

uk2020

**Innovation in Agriculture, Fisheries
and the Environment post-Brexit**

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Introduction

In *UK agricultural policy post-Brexit*, we made the case for the United Kingdom to leave the European Single Market and the Customs Union on the basis of the benefits which global free trade would bring all consumers. In particular, the effect of removing tariffs on food, clothing and footwear will do its greatest good for those on the lowest incomes – including those in rural areas – for whom such products represent the greatest share of outgoings.

There is great debate in rural areas about the continuance of current farming subsidies after Brexit and their nature. In some ways, however, this is akin to looking through a telescope from the wrong end. Leaving the Customs Union and lowering the prices of food, clothing and industrial materials benefits all consumers, particularly the most disadvantaged, many of whom live in rural areas. Professor Patrick Minford has forecast a 10% fall in food prices, saving £305 per household per annum, or some £8.2 billion overall. That, therefore, should be the key priority.

Happily, leaving the Single Market and Customs Union is now Government policy, and we have seen the willingness of countries across the world – Australia, China, India, Japan, New Zealand, the United States – to enter into free-trade agreements with us after Brexit. We are thus well placed to prosper and, even in the absence of any deal with the EU, must continue to recognise that no deal on trade is far better than a deal which ties the UK into the European regulatory framework and so takes opportunities off the table.

We will, for example, be able to remove immediately the absurd tariffs on foods which we produce little of ourselves – representing a 14% saving on bananas, 8.8% on melons and 20.5% on tomatoes. Such moves can lower the cost of living by 8% and, by introducing competition across the economy, bring about a total gain of 6% to GDP.

Our post-Brexit approach to agriculture must be global in its outlook and must, correspondingly, move away from subsidies and protectionism. It is vital to recognise at the same time, however, that for all the benefits to all consumers, such a change may create potential problems for the much smaller proportion of people in the agricultural sector which must be addressed.

Public procurement

I am confident that food producing areas have nothing to fear from global free trade. British farmers can compete on the world stage, breaking into markets presently denied them. The CAP has failed as a policy for food production – the UK's self-sufficiency rate of 61% in 2015 was 1% lower than in 2014, but 13% lower than 20 years ago. We can learn the clear lessons from countries like Australia and New Zealand, who moved away from subsidies in the 1980s. We must free producers to embrace the most advanced and most effective technologies to boost their productivity.

The food chain contributes £85 billion per year to the UK economy, supports 3.5 million jobs, and provides 62 per cent of the food we eat. The food and drink sector is the UK's largest manufacturing industry – bigger than cars and aerospace combined; it employs one in eight people. Many of these jobs are located in rural areas, and a UK policy must encourage import substitution and the export of quality products.

Public procurement by hospitals, schools, defence and prisons is worth £2.4 billion per annum and represents around 5.5 per cent of food service sector sales. We must direct this procurement towards UK producers to provide a baseload demand, and create an expectation for authorities to source nutritious foods of the highest standards, and farmers empowered to supply those products.

In accordance with the 2014 Bonfield Plan and fully compliant with WTO rules, it must be made easier for procurers to deliver an efficient service via a straightforward consistent process, which in turn provides a clear message to suppliers as to what is required. We can thus encourage more SMEs and local suppliers to the market, with systems of assurance in place to maintain a close alignment between procurers and suppliers.

A key part of this toolkit is the “balanced scorecard” for procurement decisions. This scorecard is entirely compatible with Government Buying Standards, ensuring a baseline of nutritious and sustainable produce, but goes beyond them. Straightforward criteria such as cost are weighed against more complex themes of resource efficiency, animal welfare, health and wellbeing and so on. In so doing, priorities such as farm assurance and waste management can be built into decision making; suppliers should be encouraged to familiarise themselves with these criteria and register with the procurement portal to boost them in competing for public-sector contracts.

Maintaining agricultural support for market failures

There are, however, certain areas of the rural economy which could not survive simply by producing food, and these we should continue to support generously for the enormous public good which they do in maintaining and nurturing the environment, on which sits a £30 billion annual tourism industry.

For those areas, we can look to the successful policy in Switzerland, where particular services are remunerated through direct ecological payments with the aim of creating valuable plant and animal habitats. Farmers are rewarded for extensive meadow land, permanent flowery meadows, preserving natural field margins, reed beds, hedges, copses and wooded river banks amongst others.

A key facet of the Swiss approach is its significant support for Alpine farmers, exceeding CAP payments. Many of these farmers would struggle to compete on the basis of food production alone, but are crucial to the environmental maintenance of the Alps. Every summer, some 220,000 sheep, 20,000 goats, 120,000 cows and 350,000 calves spend three months on

upland pastures, and farmers receive payments for this transhumance on the condition that they farm in an environmentally-friendly manner.

In the same way, we can explore the introduction of “Land Management Contracts”, allowing farmers to enter into agreements with the Government as to the public benefit that they will deliver, and what they will receive in return. Such schemes must offer a sound commercial option to businesses, with a commitment to simplicity of administration and light-touch bureaucracy. A straightforward metric must be devised which focuses long-term outcomes – such as the delivery of clean water, soil management or the creation of new habitats – and is sensitive to the precise needs of the local environment. Thus, contracts could be individually tailored to suit the local – rather than national or supranational – objectives.

If these contracts are to be a success, they must be long-term – perhaps on a scale of 10 years – rather than in constant need of renewal. To that end, we ought to begin pilot schemes now as we move from the old regime to the new in order to provide vital practical insight into the details of good design and management.

In essence, public money should be used to compensate market failures. Environmental benefits are one such example, but improving rural connectivity is equally vital if we are to stimulate the rural economy.

For the first time in the history of humanity, there is the potential for those in rural areas to overcome the innate disadvantage of their remote location. But that disadvantage will only be exacerbated if communications continue to improve in towns and cities and not in rural areas. Good transport links, better mobile coverage (currently dire and deteriorating in the countryside) and fast, reliable broadband must thus be key priorities for unlocking rural enterprise. Openreach is committed to delivering superfast broadband to 95% of the UK’s 30 million premises by December this year. This appears to be great news, until one considers that the remaining 1.5 million premises are disproportionately in rural areas; yet further investment is extremely hard to justify in commercial terms.

This failure is definitely holding back rural development and this most recent but most vital public utility is, therefore, a justifiable use of public funds. Connecting the countryside as well as the town will usher in unprecedented opportunities for businesses to thrive and create productive employment opportunities. The future of the countryside can, therefore, be a mixture of productive farming – with new technologies making for ever more efficient harvests – tourism, recreation, conservation, and well-connected businesses ensuring a sustainable, prosperous and self-sufficient rural economy.

Another interesting case of market failure is the need to support farmers and the meat industry for maintaining high animal welfare standards. The British Veterinary Association are right that “a market exists for high standards of animal welfare” and with expanding global trade, it must be ensured that food labelling reflects the different conditions and regulations under which food has been produced, and that all produce sold in the UK meets Red Tractor Standards.

But we can go further, and where we insist on a practice which makes a farm less efficient, we should be prepared to compensate it. It was a mistake made in 1998 when John Gummer introduced a ban (not adopted in the EU until 2013) on the intensive stall-and-tether system for pigs. British farmers lost out to their Continental counterparts – with some driven out of business altogether – and received no rewards for the good that they did. Consumers simply bought imported pork products from countries which maintained more efficient but less humane production systems.

It is quite apparent that the majority of the British people take a keen interest in animal welfare, and would be horrified by some current abattoir practices designed to cater for religious minorities. However, unnecessarily large quantities of Halal meat are being produced, exceeding the demands of religious groups and now being sold into the conventional supply chain. Considering that these slaughter techniques were established to ensure meat was safe before the invention of refrigeration, there is now no health excuse for them. At the very least, we must ensure that all animals are stunned prior to slaughter, following the example of New Zealand, whose lamb exports for the Middle East are all stunned.

Free trade and subsidy reform

Whilst support will be maintained, we must recognise that moving away from production subsidies is a prerequisite for forging new trade deals. Abandoning the CAP thus affords an opportunity for far-reaching subsidy reform; we ought to be open to learning lessons from across the world, including New Zealand, which abandoned production subsidies in the 1980s.

Those reforms were born of necessity: Government debt had increased from under 10% of GDP in 1976 to 41% by the mid-1980s, signalling a looming public debt crisis. Nonetheless, the removal of subsidies had the effect of increasing the sector's incentives to respond to market signals by adopting new methods of production. It is significant that the reforms provided only very limited transitional support to assist these changes, and by and large they were left to be taken as business decisions. The farmers themselves were thus given responsibility for their own commercial viability.

New Zealand subsidies had risen to 34% by 1983, as given by the OECD Producer Support Estimate, and were consequently the overwhelming influence on farmers' decision making. As a result, a nation of 3.5 million people had 70 million sheep, and soil erosion became a serious concern, with ever more unsuitable land being used for unsustainable flocks. By 1983, as the OECD reported, the situation had worsened to such an extent – with no market and no room for storage – that the New Zealand Government ordered six million tonnes of sheep meat to be turned into fertiliser.

In the 30 years since, sheep numbers have more than halved, but a spectacular increase in productivity has meant the New Zealand still produces a similar quantity of meat. By

2012/13, lambing percentages had increased by 23% and lamb carcass weights by 27% over 1990/91, which is a convenient base year in which any residual effects of subsidies were negligible. Over the same period, the weight of lamb sold in kilograms per ewe has increased by 89%, and milk solids per dairy cow have increased by 31%

As well as the removal of protectionism, pro-active work on market access has been a vital component of this remarkable progress. New Zealand approached trade liberalisation from many angles, and today has free trade agreements with all 10 nations of ASEAN, and is the only country in the world to have separate arrangements with China, Hong Kong and Taiwan.

New Zealand's food and drink exports have grown at a compound annual rate of 8.3% per year over the last 15 years. That rate has been 15% per year for the last decade for processed foods, and nutraceuticals have seen an annual growth of 18%. Drinks, led by wine, have achieved annual export growth of 24% in the 15 years to 2010. Wine exports alone have increased from \$10 million in 1984/5 to \$1.6 billion in 2016.

The horticultural sector has been among the chief beneficiaries of the move away from subsidies. Prior to the reforms, it exported little as the subsidies to meat, wool and dairy far outstripped those to horticulture. In 1983/4, for example, New Zealand exported \$42 million worth of kiwi fruit and \$140 million of horticultural products, but by last year kiwi exports alone were over \$1 billion, with total horticultural exports around to \$4 billion.

The benefits of controlling its own regulations – what former New Zealand High Commissioner Sir Lockwood Smith calls “the value of unilateral liberalisation” – have also come to the dairy industry. New Zealand produces only 3% of the world's milk, insufficient to grow its economy alone. It must instead add value to milk from abroad.

It does so through joint ventures with other countries, using its position at the WTO. One project with the Netherlands exports lactose, a by-product of Dutch cheese production. Another in the UK turns this into galacto-oligosaccharide and produces whey for infant milk formula and other milk products. As a result, Sir Lockwood concludes that “We produce only 3% of the world's milk, yet we control over a third of all international trade in dairy products.”

The changes have also stimulated new industries. New Zealand had no deer industry and exported no venison in 1984, but the national deer population is now around 2 million and the earnings from exports are in excess of \$100 million.

This independence gave rise to several industry-led initiatives with the aim of improving the sustainability of the New Zealand agricultural sector. A range of voluntary codes of practice, for, among others, the pork and logging industries were drawn up, along with guidelines for grazing and the responsible use of fertiliser. These projects were born not only of the general consideration of sustainability, nor in the face of potential regulatory pressure, but also in response to changes in the market. It is well known, for instance, that consumers are

increasingly concerned with how a product is produced, and there is consequently a market incentive for farmers to establish demonstrably sustainable, environmentally conscious means of production.

The reforms also had a positive environmental impact by reducing the use of fertilisers and pesticides, decreasing pollution levels in rivers, reducing the farming of marginal land and increasing biodiversity. Land clearance and overstocking, which had been major causes of high levels of soil erosion, were stopped. The production of livestock has instead been intensified on better land rather than hills prone to erosion, and hills have been reforested leading to a million hectares or 50% increase in area under plantations.

New Zealand is not the only country to have benefited from such radical reform. Since the 1980s, Australia has moved from a heavily regulated agricultural market, including price controls and financial support, to the third-least subsidised agricultural sector in the world.

The results have been remarkable. Australia has signed 9 free trade agreements in the last 12 years, and trade liberalisation has reduced the cost of everyday items for consumers, allowing them to spend more money in the rest of the economy. Meanwhile, family-run farms (which make up 99% of the sector) have seen reduced input prices allow them to compete globally, as one of the most successful agricultural sectors in the world, without the need for subsidies. The Australian High Commissioner Alexander Downer was a vocal proponent of these reforms as MP for Mayo. The dairy farmers of the Adelaide Hills – the core of his Liberal Party vote – were furious, but have prospered since, either by selling or consolidating their farms or by diversifying into wine.

Alexander Downer is absolutely right when he summarises the Australian outlook:

“I am not aware of any country that has become rich by being protectionist, or by following an economic model based on import substitution. Hermit kingdoms are not happy, wealthy or successful. Protectionism hinders, rather than helps, an economy.”

New technologies

Global free trade, therefore, presents a host of new opportunities for British farmers and growers. But the first priority in growing the rural economy must be to increase food production and in those areas where production is a viable source of income, the key to future success lies in the uptake of new technology. From automation to bio-technology, we must be alive to the opportunities of innovation in seeking to offer farmers the greatest freedom to grow their businesses and consumers the greatest choice of products at the best prices, all the while conserving and nurturing the natural environment on which we all depend.

It is an appalling indictment of the EU regime’s extreme technological risk aversion that the world’s largest chemical company, BASF, has abandoned all further biotechnology research for the European market. Their entire blight-resistant potato project has moved to the USA,

which was terrible news for a constituent of mine who rang me to say that he had sprayed his potato crop 15 times that season, and that developing GM blight-resistant potatoes was the only solution.

The UK stands to be a world leader in the biotechnology sector. The Bio-Industry Association reports that UK biotech companies raised £1.13 billion last year, making us already the world's third largest biotech hub in financial terms. We are home to the world-class facilities of the John Innes Centre, Harper Adams University, Rothamsted Research and others, whose developments stand to have massive implications for farmers and growers in the years ahead.

I took Michael Gove to Harper Adams last month. We saw the Hands-free Hectare and I was particularly interested to see a robotic strawberry harvester at work. The machine moves smoothly along a row, analysing each strawberry against a memory bank of images to determine its ripeness. Diseased strawberries are discarded, unripe fruits are remembered for a later pass and ripe examples are picked with its arm and placed into a punnet. When the punnet is full, it is packed and loaded ready for shipment. The crop can thus be taken from the field to the consumer without having been touched by human hands.

The potential ramifications of such technology — improved efficiency, better hygiene, significant labour savings — are enormous, and developments like this ought to form the bedrock of our new agricultural outlook, so long held back by European policy.

Immigration and labour arrangements

This technology will take time to adopt, so in the short term we must make sure that UK farmers have access to sufficient supplies of labour to remain profitable and competitive. The UK must continue to provide a welcome to both seasonal and non-seasonal migrant workers with the right skills to allow businesses to invest and grow. In addition, the status of non-UK nationals currently employed here must be guaranteed as soon as possible.

There are an estimated 67,000 seasonal workers of non-UK origin, chiefly from Eastern European countries inside the EU, in UK agriculture. Assuming an end to the Free Movement of Labour, a new Seasonal Agricultural Workers' Scheme will have to be devised and put in place before the end of the current free movement arrangements. The last SAWS was removed in 2013 after freedom of movement was extended to Romania and Bulgaria, and had a limit of 21,250 people. The scheme included licensing schemes for business, ensuring that safety, workers' rights and welfare standards could be maintained, and any new scheme ought to be similarly constituted.

There is a precedent for the success of such approaches in the form of New Zealand's Recognised Seasonal Employer Scheme (RSES), first introduced in April 2007, which allows up to 8,000 workers — chiefly Pacific Islanders — into New Zealand on a seasonal basis. The scheme has been suggested as an international best practice by a study for the World Bank, bringing benefits to migrants as well as the sending and receiving countries.

Unlike the British SAWS, the New Zealand scheme includes a Resident Labour Market Test, ensuring that employers take reasonable steps to recruit domestic workers into available positions. Employers under RSES are also required to pay the market rate for work being carried out to avoid a local workforce being undercut by immigrant labour, and must bear the cost of repatriation if worker becomes illegal.

What is true for labour arrangements must also hold for educational opportunities. Agriculture is the fastest growing subject at UK universities, with student numbers increasing by 4.6% last year. More than 19,000 people are now studying it, and it remains one of the best options for students' future employment prospects. In 2013/14, for instance, 96% of graduates from Harper Adams University were either employed or engaged in further study six months after completing their course. The opportunities which leaving the EU provides in attracting the brightest students not only from Europe but around the world can ensure that this sector can continue to thrive.

Glyphosate and no till

Farmers are used to adapting to changing times. To take one example: A farmer in my constituency, Tim Ashton, has become an enthusiastic advocate of no-till farming, eliminating all ploughing.

Before the repeal of the Corn Laws, Shropshire was predominantly an arable region, but turned to livestock and dairy as circumstances changed. Farmers like Tim Ashton are now adapting once again. Looking ahead to a sector possibly without subsidies, he is changing his methods of producing arable crops and is seeing spectacular results with no-till. He has cut his production costs by 60% and can now compete on world prices with Kansas, Argentina and Australia.

The new technology also allows for new systems of soil management. The soil provides a habitat for an extraordinary diversity of species and providing ecological services worth some £1.5 trillion to the global economy each year; improvements, and in particular no-till farming, can see it thrive still further.

Soils managed with no-till can improve water filtration and storage (and so reduce flood risks), and reduce the cost of crop production, the levels of soil erosion and diffuse pollution. As a result, no-till techniques can greatly reduce the environmental impacts and enhance the sustainability of agriculture.

When I visited Tim with Michael Gove last month, he told me that he had now given up counting the barn owls on his land, so abundant had they now become. Given the long-term and wide-ranging benefits which no-till provides, growers could be supported by the taxpayer through the transition process as part of the wider scheme to reward farmers for environmental good they do.

However, this all depends upon sanity on glyphosate. Systems like no-till cannot flourish if we continue to equate sustainable, environmentally-friendly farming with practices that are completely without pesticides and herbicides. Glyphosate is critical for no-till producers, providing an effective way to eliminate winter growth without damaging nearby crops or plants and without the need for aggressive ploughing.

Without glyphosate, fighting weeds will be more expensive and more complicated, forcing farmers to resort to extensive ploughing. It has long been regarded as the most effective herbicide available and, as the Agriculture and Horticulture Development Board concluded, “the widespread use of glyphosate in no-till practice does not appear to be an environmental problem.”

Calls for glyphosate to be banned in the European Union have been driven by a study undertaken by the International Agency for Research on Cancer (IARC) which said it was ‘probable’ that glyphosate is carcinogenic. Such claims have been denounced by scientific studies and regulators.

The scientist who advised the IARC, Christopher Portier, received \$160,000 (£121,500) from law firms bringing claims by cancer victims against the manufacturer, and yet did not declare those earnings when he wrote to the European Commission suggesting that it accept the IARC classification.

IARC wrote to the chairman of the US House Science Committee, Lamar Smith, in November rejecting a request for their senior officials to attend a hearing. Congress wanted IARC to address the allegations of its manipulation of its assessment, but IARC Director Christopher Wild simply said that his agency was not in a position to provide any witnesses for a hearing in the United States. Christopher Portier himself is a US citizen, so this seems a peculiar position.

Questions have thus understandably been raised surrounding the legitimacy of the IARC’s findings, and yet a potential glyphosate ban looms, threatening to make British farming less competitive – just as we seek out new markets.

It would be a tragedy if promising new approaches like no till were stopped by nothing more than an aggressive campaign with no scientific basis.

It was good to learn that the British negotiators pressed for a renewal of glyphosate’s licence in Europe in October, since maintaining the technology upon which farmers already rely is vital.

Neonicotinoids

We must, however, be consistent and ensure that outlook prevails across the board as we forge our own policy; it would be a backward step if we were to go ahead with the near-blanket ban on neonicotinoid insecticides.

The EU's ban on the use of neonics, ostensibly to stem a decline in the honeybee population. This might seem a reasonable response, but for the fact that, quite simply, the honeybee population has not been in decline. In Europe, North America and every continent but Antarctica, honeybee numbers are higher today than they were two decades ago when neonics were first introduced. The same is true for wild bees. The observed declines before 1990 ceased or were reversed around the time when neonics were first introduced.

When the ban was first imposed, the EU cited the work of the French scientist Mickaël Henry. M. Henry now confesses that he may have overdosed the bees with neonics in his experiments, as many of us suspected at the time, and admits he has "no real clues" how much insecticide bees encounter in the field.

As a result, the European Commission now concedes that the neonics ban "was at no time based on a direct link on bee mortality." Which raises the questions: Why were neonics banned in the first place and why does the ban still stand?

Though green groups claim that neonics devastate bee populations, there remains much scientific debate over how much neonic residue gets into the pollen that bees consume. The fact remains that there has been no "bee-pocalypse." The reality is that the policy was more influenced by the hysteria of non-governmental organisations and their baseless predictions than a sober analysis of the science. As a result, an increase in insect pests has led to crop losses in fields across Britain and Europe. The rapeseed area planted in Britain for this year was 557,000 hectares, representing a thirteen-year low and continuing a decline which has issued since the ban. In 2016, British farmers lost around £20 million and almost 28,800 hectares of crops due to the ban.

The most recent studies have again supported the view that the three most widely used neonics for flowering crops pose no risk to honeybees when used correctly. Keith Solomon and Gladys Stephenson of the University of Guelph reached their conclusion by analysing 170 studies submitted by Bayer and Syngenta to the regulatory agencies, conducting specifically-developed weight of evidence assessments to gauge the quality of reported data and to compare relevance of results from different studies.

Michael Gove has done some excellent work as Secretary of State at DEFRA. His forging ahead with a domestic ban on ivory sales in particular will have enormous benefits to elephant conservation in Africa. But I would not be a candid friend if I did not say that his decision to ban almost all neonics is a mistake.

Their key advantage lies in the fact that they are not usually sprayed on a crop, but inserted into the plant as “seed dressing”, making for less damage to non-pests. This means that farmers need not repeatedly use older and more dangerous sprays — including pyrethroids — which contaminate water courses, pose a threat to aquatic life and which, in any case, are ineffective as pest populations quickly become resistant to them.

Michael Gove has said very little about how he anticipates farmers protecting their crops from aphids and other pests without neonics. Are they to use older, more damaging and less effective sprays, or are they to give up growing crops all together? Such questions need answering urgently if arable farming is not to become another casualty of wrong-headed European thinking.

Chlorinated chicken

Another example of such thinking came this summer, with the debate on whether American chickens washed in chlorinated water should be allowed to be sold in the UK as part of a new trade agreement with the US.

Chlorinated disinfectant processes are nothing new. They are allowed by the WHO and Codex Alimentarius, and the European Food Safety Authority has raised “no safety concern” over the active substances – chlorine dioxide, acidified sodium chlorite, trisodium phosphate and peroxyacids – used in the rinses. More recent studies have corroborated both the safety and the effective anti-microbial activity of chlorine dioxide, as well as suggesting that spraying does not select for increased resistance of carcass bacteria to subsequent anti-microbial drugs. In any event, the doses of chlorites and chlorates consumed by eating chicken – which are lowered still further by evaporation during cooking – are so low as to be negligible in relation to human health.

The recent concerns, therefore, seem overblown, particularly when one considers that chlorine rinsing is used on other products in Europe with no discernible adverse effects. A number of European countries, including Belgium, Denmark, France and Switzerland, routinely use chlorine rinses to disinfect fish, often eaten raw so there is no evaporation during cooking. In the UK, a study by the Food Standards Agency’s Committee on Toxicology revealed that “in a 150g bag of salad, there would be less chlorine and chlorination by-products than is permissible in a 250ml glass of tap water” and concluded that the results “did not indicate any cause for concern with respect to the presence of chlorination by-products in prepared salads.”

These considerations ought, surely, to form the core the debate, and yet, almost immediately, the discussion has been framed along the lines of the traditional EU argument: Chlorine washing is simply an excuse for unsanitary practices, so there is as a clear choice between hygienic poultry farming and that dependent upon chlorine washing. When Michael Gove says “we are not going to dilute our high animal welfare standards or our high environmental standards in pursuit of any trade deal” he is right, but our focus in pursuit of

those standards must be driven by tangible health outcomes. Certainly, there is no reason that hygienic husbandry and chemical disinfectants cannot go hand in hand.

If the European view were true, for instance, and “fork-to-farm” practices were to be unambiguously preferred over disinfectants, we might expect the prevalence of food-borne disease to be higher in the USA than the EU. Campylobacter and Salmonella are obvious candidates to examine for this kind of assessment; the EFSA estimates that some 64% of isolations of Salmonella Enteritidis in food are from poultry, and the UK FSA has demonstrated the direct relationship between falling human cases of Campylobacter here and a decrease in the number of highly-contaminated chickens.

Comparing the prevalence of these two diseases in the USA and the EU is revealing. Per 100,000 of population, it is estimated that the EU sees 71.0 cases of Campylobacter compared to 13.45 in the USA, and 23.4 cases of Salmonella compared to 15.45 in the USA. Differences in methodology mean that such figures cannot, of course, be considered definitive, but at the very least they demonstrate that American practices keep the vast majority consumers safe from these most common of food-borne diseases, particularly noting that Americans consume over twice as much chicken per head as Europeans.

What right, then, has the Government to forbid British consumers from buying a clearly-labelled cheaper product, produced by safe and effective means, should they so choose?

None. The Government does not have the right to deny consumers a choice of products and prices, nor the right to deny farmers the use of every safe, effective tool at their disposal. Nature cannot be cowed or coerced by hysteria or sentiment. We must be rigorous and level-headed if we are to forge the best possible future arrangements in the best interests of consumers and farmers alike.

The beef hormone controversy

The same approach must be brought to bear in our approach to the long-standing debate over hormones in American beef. The European Union banned imports of beef containing artificial growth hormones in 1989. WTO rules require any such bans to be health and safety measured based upon valid scientific evidence, and when the United States took the EU to the WTO’s Dispute Settlement Body, the WTO ruled against the EU.

The dispute continues, typifying the EU’s intransigence and a tendency for sentiment to cloud scientific judgement. In designing our own policy in future, we must ensure that we maintain a sense of perspective.

It must be remembered that beef from an (uncastrated) bull without added growth hormones typically contains testosterone at levels more than 10 times higher than those from a (castrated) steer to which hormones have been added. European beef is primarily sourced from bulls, whereas hormone-treated American beef is mostly from steers, so for all

this decades-long dispute, American beef generally contains lower levels of hormones than most European beef.

We eat a great many foods containing far higher hormone levels than those found in American beef. To take one example, one would have to eat some 6kg of oestradiol-treated beef to equal the amount consumed in one hen's egg.

Moreover, the levels of oestradiol, progesterone and testosterone arising in treated animals are far lower than their production in humans. A 500-gram portion of beef from an oestradiol-treated animal contains around 15,000 times less than the amount produced daily by the average man, and about nine million times less than the amount produced by a pregnant woman.

Once again, an emotive subject has been used to further a protectionist agenda, with little basis in scientific fact. We must resist this approach across the whole range of policy making if we are to take full advantage of our independence from Brussels.

Genetically-modified organisms

Few technologies have been more emotive or more derided than genetically-modified organisms. Viewed from any kind of rational standpoint, the current developments in GMO technology is merely the natural development of the kind of husbandry that mankind has been practising for millennia. We have bred and crossbred plants since the Stone Age in order to modify their genetic makeup, producing higher yields and promoting resistance to pests and disease. By the 19th century, with the principles of Mendelian inheritance understood, we reached a position in which, as the author Henry Miller noted, “virtually everything in North American and European diets has been genetically improved in some way.”

It is not even true – as many of the environmental activists claim – that GMO technology allowed the transference of genes between species for the first time. For more than fifty years, “wide cross” hybridisation has been doing exactly that, notably in combining the attributes of wheat and rye to create the high-protein, high-fibre, low-sodium grain triticale. Induced mutation breeding, using ionising radiation or caustic chemicals, has been routine since the 1950s. The only difference with the GMO technology pioneered in the 1980s is that it eliminates the guesswork. A single gene, or several specific genes can be transferred from one plant into another, making a GMO nothing more than a plant that has had its genetic makeup adjusted with the highest degree of precision.

Why, then, should the activists and the lobbyists so protest, when they are perfectly content for the products of more traditionally genetically-modified procedures – even those produced by radiation or chemical baths to induce random mutations – to carry the organic label?

Indeed, the precision of GMOs makes them inherently safer; unwanted characteristics are incredibly unlikely to make their way into a GM plant, but there are no such guarantees from random breeding. Every step in the creation of a GMO is closely monitored. In the USA, for instance, the Environmental Protection Agency (EPA), Food and Drug Administration (FDA), and Department of Agriculture (USDA) require safety tests on every GMO crop before it comes anywhere near the dinner plate.

The results speak for themselves. Quite apart from the potential health benefits that GMOs can bring – eliminating allergens, guarding against contamination for mycotoxins and so on – the simple facts that from over two trillion meals served containing biotech crops, nobody has ever made a credible claim of adverse reaction.

The potential for GMOs – safely and precisely – to alleviate food scarcity is vast. At present, various types of malnutrition affect almost 2 billion people around the world. It accounts for the loss of 3 million young lives each year and stunts the growth of one in four children. If we cannot feed ourselves properly now, then how can we expect to do so with our present practices when the global population reaches 9.8 billion in 2050?

Manifestly, better approaches are needed and embracing biotechnology holds the key to that progress, particularly in the developing world, where – year on year – more biotech crops are planted than the developed world. In South Africa in 2014, for example, GM maize was beginning to bring enormous benefits to the local smallholders. Production had soared from 1 tonne per hectare using convention seeds to 5 tonnes per hectare with the GM seed. The crop which they harvest can withstand droughts and destructive pests, ensuring the farmers an income and spurring development still further. Once they had improved their irrigation, farmers expected see an increase to 10 tonnes per hectare.

Such approaches stand firmly in the tradition of the Green Revolution started by Norman Borlaug. Many of us will remember the traumatic news bulletins of the 20th century with images of starving people on the Indian subcontinent. Borlaug, put an end to this shame. He is now known as “The man who saved a billion lives” and was awarded the Nobel Peace Prize for his pioneering work in transferring wheat with new genetics from the Americas to the Indian subcontinent in the 1960s. He used genetic modification to save a billion lives from starvation, and now India is a net food exporter.

Yet still, the hostility persists, and nowhere more virulently than in Greenpeace’s war on Golden Rice. It was developed at the end of the last century by Professors Ingo Potrykus and Peter Beyer, and is enriched with vitamin A-producing beta-carotene. In 2001, they donated their invention to the world in the hopes that it would be used to end the scourge of vitamin A deficiency, which is the principal cause of childhood blindness globally.

Had Golden Rice been a part of their diet, millions of young eyes and millions of young lives, primarily in Africa and South Asia, would have been saved. The Golden Rice Humanitarian Board lays the blame for their crop’s delayed development firmly with political suspicion and interference. Greenpeace, with its \$500 million war chest, has rallied the forces of green

privilege in a global campaign to frighten the public about GMOs and to pressure governments into keeping Golden Rice off the market.

The Humanitarian Board believe that their project should have been where it is today, with the major part of a regulatory package finished, in around 2006, 11 years ago. There are now fewer deaths among children under five than there were 10 years ago, down to 16,000 per day from 26,000 per day. But they estimate that this death toll still equates to around 4,500 preventable vitamin A deficiency related child deaths daily, and many of them in countries where rice is the staple, usually grown close to where it is consumed.

It is small wonder that 129 Nobel Laureates denounced the Greenpeace campaign against Golden Rice in 2016, saying “Opposition based on emotion and dogma contradicted by data must be stopped” and asking “How many poor people in the world must die before we consider this a “crime against humanity”?”

Releasing land

It has been estimated that by embracing such technology, less land will be needed, by an area larger than India, to feed the 9.8 billion people of 2050 than is presently required to feed today’s 7 billion. Indoor vertical farming based on hydroponics may accelerate the rate of change yet further.

In sharp and frustrating contrast, Europe’s reluctance to adopt the latest innovations in agriculture diminishes potential yield and uses up more land than is needed.

US maize yields have overtaken those of France in the last 20 years. When I made this point in 2015, French yields were around 0.9 tonnes/hectare behind American yields. Now, France is missing out on over 3.5 tonnes per hectare compared to the US, amounting to a total loss of 5.6 million tonnes across its 1.5 million hectares. If France had kept pace with US technology, that crop could be worth an extra £600 million to French agriculture, or else France could free up 500,000 hectares currently used for the maize crop and put it to use for wildlife, recreation, or forestry.

It is thanks to innovation that the amount of land needed to produce a given quantity of food, averaged over all crops and animals in proportion to their contribution to human diet, has fallen by 68% since 1960. According to Indur Goklany, if that had not happened, we would currently need to farm 82% of the land area of the planet to support today’s population, instead of the 34% we do farm. Farming to such an extent would be impossible; many of the currently unfarmed areas are not sufficiently warm, moist or fertile to produce food on any scale. It would have meant destroying all remaining rain forests, nature reserves and national parks.

It is clear, therefore, that agricultural innovation helps to reduce the footprint of human activity and releases land for nature. According to Jesse Ausubel’s calculations, on current trends we will be able to release a vast area from agriculture during the current century, even

while population continues to increase. It is a myth that more food leads to more people; it is the other way round. Famine and high child mortality were significant causes of high fertility in the past. Low child mortality is the main cause of low fertility as people plan smaller families.

This notion of “sustainable intensification” or “land sparing” needs to be incorporated into British farming policy. We will do more for nature here by allowing farms to be intensive and competitive, whilst also insisting that wildlife areas are managed intensively to help wildlife. A properly managed, fertilised and weed-controlled bird-seed crop is far more use to yellowhammers than an equivalent area merely taken out of farm production and left to grow rank cocksfoot grass.

Global co-operation and global bodies

As an independent nation, the UK can take the lead in championing innovation, reaffirming our commitment to global development on all fronts. By its very nature, environmental policy must be global in scope, and it has been organised as such since long before the EU came into existence.

We have long provided a strong lead in steering international conventions and agreements. We were a founding nation of the 1979 Berne Convention on the Conservation of European Wildlife and Habitats, and early signatories to both the Washington Treaty, establishing the Convention on International Trades in Endangered Species, and the Ramsar Convention for protecting wetlands.

But to the voices of the Left, global agreement has become synonymous with centralised, over-mighty administration, just as global co-operation has been conflated with uniformity of implementation. Global problems, they assert, can be addressed only by supra-national governments, given the power to make and implement laws over vast areas by a corresponding dilution in the sovereignty of nation states.

The weight of history, however, is against this view. Democracies have a far better record of preserving the natural environment than do unelected governments of whatever shape. Examples abound of the failures of tyrannies and bureaucracies, from the drying up of the Aral Sea in central Asia as a result of a Soviet irrigation policy — described by former UN Secretary General Ban Ki-Moon as “one of the planet’s worst environmental disasters” — to the desperate consequences of the Common Agricultural and Fisheries Policies.

The EU has prioritised bureaucratic compliance above all else in seeking to impose common environmental outcomes across the continent, but common outcomes are at best ill-suited and at worst actively harmful to the diverse range of environments to which Europe is home. This misguided approach in turn brings about catastrophic misrepresentations and misuses of the very global conventions which they claim to be upholding.

The absurdity of this one-size-fits-all thinking is no more clearly highlighted than the pan-European approach to protected species. Each year in the UK, over 1,000 licences are applied for by developers to remove great crested newts from their sites, with one project spending over £1 million on catching 150 of them. The licences are in place because great crested newts are a protected European species, but the rigid, prescriptive nature of the licensing process has long maligned the newt as a disproportionate barrier to much-needed development.

Recently, however, Natural England have trialled a new scheme, using DNA mapping to save considerable time over traditional surveying techniques and guiding development quickly toward more suitable sites. Natural England have suggested that it may “no longer be necessary to catch and relocate any newts found on the development sites” with new populations instead “strengthened through habitat improvements so there is no threat to their conservation status.” This is exactly the sort of tailored, locally-informed scheme which an autonomous environment policy can provide much more widely.

Leaving the EU means that the UK can retake a full seat on the world bodies that determine global regulation, at which we are currently represented by the EU collectively. These include the WTO, the World Organisation for Animal Health (OIE) and the Codex Alimentarius Commission, which regulates guidelines on food and food safety.

Taking our own place on the International Plant Protection Convention, for example, would give us a far stronger voice in addressing the diseases which are becoming more and more prevalent as globalisation encourages the international trade in plant products. By taking back control of our own borders, we can learn robust lessons from Australia and New Zealand, establishing the UK as a haven for healthy plants, which can then be safely and profitably re-exported.

Retaking these seats will not only see us regain our right to vote in such bodies, but also our right to initiate new standards and propose amendments to existing ones. We will, once again, be free to co-operate with long-standing Allies across the Anglosphere and the Commonwealth. We are thus well placed to give global leadership to ensure a viable and sustainable environmental future.

Biodiversity offsetting

It should almost go without saying that conservatives care deeply about the conservation of nature, yet in a small and heavily-populated country such as ours, there will always be developments or infrastructure projects that require compromises between economic or social benefits and the natural environment. Foremost in our minds in such circumstances should be whether environmental damage can be avoided or mitigated and, as Edmund Burke noted, we “should not think it amongst [our] rights to cut off the entail, or commit waste on the inheritance, by destroying at [our] pleasure the whole original fabric of their society; hazarding to leave to those who come after [us], a ruin instead of an habitation.”

Development should be assessed according to the “mitigation hierarchy”. In the first instance, harm should be avoided by relocating to a different site. If this is not possible, then the impacts should be mitigated through, for example, the detailed design of the development. Where there is unavoidable damage, however, we should still look to preserve, sustain and improve the environment through a system of biodiversity offsetting. That is, whenever a development entails a degree of environmental damage, an equal or greater amount of environmental value is added to another area. In so doing, offsetting guarantees that there is no net loss to biodiversity from development; it often leads to a net gain.

Offsetting would not change existing safeguards in the planning system. It would make it far simpler and quicker to agree the environmental impacts of a development and to ensure any losses are properly counterbalanced. A standard framework for evaluating impacts coupled to a national metric ensures consistency across the country so that small and large developers alike are freed from the burden of tackling diverse local approaches. A less complex process can reduce costs for all concerned parties. It can also help to create a ready market for farmers, landowners and environmental organisations to supply the necessary compensation and provide long-term opportunities for investing in habitats and biodiversity. It would thus sit well alongside schemes to reward farmers directly for their environmental work.

Over 25 other countries, including the United States, Germany and Australia already use offsetting; we should embrace the lessons to be learnt from abroad. Not all of the precise details of the models in use abroad would be applicable here, but they demonstrate that the offsetting principle can work effectively. In Australia, for instance, offsetting has reduced the number of applications to develop on native grassland by 80%. The Ecosystems Market Task Force proposed that offsetting be adopted here as its first priority recommendation, saying:

“Government should clearly signal its intention to mandate a national system of biodiversity offsetting across England, in which planning authorities are required to use offsetting to deliver a net gain for nature from all new developments.”

Along with six pilot schemes which ran between 2012 and 2014, the Thameslink Programme provides a useful example of the approach at work. The £4.6 billion upgrade to one of the busiest stretches of railway in Europe takes in sites from urban depots with little vegetation, scrub-covered railway embankments in Greater London and woodland areas in the surrounding countryside. As a result, the project needed to address a number of biodiversity concerns, including green corridors, linking habitats and migration routes for protected species.

In the first instance, Thameslink sought to avoid and mitigate the environmental consequences of the project by reducing the amount of vegetation to be cleared and relocating certain infrastructure. Where such mitigation was not possible, however, Thameslink looked to offset its residual losses. Around 1500 trees were planted in

Heartwood Forest and a 700 m² brown roof has been constructed at Farringdon Station to provide habitat for invertebrates.

The central aim of offsetting is to provide a system which properly values the natural environment, with environmental value considered from the very start of planning and development processes. Such a system would in turn provide opportunities for landowners, and certainty for developers and the environment.

A successful offsetting scheme requires a thorough, long-term evaluation of the UK's natural capital. Our natural assets include forests, rivers, land, minerals and oceans, which the most recent ONS figures from 2014 estimate at £497 billion. The work of the Natural Capital Committee, chaired by Professor Dieter Helm, must be continued to provide a framework for future policy. The Committee provides advice to Government on the sustainable use of natural capital, identifying the priorities for natural capital improvement, and in setting the research agenda.

Border controls and invasive species

The problem of invasive species is by some margin the largest cause of extinction in the modern world and damage from invasive species costs an estimated £1.8 billion each year. The red squirrel and the white-clawed crayfish face local and perhaps national extinction as a result of diseases spread by alien grey squirrel and signal crayfish. The intransigence of the EU has meant that, while studies have been completed, effective action has been woefully slow, and the threat to these native species continues to grow.

An invasive flatworm from Brazil – the Obama Flatworm, *Obama nungara* – is a predator of land snails and earthworms, and thus endangers both soil fertility and wildlife. It is already a threat to agriculture in France and is spreading rapidly across Europe. The latest sighting in the UK was a 4.5cm specimen crawling out of a pot plant that had been bought in Oxfordshire having been imported from the Netherlands. There are 18 further invasive flatworm species already in Europe, and the uncontrolled trade in pot plants is rapidly expanding their reach. Some have a yet worse reputation for environmental harm, with the New Guinea flatworm currently in France recognised among “the 100 worst invasive alien species in the world” by the conservation charity Buglife.

All too often, such groups report the arrival of exotic grasshoppers, wasps, beetles, moths and spiders at garden centres and nurseries, many with the potential to cause dramatic damage to native wildlife and agriculture, only to be met with inaction. Increases in global trading have increased the risks of plant disease, and the insistence of the EU on free movement has increased the rate of ash dieback, and put some 80 million ash trees in the UK at risk.

It is thus small wonder that the CEO of Buglife, Matt Shardlow, describes our current biosecurity as “feeble”. The British Isles being islands, however, gives the UK in co-operation with the Republic of Ireland an enormous natural advantage in protecting our landscape from invasive species. With the latest developments in technology and technique, we can

capitalise on that advantage to develop a modern, responsive system to predict, monitor, and control the spread of pests and disease.

By retaking control of our borders, we can implement a system with the kind of rigour found in Australia and New Zealand, to the benefit of our animal and plant health. This will ensure the safety of British trees, plants and animals for generations to come.

Control of our borders will also mean that we can combat the insidious trade of bush meat into this country. 7,500 tonnes of bush meat – including chimpanzees, gorillas, monkeys and forest antelope – are imported to the UK each year according to the Born Free Foundation. A 2010 study found 270 tonnes coming through Charles de Gaulle airport alone. Such meat is enormously dangerous; it has been linked to the increased risks of Ebola and bubonic plague on these shores. Michael Gove has done tremendous work consulting on the long-awaited ban on domestic ivory sales. He must apply that same zeal to tackle these equally serious wildlife crimes.

Tacking control of fisheries policy

Of all the environmental damage that European policy has done, perhaps the worst has been to fisheries. The Common Fisheries Policy has been a biological, environmental, economic and social disaster; it is beyond reform. It is a system that has forced fishermen to throw back more fish dead into the sea than they have landed. It has caused substantial degradation of the marine environment. It has destroyed much of the fishing industry, with compulsory scrapping of modern vessels. It has devastated fishing communities.

In 1995, 9,200 British fishing vessels landed 912,000 tons of fish; by 2002 there were 7,003 vessels landing 686,000 tons. This 25 per cent decline in just seven years meant the loss of on average one fishing vessel per day. In that same period landings dropped from over 900,000 to just 627,000 tonnes annually, with a value of only £770 million.

This decline is all too apparent with an analysis of the UK's fishing imports. By 2015, by which time there were just 6,187 British fishing vessels at work, UK imports reached 680,800 tonnes of fish and 92,500 tonnes of fish products, with a combined value of at £2.784 billion, of which just under a third came from our EU neighbours. To make matters a great deal worse, much of that harvest was caught in British waters, meaning that we are buying back our own fish.

Having signalled our withdrawal from the London Fisheries Convention it is now taken as read that we will abandon this disastrous policy, retaking control of the waters of our Exclusive Economic Zone. We can thus rejuvenate British fishing with a new, bespoke approach to support the country's 12,000 fishermen and the communities which depend upon them.

International relations with specific partners – and particularly our Nordic friends and neighbours – can be managed through the North East Atlantic Fisheries Commission

(NEAFC) of which the Russian Federation, Norway, Iceland, Denmark (representing the Faroe Islands and Greenland) and the European Union are parties. As for a number of international organisations, the UK taking up a full seat on the NEAFC must be a crucial part of the withdrawal process.

Quotas and discards

The CFP's system of fixed quotas has led to appalling levels of discarding. CFP rules have forced fishermen to dump billions of dead fish because they are too small or the wrong species. An estimated million tonnes of fish a year are thrown back as discards, up to a quarter of all fish caught according to some estimates, with even higher rates in some parts. These discards are worth some £1.6 billion annually, or the equivalent of 2 billion fish suppers.

Perhaps the most crucial aspect of a new policy must, therefore be to take measures to prevent discarding. An EU discard ban has been attempted, but has proven unworkable. It simply addressed discards as the symptom, but failed to recognise them as an unavoidable consequence of the quota system. Instead, the practical effect is that discards are simply dumped on land rather than at sea, with some going into landfill. Under such a ban, when a vessel runs out of one species it must stop fishing, even if it has adequate quota for others. This has potentially ruinous economic effects as vessels will be forced to tie up upon exhausting their smallest allocation – the so-called “choke species”.

Refined effort control

Discards are an inevitable consequence of quotas, so the present fixed-quota system must be converted to one based upon refined effort control, which prioritises accurate and timely data collection. The immediate effect of adopting a refined effort control system in order to conserve fish stocks is that government bodies, scientists and fishermen are relieved of having to administer the labour intensive and unpopular quota system. In terms of transition, the basis of the allocation would be one of maintaining the status quo, for whatever time it takes to introduce the new, fully-working system.

This would involve converting existing Fixed Quota Allocation entitlements into their equivalent within a refined effort control system. This will be in the form of Flexible Catch Composition percentages, for which five-year track records of species landed should provide the basis of the percentage catches per species. Once quotas have been converted and attached to licences, it will be necessary to review the catch composition percentages as real, accurate catch data are revealed with each mandatory landing. Flexible Catch Compositions would provide financial and investment stability, whilst avoiding embroiling the Government in a lengthy dispute over investments made in Fixed Quota Allocation entitlements.

Flexible Catch Compositions also provide a degree of individual species control, discouraging a free-for-all “race to fish” by setting targets for a sustainable mixture of species which a vessel should catch. They work based on all catches being landed and recorded, with fish caught over the FCC percentage incurring a penalty in the time a vessel is allowed at sea equivalent to the value of the excess fish.

There is thus no financial incentive to chase high-value or vulnerable species, since this would lose too much of a fisherman’s time. Neither is there any incentive to discard as the time loss never exceeds the value of the excess fish caught; the loss of time is paid for by the fish. Instead, vessels are encouraged to use their time wisely by catching a sustainable mixture of fish, while still being afforded the necessary flexibility which our rich, mixed fisheries demand.

Accurate, real-time information is vital for the success of a refined effort control system, and technological advances make provision for the rapid temporary closure of fisheries in response to risks of excessive commercial catches. Imposing mandatory reporting of all landings further ensures that data collection is as accurate and up-to-date as possible.

Technical improvements in both hardware and software have made the monitoring enforcement of such a system much more effective. Vessels and their nets can be equipped with sensors interfaced with a master database so that effort control can be based upon highly precise soak time, negating the need to impose a precautionary lower-limit estimate.

By monitoring gear deployment, soak-time data thus provides a fleet the flexibility to spread out over its full geographical range and stocks. Real-time updates relayed to a vessel will allow a skipper to steer the best course for a trip more efficiently and, correspondingly, allow administrators on land to be much more responsive to required variations when they arise. Such monitoring effectively turns each fishing vessel into a research centre pouring out data to scientists on an hourly basis, improving our understanding of fish stocks and hence placing their sustainability on a much more robust footing.

Real-time data from fully-documented fisheries allows for transparent, real-time management, in stark contrast to the current policy. The quota system encourages hidden discarding and misreporting. It is based on information which is guaranteed (because of discards) to be inaccurate by at least 50%, and probably six months out of date. The accuracy of the data from refined effort control will allow scientists and fisherman to agree modifications to the Total Allowable Catch and to Flexible Catch Compositions, working wholly in harmony with nature and the natural fluctuations in fish populations.

Examples of such systems abound. The Fisheries Minister in the Faroe Islands, where it is mandatory to land everything, summarised the pragmatism of the approach by saying: “We might not like what we find, but we know exactly what is going on.”

Likewise, in the Falkland Islands, accurate figures are discussed with senior scientists and any vessel taking too much by-catch is told to steam on. In Iceland, vessels are told to move

if they are catching too much of a certain species at an hour's notice. This sort of control can now be given to local fishermen and those with an interest in the local marine environment.

The Falklands example is, in fact, an archetype for national control bringing stability and prosperity to a once chaotic fishery. Until 1986, there were no proper controls for the Spanish and Asian fishing fleets, but the Spanish have since become the largest purchasers of fishing licences, and the most significant investors in joint ventures in the Falklands fisheries.

In addition to the temporary closures and real-time movements, we should allow for the establishment of a system of permanent conservation zones, defined as absolute "no-take" areas. These would tend to be spawning and nursery areas which are so biologically sensitive that any damage done by commercial fishing would be unacceptable. They may have special biological or other significance such as in areas where there are cold water coral reefs, or where commercial fishing would be undesirable. Permanent closure must, however, be properly considered; used unwisely, it can have the effect of simply displacing fishing effort into other areas, with the resultant reduction in fish mortality leading to an overpopulation and the eventual starvation of the fish in the area.

Trials

A trial of refined effort control should be conducted to examine and improve the scheme as an alternative to fixed quotas. The trial should be performed on a national basis, involving each major fisheries area, with two or three vessels in each gear category and each sector taking part. Each vessel would be given exemption from quotas and the associated legislation, and given licences allocating them the number of hours which they are permitted to fish, and the gear which they are permitted to use.

As part of the trial, each vessel should document two trips at sea. The first would be its trip under the refined effort control scheme, recording the overall stock mortality, the proportion and composition of the retained catch, and the overall expenses of the trip. The second log would record a theoretical trip under the quota system to act as a comparison. The Government should look to instigate such a trial immediately in order to consider the full applicability of refined effort control as a replacement for the CFP upon our withdrawal.

The Secretary of State has suggested his willingness to see an overhaul of our fishing policy, but has indicated some support for a system of "individual transferrable quotas"; a total sustainable catch is decided, before being then divided among the fishing fleet according to each vessel's owned share. He has, in particular, looked to Iceland as a model for a thriving sector but this is, in large part, to ignore the markedly different ecologies of British and Icelandic waters. UK fisheries are far more mixed than those in Iceland, making it all but impossible to catch the "correct" species and avoid discards. This problem is less severe in Iceland, but there are still undoubtedly choke species and, inevitably, discards.

ITQs also tend to concentrate ownership of quota in the hands of a few large owners, driving away smaller businesses and traditional fishing families. This effect is creating an appetite for reform in Iceland, and is not something we should seek to import. Indeed, as the UK effectively already operates a de facto ITQ system in the way it administers its EU quota share, adopting this approach would simply be to extend the failures of the CFP which we have endured for so long. In any event, the Government should commission a trial of ITQs alongside the refined effort control trial so as to have the fullest possible understanding of the best option for the future of the industry.

Conclusions

Leaving the European Union is great news for agriculture, fisheries and the environment. It gives the United Kingdom a chance to rid ourselves of its stifling, backward-looking approach to technology and, in so doing, offers the agricultural and fisheries sectors a fantastic opportunity to increase their productivity.

New technologies must be embraced, and feasible new developments must be assessed rationally and soberly. That way, British farmers and fishermen can remain globally competitive and all consumers can reap the price-lowering benefits of increased free trade around the world.

Crucially, the technologies outlined in this paper highlight that policy decisions should not be seen as a binary choice between “going green” and fostering new technologies. Whether it is in the continuing role for herbicides in promoting healthy, bio-diverse soil or state-of-the-art equipment guaranteeing real-time information to ensure the economic and ecological sustainability of fishing, the message is clear. Our new, independent policies must prioritise innovation – informed by rational, science-led analysis – if sustainable and environmentally-friendly farming and fishing practices are to continue to put food on our tables for years to come.

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