

Written evidence submitted by the Game & Wildlife Conservation Trust

The Game & Wildlife Conservation Trust (www.gwct.org.uk) is a leading, independent UK wildlife conservation charity conducting scientific research into Britain's game and wildlife to enhance the British countryside for public benefit. We use our research to provide training and advice on how best to improve the biodiversity of the British countryside. We employ 22 post-doctoral scientists and 50 other research staff with expertise in areas such as birds, insects, mammals, farming and farmland ecology, fish and statistics. The GWCT's Allerton Project, our lowland demonstration farm in Leicestershire, undertakes research into the effects of different farming methods on wildlife and the environment, and shares the results of this research through educational activities for practitioners and the public (<https://www.allertontrust.org.uk/>).

Summary

In answering the questions below we have sought to emphasise that the complexity of addressing the connection between environmental change and food security can lead to unintended consequences. The sustainability of our food system should encompass environmental, economic and social outcomes and within environmental outcomes policy should consider the direct and indirect consequences of both action and inaction. Balancing these considerations is difficult and this is where we believe that science can help by providing the necessary evidence around trade-offs. We use our Allerton Project to demonstrate how science-led techniques can enable food, carbon, biodiversity, water and wild areas to be delivered on a single farm.

Terms of reference

We have only responded to some of the questions posed.

Section 1: Climate change and food security: projected effect, risks, and mitigation

- What are the main risks posed to future UK food security from projected climate change and biodiversity loss pathways?

The risks are two-fold: those directly affected by climate change such as extreme weather events, and indirect risks which are a consequence (usually unintended) of other actions such as policy. The direct impacts of climate change on agriculture and biodiversity are well documented e.g. POST, Climate Change and Agriculture, May 2019 so we will focus on our concerns about the unintended consequences of current policy direction.

But firstly, we wish to emphasise a point we often make to inquiry responses that focus on rural land management and its impacts – the need for an holistic approach to policy. Given that land use decisions impact on a 'living ecosystem' (our land) every decision made has both direct and indirect consequences. Agricultural policy has since the Second World War focussed on maximising single outcomes; initially food resulting in the impact on biodiversity that we are now experiencing. If we now, partly as a consequence of this, focus on biodiversity and net zero (the two being

inter-connected) we are at risk of losing the all-important balance needed between the two objectives of food and the environment. The efficient use of our finite land resource is key to protecting our food security in the face of climate change.

Indirect risks to food security from policies addressing Net Zero and biodiversity loss include:

- i. Extensification of farming systems in support of biodiversity ambitions will result in lower levels of domestic food production. However, we would argue that this does not need to be the case – see Section 3 below.
 - ii. The move to renewable energy is requiring land use for tree planting, other biomass production and onshore solar. Policies to promote the adoption of these options is seeing farmers effectively de-risking from market volatility by converting their productive land to schemes that pay a ‘guaranteed’ income.
 - iii. A focus on carbon emissions is resulting in management approaches such as tilling practices and re-wetting lowland peat that may increase the release of other GHG emissions such as nitrous oxide and methane, which whilst not as persistent, have a more significant short-term impact on climate.
 - iv. The focus on the removal of Plant Protection Products (PPP) in the face of concerns about impacts on biodiversity is happening in response to a hazard-based approach to regulation rather than a risk-based approach. This means that we are losing PPP options without the understanding of how the problems that these addressed can be resolved. Gene-editing and the development of bio-pesticides will help fill the gap but in the meantime, farmers are facing higher levels of risk when growing oil seed rape or sugar beet for example. Given uncertainty in the wider farming environment, farmers may seek to de-risk their production by moving to other crops (or indeed ELMS options) resulting in the need to import these products from other countries and effectively exporting our environmental and carbon footprint.
 - v. Undue emphasis on emissions from livestock production and the misplaced belief that this land could be converted to human-orientated production. We address this point further in Section 3.
 - vi. Another point to consider is the role of planning and licensing in facilitating the creation of on-farm reservoirs (which were recently supported by grants). Whilst wetter autumns are impacting on the farmer’s ability to cultivate, the drier summers are resulting in lack of water being a limiting factor in crop yields, even resulting in crop failure. The ability for farmers to store water in on-farm reservoirs from the autumn/winter for use in the summer should be considered important.
- How do existing UK food production, import, and export practices contribute to climate change and biodiversity loss?

As we stated above, maximising a single output such as food from land has resulted in farming systems contributing to the current climate and biodiversity crises. Given that 70% of our land is farmed, it is not surprising therefore that agriculture, forestry

and fishing contributes c47mt CO₂e pa¹ or that whilst wheat yields have increased, farmland bird numbers have declined (see graph in Section 2). We believe that it is possible to adjust existing practices (as opposed to changing) to address these concerns; indeed, we demonstrate how the GWCT has achieved the dual aims of food production and environmental protection in Section 3.

Whilst trade can provide resilience and variety to our food supply, we are concerned that the recent FTAs, in particular those with Australia and New Zealand, have the potential to harm food sectors where we are able to support demand through domestic production. This may not seem to answer the question but what it means is that often we are supporting overseas production models that are less environmentally friendly than our own – thereby undermining domestic food production and climate change and biodiversity ambitions. For example, UK beef has a carbon footprint 40% of the global average and up to 30x lower than that imported from systems based on deforestation - such as in the Australian Northern Territories – or oil seed rape imported from Canada, Ukraine and some EU countries which has been grown using neonicotinoid insecticides that are banned here due to their impact on pollinators.

- How self-sufficient is the UK in producing food? What practices could the UK adopt to become more self-sufficient while reducing the emissions associated with agriculture?

We have not addressed this here as we cover it in Section 3 below.

Section 2: UK preparedness: Government and market

- Does the Government's Food Strategy address the risks of climate change and biodiversity loss adequately? Does it prepare the UK to adapt to a world affected by ecological crises?

The Food Strategy makes a number of references to the support that Government is providing to the sector to address these issues, for example through ELMS and the Farming Futures R&D fund, which are welcomed. Indeed, other legislation before the House is also supportive, such as the Genetic Technology (Precision Breeding) Bill, as we believe that science-led developments will be an important piece in the sustainability jigsaw. However, we were surprised that more emphasis was not placed on the role of sustainable intensification in farming. This approach had been the subject of a £4.5 million, four-year, multi-partner Defra-funded research programme to investigate the challenges of securing the optimum balance between food production, resource use and environmental protection; yet as Julian Sturdy said in a February 2022 debate on 'Agriculture: Sustainable Intensification and Metrics' "*.. the recommendations and advice generated through the DEFRA SIP appear to have been quietly shelved and forgotten.*"² This project would help with defining the metrics

¹ Ricardo Energy and Environment, Office for National Statistics November 2022.

² <https://hansard.parliament.uk/commons/2022-02-22/debates/17FF7737-ED13-4456-BD6D->

required to objectively measure the environmental sustainability of food (Food strategy 2.3.3) – something that is urgently needed to avoid the unintended consequences of policy decisions.

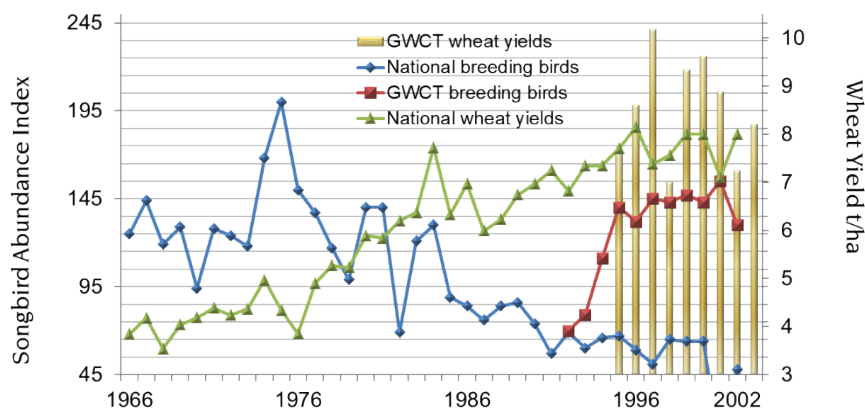
In addition, the assertion in the Food Strategy that “*Decisions on the liberalisation of products through FTAs will consider factors such as climate change, animal welfare and the environment alongside the broader economic and strategic benefits of our trading relationships*” we do not feel has been addressed in the recent FTAs as suggested above. This is important as the Government needs to use all possible policy levers to support the transition to a sustainable food supply, including taking into account the importance of not undermining domestic production sectors which arguably have a lower environmental and climate impact versus global averages.

- What role should the Government take in ensuring that land is available to secure the UK’s food supply in the context of a changing climate?

We don’t see a need for specific Government intervention; just the need for supportive policy that guides land managers towards the most efficient use of their land and the optimisation of multiple outputs. At the outset in Section 1 we highlighted the downsides of policy maximising a single output – be that food or the environment – and the need to ensure a balance between these. To that extent we maintain that a framework for land use is urgently needed (and committed to by Government for 2023) to balance not only environmental outcomes with food but also the various other demands on our land. Hence, we concur with the House of Lord’s Land Use Committee report recommendation that the framework goes beyond the Defra remit to address wider aspects of land use and incorporates the concepts of integration and multifunctionality³. ‘Stacking’ outputs from the land is a vital aspect of ensuring our ability to support food production alongside other environmental and ecosystem service provision. To avoid negative consequences of trade-offs this process needs to be evidence-led – see Section 3.

We support use of the term ‘framework’; we feel this is important as it provides the basis for collaborative approaches rather than the additional top-down influence that a strategy suggests.

We remain strongly of the view that policy that incentivises the extensification of productive farmland is a threat to future food security. However, a productive farm does not need to be a threat to the environment. The Allerton Project is a good example of a sustainably managed farm that whilst maintaining (and in some years exceeding) national wheat yields has doubled the number of songbirds (see graph below). We discuss the Allerton Project’s outcomes further in Section 3.



Section 3: Securing a sustainable food supply

- What are the most environmentally friendly ways of producing a secure supply of nutritious food?

In this section on securing a sustainable food supply the Committee has expressly requested evidence on the most environmentally friendly ways of producing a secure supply of nutritious food. Given our experiences at the Allerton Project, our lowland demonstration farm, we can provide input on the domestic supply element of an overall strategy. Our points above about the role of trade agreements as complementary to domestic production are pertinent here too.

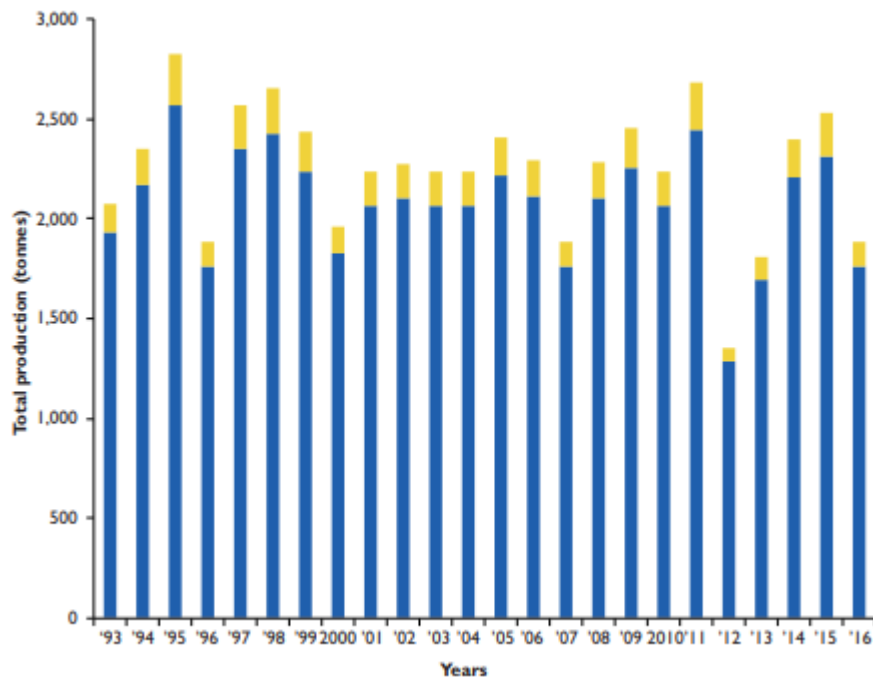
Firstly, however we would challenge the interchange between the terms ‘sustainable’ and ‘environmentally friendly’ simply because the former goes beyond purely environmental considerations. As we have often said ‘you cannot farm green if you are in the red’ and so a sustainable food system needs to consider farm economics and land use. Short (and medium) term challenges to domestic production from the energy crisis and changes to support systems are seeing farmers seeking to de-risk their business through focussing on support payments for environmental goods. This is only ‘sustainable’ if it does not result in significant changes to land use away from food production. As we can demonstrate at Allerton, optimising crop/livestock yields in-field can be complemented by optimising biodiversity at the margin and difficult to farm areas. Also, it should be remembered that ‘environmentally-friendly’ management approaches, if not well designed, can result in an increase in the carbon footprint of a crop. For example, reduced use of PPP can result in a pest damaged crop which will uptake less fertiliser than assumed for ‘normal’ yields (with the potential for the excess fertiliser not taken up by the crop to be leached from the soil, negatively impacting on water quality) and this alongside the emissions from normal cultivation processes will result in an increased carbon footprint per unit of output. What is needed are evidence-led policies that encourage sustainability through optimising inputs and outputs.

The Allerton Project (<https://www.allertontrust.org.uk/>) epitomises the outcomes of the research that the GWCT undertakes alongside the operation of a commercial farm

and is an example of how food, carbon, biodiversity, water and wild areas can be delivered on a single farm through the development of scientifically researched management approaches to optimise outcomes. Also, as scientific understanding improves, policy needs to adjust. We would very much welcome a visit by the Committee to demonstrate our work but in the meantime the approach and outcomes can be summarised as being a focus on:

- Improving soil health and nutrient use efficiency through reducing soil erosion/losses by adopting less invasive tillage practices, crop rotations, utilising in-field and field-edge margins and buffers and cover crops - [Soil and Water | The Allerton Project \(allertontrust.org.uk\)](#)
- Reducing the impact of farming practices on water courses. Whilst buffer strips are useful for improving water quality and reducing soil erosion, they can be made more multi-functional if they are expanded to allow flood water to gather with tree species such as willow and alder, which will naturally regenerate these areas, locking up carbon. Farm ponds are another option we have used to hold back water thereby reducing the impact of agricultural pollution (nutrients, sediment, pesticides) whilst also supporting additional biodiversity on the farm.
- Supporting reduced plant protection product use through integrated pest management - [Integrated Pest Management | The Allerton Project \(allertontrust.org.uk\)](#)
- Optimising soil carbon and reducing GHG emissions ([Agricapture CO2 | The Allerton Project \(allertontrust.org.uk\)](#)) and developing a Hedgerow Carbon Code ([Hedgerow Carbon Code | The Allerton Project \(allertontrust.org.uk\)](#))
- How to optimise the delivery of multiple outcomes. Whilst this is a focus across the farm as a whole we have been researching the optimal tree density in a silvo-pastoral agro-forestry project needed to optimise outputs such as grazing yield, livestock emissions, soil and tree carbon, animal welfare (shade), biomass production and flood mitigation (infiltration) - [Agroforestry | The Allerton Project \(allertontrust.org.uk\)](#)
- Conserving and increasing the biodiversity on the farm through targeted interventions such as appropriate habitat in support of different lifecycle stages and species, predation management and supplementary feeding. [Boosting biodiversity | The Allerton Project \(allertontrust.org.uk\)](#)
- Reducing GHG emissions from livestock through for example different feed stuffs - [Feed trees to sheep to cut greenhouse gases, study suggests - Game and Wildlife Conservation Trust \(gwct.org.uk\)](#)

Whilst this may suggest a special situation, it is worth emphasising that the farm is quite ordinary and is on heavy land so we are facing the same challenges as many other farming systems. Yet the yields at Allerton compare with regional averages through good timeliness and agronomy and Allerton consistently matches or exceeds a benchmark of similar operations. The figure below shows total arable production (blue) at Allerton (using wheat as a proxy for all crops) and production foregone (yellow) through land diverted to meet environmental objectives.



Like other farm businesses costs have been minimised through a partnership arrangement and we maximise margins by marketing our crops with Conservation Grade quality premiums and forward selling at times.

However, what does distinguish us is that our approach is driven by research with the results used to inform our decision making on the farm.

- What role could a reduction in meat and dairy consumption play in improving food security and what measures could the Government take to capitalise on the trend to plant-based diets?

In consideration of the role a reduction in meat and dairy consumption could play in improving food security and capitalising on the trend to plant-based diets, we do express a note of caution. As we have demonstrated above the UK's beef production system has a carbon footprint that is 40% of the global average and there are ways of ameliorating emissions from livestock whilst also ensuring good welfare and health. Meat/dairy are nutrient-rich food sources with the majority of UK ruminants produced on pasture-based systems converting otherwise indigestible grass into a high-quality product. Grass also generally grows in regions where the weather and soil type is not suitable for crop production; so it is not a simple matter of replacing grass with plant-based proteins such as lentils. Furthermore in marginal areas such as the uplands extensive grazing supports red-listed species such as grey partridge, lapwing and curlew. As decisions about consumption patterns have wide ranging impacts, it is important that the broad definition of sustainability discussed below is used in policy formulation.

Whilst not a specific area of expertise we also feel that a sustainable plant-based diet is not wholly achievable. Some of the key plant-based alternative foods (PBAF) used to reduce meat-based consumption are based on plant proteins such as soya, peas, nuts

and oats and consequently some come from crops that are not grown in the UK; resulting in us further exporting our environmental footprint (unless supply chain controls are given appropriate oversight). The demand for plant-based dairy alternatives has also increased; these are based on oats, soya, almonds and coconuts, only one of which is produced domestically. The promotion of healthy plant-based diets has seen an increase in demand for fruits like avocados as they are one of the highest-fat plant foods. Yet their production, in places like Mexico, requires up to 320 litres of water, has resulted in environmental damage and two avocados are estimated to have an emissions footprint twice that of a kilo of bananas⁴.

Where we can increase domestic production, such as of lentils for example, then we need to ensure that this is balanced with the production of other 'core' food crops to avoid the need for unnecessary imports.

The concern remains that the focus on a single outcome, GHG emissions (and in particular carbon), may result in unintended consequences through the simplification of issues and challenges. Sustainability isn't just about GHG emissions; it is about optimising environmental, economic and social outcomes. However, the concept is often narrowed down to environmental sustainability – such as GHG reductions⁵. As a result Government policy should be directed more towards educating the consumer on the importance of a diet that balances the parameters of sustainability and not just one objective.

- Is there research and development the Government could be funding to provide food security solutions?

Better use could be made of the UK's land through the adoption of science-led innovations in farming systems and R&D that explores how multiple outcomes can be achieved. For example, the GWCT's Allerton Project is currently undertaking research into optimising agro-forestry practices to address not only livestock production (sheep in this case) but also other outcomes through collecting data on biodiversity, soil and tree carbon, soil water infiltration, soil nutrient status, soil GHG emissions, grass growth and liveweight gain of the livestock in the separate compartments under three different tree densities (also mentioned above).

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⁴ <https://www.weforum.org/agenda/2020/02/avocado-environment-cost-food-mexico/>

⁵ Garnett T. 2014. What is a sustainable healthy diet? A discussion paper. Oxford, United Kingdom: Food Climate Research Network (FCRN).