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Livestock farming needs to prove its part of the solution, not the problem

Whatever the eventual outcome of Brexit, the soft regulatory power of society may prove to have the greater impact on the long-term direction of UK farming than the hard regulation of State.

Millennials, now joined by Greta Thunberg's Generation Z, are acutely aware of the half burnt platform on which they stand to face an uncertain future. They are self-organising on local and global scales to demand agency over how natural resources are used to sustain our lives on earth, including what we eat, how it is produced, packaged, distributed, and at what environmental cost.

They are better informed and connected than any generation before them, acquiring and sharing content in a 24/7 digital world where opinion can become global fact in less time than it takes to eat lunch, and where nuance and complexity are more hindrance than help to points of view which seek to enlighten debate.

In part this may explain why those who vociferously advocate the end of livestock farming as the silver bullet to all our woes, have been successful at pinning UK farming onto its back foot in the public debate over exactly what constitutes a sustainable food and farming system. Nowhere in this debate is society's need for balance and impartiality more needed, and currently worse served, than on the matter of beef, and by extension, what role cattle farming can or should play in providing both nutritious food for a healthy people, and a bio-diverse environment for a healthy planet.

The scientific community has a clear leadership role to play in facilitating an evidence-led debate, notwithstanding its performance to date which has been a mixed contribution of some less-than-impartial reports, and science overly focused on a single metric, insufficiently tested out there in the messy complexity of real-world farming systems.

But with every rule there is an exception, and in this case, it takes the form of Rothamsted Research's North Wyke site, near Okehampton. North Wyke hosts a unique national capability of three discreet 20ha farms forming its Farm Platform, where long-term farm scale experiments are monitoring and measuring all inputs and outputs arising from pasture-based livestock farming. Importantly all of Rothamsted's long-term strategic programmes, including the North Wyke Farm Platform, are funded via the public purse rather than by private interests.

Head of Site and Head of North Wyke's Sustainable Agriculture Sciences Department, Prof Michael Lee, believes this combination of independence, and long term farm-scale experiments places Rothamsted in a unique position to raise the quality of debate on what our future farming systems should be to deliver healthy people and planet.

"North Wyke's unique capability to carry out long term farm-scale experiments enables us to assess the ability of different grassland farming systems to fit within all three pillars of sustainability; social, environmental, and economic. Food has to be safe and nutritious. Farming has to maintain our natural assets of clean water, clean air, good soil health, and bio-diversity. And farmers have to be able to make a profit. No system can be considered sustainable unless all three criteria are met."

Prof Lee believes that one of the grand challenges for society is to decide what agriculture we want and where to place our red lines in terms of food production. He goes on to say, “The first red line needs to be animal welfare. The industrial “feed lot” system of beef production commonly practiced in the Americas, depends on routine feeding of anti-biotics to ensure cattle do not develop liver abscesses because of their intensive grain-based diet. This is not in my view, ethically sound. It crosses the red line. I would personally not consume beef if I could only eat beef produced in a feed lot system.

The second red line is no more loss of habitat to agriculture. If we want to protect bio-diversity, if we don’t want to lose anymore of the Amazon, the Steppes, and the Pampas, we have to get more out of the agricultural land we have currently got without harming the environment and natural world. Really important and unique work is being done right here at Rothamsted to create a blue print of land nationally and globally; soil types, meteorological conditions, nutrient profiles, in order to build a picture of what we can sustainably grow where to deliver the most good for the least harm. In the future, all the arable land we have needs to be used exclusively for feeding humans, not feeding livestock to feed humans. That leaves a lot of agricultural land that is not suitable for growing crops because of the climate, weather, soil type, and access requirements. In the UK, that amounts to a lot of land, about 60% of UK farmland. We still need to produce food from this land, and the only option is grazing livestock if we want to produce food sustainably for a growing population. Looking into the future, there is definitely going to be parts of the UK where it will be better to remove livestock, but other parts – predominantly in the west and north – where we will absolutely need to keep grazing livestock.”

Put like that it is difficult to understand why the argument for a 100% plant-based human diet has gathered so much traction and credibility as the morally superior and only sustainable way forward. Professor Lee argues this is because the wrong things have been measured when it comes to land use efficiency. “The argument used against ruminants (cattle and sheep), is land use efficiency. Ruminants require a lot of land comparative to other types of food production, but the measurement should be ARABLE land use efficiency which will clearly show that for certain types of agricultural land, such as the grasslands of the west and north of the UK, grazing ruminants deliver the highest land use efficiency compared to other agricultural means of food production.”

The different farming treatments carried out on each of North Wyke’s discreet farms are now entering their 4th year, when according to Prof Lee, his scientific team’s diligence and patience will really start to pay off. “We now have 3 years’ worth of data measuring all aspects of the whole farming system. The sophistication of our in-field measurement systems have enabled us to capture more than 21 million data points on water quality alone, to which we add data points on levels of ammonia, nitrous oxide and methane in the atmosphere. As well as the large emphasis on environmental parameters we assess the economic sustainability of each system and key social parameters such as animal welfare and the quality of the nutrients provided in the food produced. This also allows the assessment of key nutrients (essential amino acids and fatty acids, selenium, iron, zinc, vitamins) per area of non-arable land to fully determine the role of grassland systems in a sustainable food system. ”

One begins to appreciate the value of the work already undertaken by Prof Lee and his North Wyke team. However the next stage of North Wyke’s farm platform has potential to shed significant light onto the heated debate as to what, if any, role grazing livestock should play in our future food and farming system.

“If you say that there is no place in our future farming systems for grazing livestock, it begs the question what are you going to do with all those farms predominantly on the western side of the UK representing ~1.2m hectares of land? Some will inevitably be taken out of productive farming and

could be 're-wilded' but the vast majority will want to stay in farming. And under the zero-livestock scenarios the only option open to them is to convert to arable.

To test this scenario, we are converting one of our farms to arable to simulate just such a situation. Our parameters are that the arable crop produced will have to be bread wheat quality or equivalent because in the future we should only be growing crops to feed directly to humans. In our scenario there will be no market for straw as bedding/fodder, and no farmyard manure with which to build soil fertility because there will be no livestock. Using our long-term, multi-disciplinary approach, we can answer the question of what would happen in grassland livestock regions, such as here in the south west if given over to growing an arable crop. What is the true impact of ploughing up all the grassland? What are the environmental impacts in terms of carbon emissions, and nutrient loss in soil? We will measure the yield and compare it with a grassland system in terms of both nutrient loss and nutrient output of the food produced. We will conduct the experiment over the long-term and at a whole farm level. Our science at Rothamsted is for the benefit of society so the evidence will be published and available to all. I am firmly of the view that if the science tells us that growing bread wheat in an area like the south west is much better use of land from a sustainability point of view; society, environment, economy - then fine, let's do it."

'Eat Less Meat' may become one of the slogans of our times. Whilst it is undeniable that we should reduce our meat consumption to improve the health of ourselves and our planet, in our rush to reduce, we risk throwing the baby out with the bathwater. To quote Patrick Holden of Sustainable Food Trust "there is farming that is part of the problem and farming that is part of the solution." For those of us who believe that pasture-based livestock farming is an essential part of the solution, Rothamsted's unique long-term experiments will make a vital contribution in enabling society to get beyond the slogans and arrive at an informed decision about the farming system we need to sustain healthy people and planet.