cent respectively), both of which are potent greenhouse gases. Methane has a global warming potential 25 times greater than CO_2, and it is estimated that 70 per cent of methane emissions in the UK stem from cattle. The dominant source of nitrous oxide emissions is soil (88 per cent of total emissions). This is largely a function of nitrogen fertiliser application, and it is therefore possible to reduce nitrous oxide emissions by limiting the application of nitrogen fertilisers.

The biggest impact of agriculture, however, can be seen in terms of its contribution to ammonia emissions (83 per cent of total UK ammonia emissions). Ammonia emissions from agriculture mainly occur as a result of volatilisation from livestock excreta, either in manure storage and livestock housing, or as a result of farmers spreading manure on fields. The environmental implications are profound, because the deposited ammonia can be transported in the atmosphere to other parts of the UK or even further afield, resulting in the acidification of ground and water bodies, to the detriment of plant and animal life.

Soil Degradation

Farming practices can have a significant bearing on soil quality and soil erosion, and can also lead to indirect problems such as flooding and greenhouse gas emissions.

One indicator that can be used to assess soil quality and the likelihood of soil erosion is Soil Organic Carbon (SOC). The higher the SOC content, the better the quality of soil, since SOC is a key source of nutrients and helps to increase the structural resilience of soil. Data from the ONS shows that there has been a reduction in SOC across many types of grasslands since 2007. The most significant change is found in 'acid grassland', which has seen a 28 per cent reduction in organic carbon since then. Defra has suggested that the conversion of permanent grassland to arable land has given rise to a decline in SOC. The principal implication of this is an increase in soil erosion, with far-reaching consequences for river catchments. The current rate of soil erosion is 10-100 times higher than it has been in the past, and it is estimated that 2.2 million tonnes of soil is eroded each year in UK catchment zones.[56]

Soil degradation can give rise to many indirect impacts, such as increased flood risk and greenhouse gas emissions. The inability of soil to retain water and sediment transfer from upland soil erosion to river channels contributes to flooding. Soils also act as a source and sink for greenhouse gases (GHG), but changes to soil structure from farming can influence its source and sink function,[57] either increasing or decreasing emissions. This is reflected in research showing that 80 per cent of the costs of soil degradation are experienced away from the site

56 Soil Health, Environmental Audit Select Committee, 2016 https://www.publications.parliament.uk/pa/cm201617/cmselect/cmenvaud/180/18004.htm

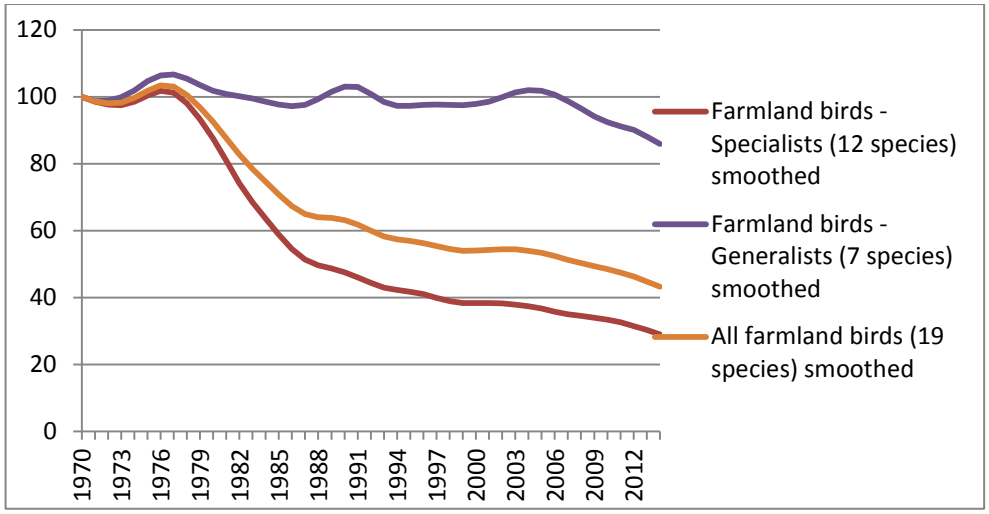
57 Greenhouse gas emissions from soils—A review, Cornelius Oertel, Jorg Matschullat, Kamal Zurba, Frank Zimmermann, Stefan Erasmi, 2016, http://www.sciencedirect.com/science/article/pii/S0009281916300551

where the degradation occurs — for example, in increased flood risk, reduced water quality, and the effects of greenhouse gas emissions. This can also have significant financial implications: in 2011, it was estimated that the cost of soil degradation in England and Wales was between £0.9-1.4 billion.

Biodiversity

It is widely argued that there has been a decline in farm biodiversity as a result of increasingly homogenous farming landscapes. Twentieth-century agrarian intensification has resulted in the fragmentation and reduction of woods and hedgerows in both the uplands and particularly in the lowlands.[58] This loss of habitat can be seen as a contributing factor to biodiversity losses. Jenkins (2003) described the transformation of natural habitats, particularly through forest clearance, as one of the biggest pressures on UK biodiversity.[59] Figure 25 describes the change in bird populations between 1970 and 2014, and shows a marked decline in specialist species of birds (-71 per cent) and all farmland birds (-56 per cent).

Figure 26: Farmland Bird Population 1970-2014



The impacts of agriculture on water, air, soil, and biodiversity are intrinsically linked. Both deforestation and soil degradation can lead to increased soil erosion, which in turn increases sediment transfer to rivers, whilst increased fertiliser application to soil can increase air emissions. Environmental impacts must be looked at holistically, and the catchment scale is the most appropriate spatial unit to consider these challenges.

Evidently, agriculture has and continues to have significant impacts on the environment. CAP policies have gradually incorporated a greater consideration of environmental impacts across water, air, soil, and biodiversity — but to varying degrees of effectiveness. The significant environmental impact of farming highlights a fundamental conflict between the current CAP system and EU directives. The former promotes behaviour that the latter is intended to regulate, creating a

58 Field boundaries in Great Britain: stock and change between 1984, 1990 and 1998., Petit S, Stuart R.C, Gillespie M.K, Barr C.J, . Environ. Manage. **67**,2003b 229–238

59 Prospects for biodiversity, Jenkins M, *Science*. ***302***, *1175–1177*

cycle of dependency, which is both financially and environmentally costly. **An alternative post CAP framework is needed — one that defines environmental outcomes, and seeks market-based approaches to them.**

Evolution of environmental CAP reform

The early years of the CAP did not adequately consider environmental issues. The period between 1970-1980 focused heavily on food production, through agricultural intensification, but at the expense of the environment.[60] Since 1985, there has been a gradual integration of environmental objectives in to the CAP in order to address the environmental challenges associated with agriculture *(Allen and Hart; 2013)*. In 1992, the MacSharry reforms initiated a partial switch from product support (through prices) to producer support (through direct payments).[61] Perhaps more importantly, this was the first time that measures to support environmental protection had been included in the CAP.

That approach was built upon in the Agenda 2000 CAP reform, with the development of the 'second Pillar', which sought to offer incentives for environmentally beneficial farming practices, along with the further consolidation of environmental protection measures via the 'Rural Development Regulation'. Further developments included the establishment of standards for 'Good Farming Practices' to support agri-environment schemes.

Three years later, the 2003 Fischler reforms decoupled direct payments in Pillar 1 from food production, and introduced cross-compliance and modulation between pillars. Decoupling payments from production was seen as central to improving environmental stewardship. A report by the European Communities Court of Auditors (2000) concluded that the intensification of agricultural production, encouraged by high support under the CAP, had caused environmental problems.

In 2005, rural development policy was refined further, and the European Agricultural Fund for Rural Development (EAFRD) was formed in order to fund each of the three axes of Pillar 2. 2008 saw a change in emphasis, with the introduction of the CAP 'Health Check', seeking to remove restrictions on farmers, thus allowing them to respond better to market signals. Alongside that change of emphasis came a set of environmental measures — such as the abolition of set-aside, increased cross compliance measures, and a further extension of modulation. This was a direct response to a number of identified environmental challenges, such as climate change, bio-energy, and water management. [62]

The 2014-2020 CAP reform provided an opportunity to take a more holistic and comprehensive review of CAP policy, structure, and the balance of funding. Reforms were considered against a backdrop of declining environmental performance in a number of areas such as water quality and biodiversity, and a decline in favourable habitats (EEA, 2010b). In order to halt this trend, a new 'green' payment was introduced covering the 'crop diversification rule' (discussed further

60 The Common Agricultural Policy: A story to be continued, European Commission, 2012, http://ec.europa.eu/agriculture/50-years-of-cap/files/history/history_book_lr_en.pdf

61 An Inside View of the CAP Reform Process: Explaining the MacSharry, Agenda 2000, and Fischler Reforms, Arlindo Cunha and Alan Swinbank, 2011, http://www.oxfordscholarship.com/view/10.1093/acprof:oso/9780199591572.001.0001/acprof-9780199591572-chapter-5

62 Modulation and other financial transfers from EAGF to EAFRD, European Commission, https://ec.europa.eu/agriculture/sites/agriculture/files/direct-support/pdf/factsheet-modulation_en.pdf

below), a new rule to protect designated grasslands, and a requirement that small arable farms under 15 hectares must devote at least five per cent of their area to 'ecological focus areas'.[63]

A number of EU directives governing water, habitats, and air pollution sit alongside the CAP, such as the Water Framework Directive (WFD) — which seeks greater protection for rivers, lakes, groundwater, and coastal waters — and the Habitats Directive (HD) – which seeks to protect some of the most valuable and threatened habitats. Despite the obvious synergies between aspects of the CAP the WFD and the HD, there are often instances of conflict and contradiction between the policy objectives in relation to agriculture. The WFD and HD aim to minimise the impact of the sector on the environment, whilst the CAP's fundamental goal is to increase agricultural productivity, often at the expense of the environment.[64] WWF highlights two examples of cases where the 'funding of irrigated crops under the CAP has led to unsustainable water use practices', and where funding that supported irrigation in some areas reduced the competitiveness of other areas, leading to land abandonment, with adverse impacts on biodiversity.

This conflict is also true of competing EU directives. For example, restoring river channels and their corridors may threaten certain aquatic and bird species. The objectives of a new post-Brexit 'British Agricultural Policy' need to be harmonised with other environmental policies and the Government's commitment to 'be the first generation to leave the natural environment in a better state than we found it'.

Critique of current CAP policy

The CAP has undergone several iterations, with an increasing emphasis on mitigating the impacts on the environment that arise from agriculture. No doubt these changes were well intentioned, and some improvements have been made. However, there are also examples of policy changes that are misguided and have exacerbated environmental problems, or dealt with problems in an inefficient manner, as exemplified by the following examples:

Crop diversification

Crop diversification — or the 'three crop rule', as it is also known — requires farmers with holdings greater than 30 hectares to grow 3 crops, with the main crop not covering more than 75 per cent. This rule was introduced in 2013 in the latest set of reforms in order to help prevent monocultures taking root. It was also aimed at improving soil organic matter.

Research suggests that diversification has the ability to increase resilience in a number of ways: to dampen pathogen transmissions, suppress pest outbreaks, and increase resilience to climatic changes.[65] Whilst this may appear laudable, it has caused considerable anger within the agricultural community. Concern among farmers has focused on the economic pressure this reform imposes, as the diversification rules can mean more time has to be spent setting up and

63 Greening, Agriculture and Rural Development, European Commission, https://ec.europa.eu/agriculture/direct-support/greening_en

64 Modelling Agricultural Diffuse Pollution: CAP – WFD Interactions and Cost Effectiveness of Measures, Ioanna Mouratiadou, Cairistiona Topp, , Dominic Moran, 2008 http://ageconsearch.umn.edu/bitstream/6461/2/pp08mo20.pdf

65 Resilience in Agriculture through Crop Diversification: Adaptive Management for Environmental Change, Brenda B. Lin, 2011, https://academic.oup.com/bioscience/article/61/3/183/238071/Resilience-in-Agriculture-through-Crop

increasing costs of storage to differentiate between crops, ultimately making them less competitive.

The cost-effectiveness of this policy also needs to be examined carefully. If the aim of the policy is to improve soil organic matter, then is the crop diversification rule the best mechanism to achieve this?

This can be examined by looking at how many farms are affected by the 'three crop rule' and how much money is spent on it. Looking specifically at the UK, a recent report by the Joint Research Council (JRC),[66] estimates that 44.1 per cent of commercial farms are subject to the rule. The remaining 55 per cent do not need to comply because they do not meet the criteria. Of the 44.1 per cent of farms that are subject to it, 15 per cent do not comply, and therefore risk a reduction in subsidy. The JRC modelling suggests that the crop diversification policy has the ability to induce 7 per cent of eligible farms that were non-compliant to fully comply, and a further 6 per cent of eligible farms to partially comply.[67] Therefore, the total numbers of farms that are affected, either fully or partially, is 5.72% (13 per cent x 44.1 per cent). Commercial farms only account for around 50 per cent of all farms covered by the Integrated Administrative and Control system — the mechanism that pays farmers — so it is logical to conclude that only 2.8 per cent of farms are directly affected by the policy.

In 2016, the Basic Payment Scheme paid farmers £2.57 billion. Approximately 30 per cent of this goes towards the three greening measures: permanent grassland, crop diversification, and the creation of ecological focus areas. Assuming an even split across all three, this implies that £257 million goes towards crop diversification, which is a very large sum for a policy that is applicable to only 2.8 per cent of UK farms. As the land area affected is so small, so are the likely impacts of the policy.

This is a classic example of the way in which EU regulations do not always reflect the reality on the ground. Conceptually, the policy makes sense, but in countries where the numbers of affected farms are small — such as the UK — a disproportionate amount of money is spent on something with limited uptake, and therefore limited environmental benefit. Moreover, the farms that usually comply with the three crop rule tend to be those that are larger, well established, and have the financial ability to farm in accordance with such rules. This has the potential to exacerbate economic inequalities amongst farms, as the bulk of the three crop rule payments are funnelled to those larger farms. Context is critical, as is understanding individual sensitivities within EU countries. This echoes the wider criticism of the EU that member states do not always have the ability to implement measures in accordance with their specific needs.

66 An EU-Wide Individual Farm Model for Common Agricultural Policy Analysis, European Commission, 2015, http://publications.jrc.ec.europa.eu/repository/bitstream/JRC92574/jrcreport_jrc92574.pdf

67 Scrap the crop diversification greening requirement and find a sensible replacement, Alan Matthews, August 4 2015, http://capreform.eu/scrap-the-crop-diversification-greening-requirement-and-find-a-sensible-replacement/

Good Agricultural and Environmental Conditions (GEAC)

Another perverse incentive of the CAP can be found within the 'Good Agricultural and Environmental Conditions' guidelines under Pillar 1. One of its compulsory guidelines is 'avoiding the encroachment of unwanted vegetation on agricultural land'. In practice, this means that farmers receive payments in return for keeping their land free of plants, without keeping animals or growing crops. That these payments can be maximised by expanding the area that is kept free of unwanted vegetation creates a perverse incentive to reward behaviour that contributes nothing to food security, yet contributes to environmental degradation. At the same time, Pillar 2 payments are granted for environmentally beneficial behaviours, such as increasing biodiversity, in order to mitigate the impact of activities caused under Pillar 1. This is not an efficient use of public funds. Future policies should seek to prevent subsidies being awarded for damaging activities, and shift support towards payments for beneficial environmental outcomes.

Neonicotinoids

Another contentious issue has been the use of neonicotinoids — a type of pesticide. As of 2013, the European Commission implemented a temporary ban on the use of three neonicotinoids based on a growing body of literature (Klein *et al* (2017)[68], LaLone *et al* (2017)[69]), which suggested these substances could harm bees. Whilst some studies refute this, the EU acted on the Precautionary Principle. However, there has been significant opposition to the ban: proponents of overturning it argue that the use of neonicotinoids is vital to increasing crop productivity and reducing immunity to the overuse of a more limited range of pesticides.

Although the ban still exists, there are instances when it can still be used — subject to meeting certain criteria. For example, in 2015,[70] the UK Government granted an exemption to the NFU, which allowed restricted seed treatment for 120 days in Suffolk, Cambridgeshire, Bedfordshire, and Hertfordshire. It is perhaps more accurate, therefore, to describe the use of neonicotinoids as 'restricted' rather than 'banned'. Whilst there is a rationale for a degree of caution in the use of new technologies and substances, EU regulations have at times gone too far in invoking the Precautionary Principle. The example of neonicotinoids underlines the need to base policy and regulation on the latest scientific evidence, and to adapt policy as new evidence comes to light.

The examples above are but a few of the CAP rules that have a significant bearing on agricultural practices. They are constituent parts of the CAP, but also work in conjunction with many EU directives. **Politicians will need to consider how many CAP and wider EU directives should be transposed into the Great Repeal Bill.**

This report has demonstrated that the current framework of CAP subsidies and high external tariffs has many significant defects. It has created a farming sector in the EU that is both uncompetitive and

68 Why Bees Are So Vulnerable to Environmental Stressors, Simon Klein, Amelie Cabirol, Jean-Marc Davaud, Andrew B. Barron, Mathieu Lihoreau, 2017 https://www.researchgate.net/publication/312574099_Why_Bees_Are_So_Vulnerable_to_Environmental_Stressors

69 Weight of evidence evaluation of a network of adverse outcome pathways linking activation of the nicotinic acetylcholine receptor in honey bees to colony death, Carlie A. Lalone, Daniel L. Villeneuve, Judy Wu-Smart, Rebecca Y. Milsk, Keith Sappington, Kristina V. Garber, Justin Housenger, Gerald T. Ankley, 2017, http://www.sciencedirect.com/science/article/pii/S0048969717301250

70 Commons Library analysis: Bees and neonicotinoids, House of Commons Library, July 2017, http://researchbriefings.parliament.uk/ResearchBriefing/Summary/SN06656

environmentally damaging, whilst raising food prices for UK consumers.

Moving forward, the UK Government needs to create a new system that is more sustainable - economically and environmentally. We have argued that tariffs for agricultural products should be reduced or removed entirely, direct subsidies for agricultural production should be phased out, and an Industrial Strategy should be developed for rural areas to raise rural productivity.

The final component of the post-CAP framework must be to ensure that the environmental benefits of land management are maximised — in line with the Government commitment to 'be the first generation to leave the environment in a better state than we found it'.

The CAP has gradually evolved towards supporting environmentally beneficial practices. However, as described above, the agri-environment schemes that do exist under Pillar 2 are often in conflict with the activities subsidised under Pillar 1 – leading to a set of perverse incentives, and gross inefficiency.

Following Brexit, the UK needs to radically reform this set of policies and move to a situation where public money only supports the provision of public goods associated with land management, rather than subsidising production. Reform should focus on a **'Payments for Ecosystem Services' (PES) model** accessible by all landowners, rather than just farmers. This would mark a significant departure from the CAP model and its current pillar system, and would have great potential to mitigate the negative impacts of agriculture on the environment, while maximising the benefits.

Payment for Ecosystem Services

A variety of benefits can be derived from natural resources and ecosystems, such as food production, flood risk mitigation, the provision of clean water and clean air, and carbon sequestration, as well as aesthetic benefits such as the landscape itself. These benefits are sometimes referred to in the literature as **'ecosystem services'** — the services that mankind can derive from ecosystems.

Some of these benefits, such as food production, are captured directly by landowners and farmers. However, many of the benefits that can be derived from ecosystems are non-market externalities or 'public goods', in the sense that their benefits are spread across society as a whole. Maintaining a beautiful rural landscape can support rural tourism, with benefits for businesses in rural areas, for instance; and tree planting can reduce flood risk and improve water quality downstream. These examples result in market failures, however, in that there is no direct incentive for landowners or farmers for the provision of these positive externalities, so they tend to be under-provided by the market alone. While it is helpful to frame the natural environment as a capital asset, we also need to be clear about who will pay for the liabilities.

The concept of **Payments for Ecosystem Services (PES)** seeks to address this market failure by assigning a monetary value or payment for the provision of ecosystem services. The concept of PES has gained

significant traction as a mechanism for improving environmental outcomes, by creating direct incentives for farmers and landowners to provide these services. In its simplest form, this can take the form of payments from the Government for the provision of specific ecosystem services. A further development of this model is to create markets for the provision of ecosystem services with many buyers and sellers. For example, PES schemes aimed at protecting water quality could be funded by water companies, which have a duty to provide clean water.

There are a number of examples where PES schemes have already been shown to be effective (see Box 1).

In many cases, ecosystem services are deeply interlinked, and for this reason they should not be explore on a service-by-service basis. For example, peatland management can provide services in terms of carbon storage, and improving water quality and biodiversity. A good example of this is the Pumlumon Project, managed by Montgomeryshire Wildlife Trust (MWT) which was set up in 2005. The project is based on an integrated approach, with several organisations buying ecosystems services such as carbon storage and sequestration, water storage, and flood attenuation. After the first eight years, it had saved 1,346 tonnes CO_2e/year and stored 155m litres of extra water.[71]

Box 1: Examples of Payments for Ecosystem Services

United Utilities is the water supply company in the North West of England, and as such, has a duty to provide clean water to its customers. Water quality is affected by pollution from a number of sources, including the use of fertilisers and pesticides in agriculture. United Utilities has purchased 56,000 hectares of rural land in the North West, in order to protect upstream water quality, and to prevent contaminants entering its reservoirs. In collaboration with farmers and consortium partners, such as the RSPB and Natural England, £10.6 million was invested in moorland restoration, woodland management, and watercourse protection.[1] This has the ability to improve water retention and reduce erosion, which are key to preventing downstream sediment transfer. After eight years of hydrological and water quality monitoring, results showed that water quality was improved in key areas as a result of these actions.

Between 2011 and 2015, Defra funded pilot projects exploring the potential for PES across England and Wales. One of the pilot schemes looked at developing a catchment-based approach to reduce flooding in the Winford Brook Catchment, South Bristol. The catchment had been singled out by the Environmental Agency, owing to a number of flood-related deaths in recent years. The scheme focused on limiting the sedimentation of an upstream reservoir, in order to reduce the frequency of dredging and, therefore, reduce the flood risk. Analysis showed that the present value associated with each cubic metre reduction in erosion per year was between £666 and £1,025. Payments could be made to farmers and landowners to change their land management practices and reduce soil erosion.

71 Developing the potential for Payments for Ecosystem Services: an Action Plan. Defra, May 2013, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/200889/pb13918-pes-actionplan-20130522.pdf

One problem with PES schemes is compiling sufficiently robust data to demonstrate their impact — and it is important to consider the context in which such schemes can and should be applied. In the examples above, direct beneficiaries such as municipal water companies administer the schemes and monitor the impact. In order to maximise the usefulness of the PES model as a tool, it is essential that buyers and sellers of ecosystem services are able to verify the efficacy of the schemes, particularly in terms of their environmental benefits. In the examples above a number of metrics were successfully quantified — dredging costs, water stored, and carbon sequestrated — but further work and piloting will be needed before the approach can be rolled out more widely.

From the outset, it is critical that we define the environmental objectives we want to achieve, rather than simply looking at the viability of farms, and how much subsidy they would need in order to achieve some desired environmental objectives. The Government has made a commitment to 'be the first generation to leave the environment in a better state than we found it', and its work around Natural Capital and the forthcoming '25 Year Plan for the environment' forms the basis of the required objectives referenced above.

In many cases, moving to a PES model will benefit some of the farmers most in need of financial support. Many marginal farms in upland areas will struggle to compete in a world where tariffs and production subsidies are substantially reduced. However, these same farms often have significant potential for the provision of ecosystem services.

Overall, the PES model offers a more attractive use of public funds than subsidies tied to production or land holdings. Unlike the payments under the CAP, PES payments are not restricted by EU or World Trade Organisation agreements, which means they can be directly attributed to the value of the environmental management for the beneficiaries, rather than to profits foregone and costs incurred by the farmers.[72]

Biodiversity Offsetting

Another concept that should be considered alongside Payments for Ecosystem Services is **Biodiversity Offsetting**. This is a mechanism whereby if habitat is lost in one area then this loss can be offset through the replacement, restoration or enhancement of habitat elsewhere – on the basis that overall there is a net gain in habitat. For example, if a particular piece of land including habitats is developed for housing, then a separate area of agricultural land, previously of low environmental value, could be enhanced to create a new habitat. Whilst this is a somewhat simplistic view of the way ecosystems operate, there are circumstances in which this approach could be helpful as a way of optimising land use and quantifying biodiversity losses and compensating for them.

The UK Government launched a green paper on Biodiversity Offsetting in England in 2013 looking at ways in which this approach could be used to enhance the natural environment, and decouple

72 Some implications of Brexit for UK agricultural environmental policy, Jeremy R Franks, Centre for Rural Economy, June 2016, http://www.ncl.ac.uk/media/wwwnclacuk/centreforruraleconomy/files/discussion-paper-36.pdf

economic growth from environmental degradation. The timing of Defra's consultation response – published almost 2.5 years after it was first devised – suggest that the appetite to roll this approach out has been limited to date. Aside from a series of pilot schemes that were carried out during the consultation period, only a small number of isolated cases and local councils have explored this approach further.[73] The adoption of offsetting is far from widespread.

Biodiversity Offsetting could play an important role in the transition from the current CAP regime to a new policy framework defined around ecosystem services. If agricultural activity diminishes as a result of the changes to agricultural subsidies described in this report, then Biodiversity Offsetting could offer an alternative source of revenue for current landowners and farmers, and an alternative use for some marginal farmland.

Farmers could turn parts of their farmland into new habitats for biodiversity offsetting. A 'land bank' could be created, such that developers can then purchase biodiversity offsetting 'credits' to mitigate the impact of their development. The proceeds would go directly to landowners or farmers.

A prerequisite to replicable and accurate offsetting is a transparent ecosystem based system of calculating the impact of both the development and new habitat created. In order to be eligible for offsetting, landowners need to demonstrate that they have a long-term credible management strategy to ensure that there is a genuine increase in biodiversity.

A Biodiversity Offsetting approach needs to be clearly bounded, and there are circumstances where it simply will not be appropriate – for example areas with high levels of biodiversity (such as SSSI's, Natura 2000 sites and ancient woodlands) simply cannot be replicated elsewhere, and should not be built on. Conversely, areas that have low ecological value may be suitable for offsetting and so the process of agreeing compensation for biodiversity loss can be defined through the planning process.

Integrating agriculture and forestry

One of the notable features of the CAP policy is how disconnected this is from policy concerning forestry. One of the reasons for this is that competence for agricultural policy is at the EU level, whereas competence for forestry policy remains at Member State level. This is one of the reasons that forestry and agriculture are not more closely aligned, and why, in some cases, they can be seen as fighting against each other. For example, under Pillar 1 payments, areas of woodland that prevent agricultural activity are not eligible for BPS, which creates an incentive to reduce tree coverage.

Forestry results in many environmental, social, and economic benefits – both to farmers and to society as a whole. Defra estimates that 'woodland provides at least £1.8 billion in social, environmental, and economic benefits each year'[74]. Increasing tree coverage on farms results in direct benefits such as reducing localised flooding, reducing soil degradation and providing shelter for animals and crops. The wider

73 CASE STUDY - major residential development, the Environment Bank, 2016, http://www.environmentbank.com/news/post.php?s=2016-11-01-case-study-major-residential-development

74 Written evidence submitted by the Department for Environment, Food and Rural Affairs (Defra) (FOR0073), Forestry in England inquiry, Environment, Food and Rural Affairs Sub-Committee, 2017, http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/environment-food-and-rural-affairs-subcommittee/forestry-in-england/written/41694.pdf

benefits to society as a whole include improving water quality, landscape and biodiversity, as well as carbon sequestration.

Tangible benefits can be realised from increasing woodland, with the Natural Capital Committee suggesting that for every 250,000 additional hectares of woodland planted, this creates approximately £500 million of net societal benefits,[75] or £2,000 for every hectare planted.

The following example shows how afforestation can be a cost-effective mechanism to mitigate carbon emissions.

Case Study: Carbon Abatement through Tree Planting

According to the Forestry Commission, the cost of planting a tree is between £1.40 and £3. This price includes the tree, the tree stake and the labour required for planting, and the variation reflects the size and quality of the supporting tree and guard.

Using the Forestry Commissions 'Carbon Lookup table' — a model for carbon sequestration from woodland — it is possible to calculate how much $C0_2$ could be sequestrated from a hectare of woodland. For illustrative purposes, we modelled a spruce woodland planted at a typical density of 2,500 trees per hectare, which would achieve carbon sequestration of 465-777 tonnes of CO_2 equivalent.

At £1.40 per tree and 777 tCO2e/ha, this equates to a cost of carbon abatement of £4.50/tonne. Even if we add the cost of purchasing marginal agricultural land at market prices (£4,500-5,000 per hectare[1]), this would increase the cost of carbon abatement to £11 per tonne. These figures are well below the long term social cost of carbon, used by HM Treasury for policy analysis (which is £39-£116 per tonne in 2030). It is also far below the cost of other carbon abatement opportunities such as subsidising renewable or nuclear power, or low carbon heating or transportation.

This demonstrates that reforestation is likely to be a relatively cheap method of carbon abatement, and one which clearly merits further consideration by the Government.

Carbon sequestration is just one of the many environmental and social benefits that can be derived from tree planting. For the purposes of the above example we have assumed a spruce woodland, as this yields a significant carbon saving. If Government also wishes to maximise biodiversity or landscape benefits, then other species should also be considered.

Despite the benefits, the potential afforestation is often overlooked – particularly in the case of the CAP since forestry is essentially out of scope. Indeed, the coverage of UK woodland is considerably lower than its EU counterparts — at 13 per cent, compared to 38 per cent of the EU28.[76]

A new integrated land management policy framework is needed, which can facilitate deeper integration of forestry and agriculture. This can be achieved firstly by removing perverse incentives under the

75 The State of Natural Capital, Third report to the Economic Affairs Committee, Natural Capital Committee, 2015, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/516725/ncc-state-natural-capital-third-report.pdf

76 Forestry in England: Seeing the wood for the trees, Environment, Food and Rural Affairs Committee, 2017, https://www.publications.parliament.uk/pa/cm201617/cmselect/cmenvfru/619/619.pdf

current CAP regime to reduce woodland and hedgerows; and secondly through the use of PES models to encourage more tree planting.

Who governs?

This report has set out a package of proposals that could significantly alter the nature of farming in the UK going forward. The removal of tariffs and production subsidies will mean that farms will be exposed to competition in a way that they have not been in recent decades. Our proposal that all remaining public subsidies should be focused on public goods could result in significant changes to land use, with beneficial environmental outcomes across the country.

This transition creates some significant questions about how public subsidies should be directed and to what ends. As described above, Payments for Ecosystem Services can be used to achieve a range of environmental benefits, such as carbon sequestration, improving water quality, reducing flood risk, or improving the landscape. For other goals, where valuation is harder, regulation may be more efficient. In this context, who will decide what outcomes are desired, and in which locations? Will different locations pursue different objectives? What is the approach scale to make these decisions?

As a practical example, consider the Lake District — recently identified as a UNESCO World Heritage Site. The Lake District is regarded as having a landscape of great beauty, in particular its cultural landscape.[77] The current landscape is the product of centuries of human management, in particular of upland sheep farming, which has resulted in deforestation and relatively low levels of biodiversity. In the post-Brexit farming policy framework described in this report, should this landscape be preserved as it is to maximise its cultural and heritage benefit? Or conversely should it be 're-wilded', as suggested by some commentators, and returned to nature to maximise its biodiversity and wider environmental benefit?

These are the sorts of difficult decisions that will need to be made in the creation of Defra's 25 Year Plan for the Environment.

77 Nomination of the English Lake District for inscription on the World Heritage List, Lake District National Park Partnership, http://www.lakedistrict.gov.uk/__data/assets/pdf_file/0005/729671/1.0-Exec-Summary-and-Identification-of-the-Property.pdf

Recommendations

- Rather than giving production subsidies to farmers under the CAP, all remaining public support should go towards public goods such as preserving and enhancing the natural environment and the environmental and aesthetic benefits that derive from it.
- This should be achieved using a 'Payments for Ecosystem Services' approach, linked to the Defra 25 Year Environment Plan, and the work of the Natural Capital Committee. Payments should be available both to farms and other landowners, creating a competitive market for the provision of ecosystem services.
- As part of Defra's 25 Year Plan for the Environment, Government should consult on the most appropriate mechanisms for commissioning ecosystem services (including consideration of the optimal scale), and explore how they could work alongside tools such as regulation and biodiversity offsetting.
- Develop an integrated land management policy framework, which facilitates the deeper integration of forestry and agriculture. Explore the potential of reforestation as a cost-effective approach to mitigating carbon emissions.
- Perverse EU rules such as the crop diversification rule should be reformed or abandoned.
- Transpose the key environmental directives that govern the environment — notably the Water Framework Directive, and the Habitats Directives — so that there is no period post-Brexit in which no laws apply.

Policy Exchange

This major new Policy Exchange report sets out the once in a generation opportunity that Brexit offers our nation to reform its agricultural and environmental policy.

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After an overview of the evolution and framework of public policy and intervention in the area, this report outlines opportunities to improve policy by focusing on four main interest groups: consumers, producers, the wider rural economy, and the environment. Particular focus is given to the subsidies and tariffs that shape the current situation and are in urgent need of addressing. It is argued that abolishing tariffs on food products will unlock new trade deals and deliver cheaper food for consumers. It is also proposed that the agricultural subsidies regime should be reformed to focus on rewarding environmental externalities, such as increased biodiversity and flood prevention.

This report offers timely and comprehensive analysis and answers to some of the most pressing policy questions of our day.

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