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Feeding Britain sustainably

Providing the UK population with access to adequate volumes of food, at reasonable prices, whilst not contributing to destroying the Earth's climate and many species of plant and animal life is a challenge. Fundamentally, we start from a baseline that *'the vast majority of species are strongly dependent on natural habitats, and natural vegetation is of disproportionate value in sequestering and storing carbon¹* – in other words agriculture *per se* is not good for nature.

This means we have to find production systems and land uses that meet our food needs at least cost to nature. As Balmford (2021)¹ concludes: *"a land sharing and sparing approach provides such a quantitative approach for delivering this"*. Originally proposed as a two compartment system in which maximising yields on some farmland allows land not required for food production to be used to retain or restore areas of natural habitat outside agriculture², this has been extended to a three compartment approach in which more species are accommodated by sustainably increasing yields/intensity on one compartment of land and assigning the balance to one compartment of semi and natural habitats and one compartment of lower yielding/intensity farming^{3,4}. The three, rather than two compartment model acknowledges that some farmland species fare better under lower-intensity/extensive farming systems.

It is positive to see that this approach has been advocated in the original National Food Strategy document⁵ as the basis for the future of the UK agricultural sector, because it follows the science and evidence, and if properly implemented, could deliver a more sustainable balance in terms of food production, resource use, nature conservation and climate change mitigation.

Against this background, it is extremely disappointing to see the Sustainable Food Trust (SFT)'s blueprint for the future of UK agriculture⁶, published in June 2022, advocating that UK agriculture should adopt a two compartment vision based solely on a lower intensity/yield (largely organic) production base coupled with some land reverting to natural habitat, claiming this is the most suitable sustainable model for domestic production.

Unfortunately, the science and the evidence does not support the SFT's blueprint because it is built on flawed and unrealistic assumptions - where the mix and volumes of future domestic organic-based production are significantly overstated and then matched to an unreasonably optimistic, changed and reduced demand for food in the UK.

More specifically:

Supply side

- The reality that organic farming systems produce significantly less food from the same area as non-organic systems⁷ has been sidestepped by assuming that organic productivity will increase by 20% relative to current levels, though no basis or evidence is provided to support this assumption. In addition;

- Whilst the report acknowledges that production levels in some sectors would be expected to fall significantly (notably cereals, pork, poultry, eggs, dairy sectors), this is considered to be acceptable because the authors have assumed that the UK will no longer be using domestically grown cereals and oilseeds as animal feed (and the UK will largely stop importing feed ingredients), hence freeing up more of these crops for the human food chain;
- UK farmers are expected to make major changes to land use, notably a 25% cut in the area planted to cereals and cuts to the area of other arable crops, whilst increasing the area devoted to fruit and vegetable production by 50% and to temporary grassland by about 220%. It is assumed this transformation will arise through a combination of changed consumer-driven demand and a large dose of government support;
- It assumes that there would be a 50% decrease in the amount of food wasted beyond the farmgate - based on a target in the United Nation's Sustainable Development Goals and the voluntary UK Food Chain's Courtauld commitment for achieving by 2030;

Demand side

- There is a major shift in eating habits in the UK. Consumers are expected to move from current consumption patterns to healthier diets in which livestock product consumption (meat, milk, dairy products and eggs) falls significantly and people eat much more fruit, vegetables, cereals and pulses. This is to be achieved through consumer willingness to change built on the back of publicly funded food and farming education campaigns;

Critical issues

- The SFT's report does not address where the extra labour force required to harvest the additional home-grown fruit and vegetables (50% increase in area) produced will come from. The NFU recently estimated that £60m worth of home-grown fresh produce has already been wasted this year due to labour shortages⁸;
- Against a background of a cost-of-living crisis and high food price inflation, the report acknowledges that the SFT's plan will increase the real cost of food. This is, however, simply addressed by expecting significant government (taxpayer) intervention to ensure those on lower incomes are helped with subsidised food;
- The SFT champions its own metric for measuring farm level sustainability – referred to as a Global Farm Metric (GFM), as a benchmark for measuring future performance against sustainability goals at local, national and international levels. This metric takes a whole farm, area-based approach to measuring sustainability which favours the adoption of lower intensity farming systems. However, the science and evidence in the field shows that this approach to measuring sustainability parameters like GHG emissions and resource use is flawed, with the most appropriate way to measure sustainability goals being in terms of units of output such as tonnes, litres or bio-available calories^{9,10}. A unit of output basis for measuring sustainability indicators is also how initiatives in this field developed in other countries, such as the US-based Field to Market programme set up in 2009¹¹ measure performance;
- The possibility that the UK would import more food to make up for the lower output arising from a largely organic domestic production base and hence export our land use and emissions is dealt with in the SFT's report through the assumptions that UK citizens will be happy to radically change their diets in 10 years and that the UK government will embrace a system of import regulation that does not allow imports that do not meet the same domestic 'sustainability standards' based on the SFT's metric. This latter assumption is at

odds with the realities of some recent trade agreements made by the UK government (eg, with Australia) and fails to recognise that the major agricultural producing and exporting nations such as the USA, Brazil and Argentina are extremely unlikely to buy into this metric. As a consequence, a system of regulating UK imports based on this metric is unlikely to comply with World Trade Organisation rules relating to non-tariff barriers.

Feeding Britain sustainably – practical reality and the best way forward

Returning to the best way forward for UK agriculture, the science and evidence tells us we need to take forward the three-compartment approach for future land use. This means recognising this is a combination of high yield farming, natural habitat and lower yielding farming systems - it is not an either (high intensity and natural habitat only) or (lower intensity and natural habitat only) future.

It also means that where agriculture takes place that we look to the sensible combining of production methods and techniques used in both high and lower intensity (including organic) production systems and embrace (not reject) the adoption of new innovations and technology like plant genetics, digital agriculture and precision farming.

The next challenge is therefore to agree on the allocation of UK land to each of these three compartments. This is critical for the ultimate success of such a strategy. In an ideal world, we would have a nationally representative picture identified to provide for the optimum allocation of land to each compartment. Whilst this is not currently available, some research, focusing on two regions of England (The Fens and Salisbury Plain) is available, as discussed in Finch et al, 2021¹². Based on, and interpreting this research, an allocation of land of about 60% in high yielding/intensity farming, 25% as natural habitat (no agriculture) and 15% in low intensity/yielding, extensive farming for the country might be appropriate.

This is where the post Brexit re-set for UK agriculture should have begun by developing a coherent land use strategy, utilising a science and evidence-based assessment of the competing demands and priorities placed on the UK's land resource. This exercise should also have preceded the working up of policy options developed under the Environmental Land Management schemes (ELMs) in England and its equivalents in Northern Ireland, Scotland and Wales so that these options and the resources provided to support them reflect the science and evidence-based land use allocations. Given these new schemes are in their early days of implementation, it is not too late to re-evaluate and fine tune these schemes to reflect what the science and evidence tells us. To not do so would be a missed opportunity to implement a truly sustainable agricultural system in the UK.

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References

1. Balmford A 2021. Concentrating vs spreading our footprint: how to meet humanity's needs at least cost to nature. *Journal of Zoology* 315, 79-109
2. Green et al. 2005. Farming and the fate of wild nature. *Science*, 307, 550-555.
Doi:10.1126/science.1106049
3. Feniuk et al. 2019. Land sparing to make space for species dependent on natural habitats and high nature value farmland

4. Finch et al. 2020. Optimising nature conservation outcomes for a given region-wide level of food production. *Journal of Applied Ecology*, 57, 985-994
5. [The National Food Strategy - The Plan](#). 2021
6. Sustainable Food Trust. 2022. Feeding Britain from the ground up. www.sustainablefoodtrust.org
7. Alvarez R (2021) Comparing productivity of organic and conventional farming systems: a quantitative review. *Archives of Agronomy and Soil Science*. <http://doi.org/10.1080/03650340.2021.1946040>
8. https://www.farminguk.com/news/food-worth-60m-wasted-due-to-lack-of-workers-nfu-warns_60917.html
9. Balmford et al, 2018. The environmental costs and benefits of high yield farming. *Nature Sustainability*, 1, 477-485
10. Searchinger et al. 2018. Assessing the efficiency of changes in land use for mitigating climate change. *Nature* 564, 249-253
11. [Sustainability Metrics - Field to Market](#)
12. Finch et al. 2020. Evaluating spatially explicit sharing-sparing scenarios for multiple environmental outcomes. *Journal of Applied Ecology*. 2020;00:1-12. DOI: 10.1111/1365-2664.13785