

AGRICULTURAL TRANSITION IN SCOTLAND

By its cross-cutting nature, the agricultural sector is inextricably linked to a number of policy areas. It is important that coherence is achieved between them. Otherwise, Scotland runs the risk of undermining its own policy objectives as it seeks to fulfil unintentionally competing – rather than synergistic – outcomes. Policy coherence is a cornerstone of the National Performance Framework and the United Nations Sustainable Development Goals.

The farmer-led approach to developing the policy is an excellent start, but it would also be relevant to evaluate proposals from the perspective of the food and drink sector (a major contributor to the Scottish economy) and national commitments to encourage healthy eating, as well as wider communities of interest such as rural populations, consumers, scientists, environmental managers, and others.

More transparent links to Scotland's Land Use Strategy and to the Principles laid out in the Scottish Land Rights and Responsibilities Statement would strengthen perceptions of agriculture's place within Scottish Government's holistic approach to policy.

Common across our response is the central role of farmers and landowners in developing and implementing mechanisms of change – from collecting baseline data to co-designing research. Empowering them to take ownership of agricultural transformation where appropriate will also fulfil just transition aims.

Summary

Introduction

1 The Royal Society of Edinburgh (RSE), Scotland's National Academy, welcomes the opportunity to respond to the Scottish Government's consultation *Agricultural transition in Scotland – first steps towards our national policy*. Agriculture and land use are two areas in which the RSE has been active, having previously commented on the implications of Brexit on Scotland's agricultural sector and on various land use policies. Agriculture is one of Scotland's most expansive sectors, steeped in economic, cultural, and environmental significance – indeed, about 80% of Scotland's total land area is in agricultural production.¹ However, it is also a sector in significant flux. Adapting to the impacts of climate change on future food production is a growing concern even as the sector attempts to reconcile carbon-intensive traditions with national net zero targets and a need to respond to the biodiversity emergency. Managing this transformation will require an ambitious and radical policy programme with just transition principles at its heart. A working group comprising a diverse range of expertise and experience in agriculture and crop science, animal production, environmental management, biogeochemistry, climate science, social science, and other related disciplines prepared this response. The response sets out our overarching comments before addressing the consultation questions. We would be pleased to meet with Scottish Government to discuss this response should they consider this helpful.

General Points

2 It was disappointing to see that the consultation document does not make adequate reference to interrelated policies whose objectives will undoubtedly impact on the agricultural policy's ability to realise its own aims and vice versa. For example, we would have expected to see explicit mention of *Becoming a Good Food Nation*; the latest Land Use Strategy; the Scottish Land Rights and Responsibilities Statement; the Land Reform (Scotland) Act 2003 (including sections on communities' right to buy) and its 2016 successor; the Community Empowerment (Scotland) Act 2015; Regional Land Use Partnerships; the

Climate Change (Scotland) Act 2009; Climate Ready Scotland: Scottish Climate Change Adaptation Programme; the Scottish Biodiversity Strategy; Scotland's Forestry Strategy 2019 to 2029; and even relevant aquaculture policy, given its links to the overall food system in Scotland.

- 3 By its cross-cutting nature, the agricultural sector is inextricably linked to a number of policy areas. It is important that coherence is achieved between them. Otherwise, Scotland runs the risk of undermining its own policy objectives as it seeks to fulfil unintentionally competing – rather than synergistic – outcomes. Policy coherence is a cornerstone of the National Performance Framework and the United Nations Sustainable Development Goals.
- 4 The policy calls for transformational change, yet we are not convinced that it is prepared to deliver on this commitment. Many of the questions hint at staying with business as usual rather than signposting to a more progressive, multi-objective approach to the future, of which food production is only one element. Given the centrality of Scotland's agricultural sector to achieving decarbonisation targets, it is not enough to adjust familiar solutions – rather, Scotland as a nation needs to be bold and innovative in its vision for Scotland's agricultural sector.
- 5 The farmer-led approach to developing the policy is an excellent start, but it would also be relevant to evaluate proposals from the perspective of the food and drink sector (a major contributor to the Scottish economy) and national commitments to encourage healthy eating, as well as wider communities of interest such as rural populations, consumers, scientists, environmental managers, and others. Scotland's land already makes multiple contributions to society beyond just food production, such as by growing green fuel and chemical alternatives, attracting tourism, and contributing to climate change adaptation and biodiversity net gain. More transparent links to Scotland's Land Use Strategy and to the Principles laid out in the Scottish Land Rights and Responsibilities Statement would strengthen perceptions of agriculture's place within Scottish Government's holistic approach to policy.

1 Brand, A. (2021). *Land use and rural policy: subject profile* (SB 21-49). Scottish Parliament. <https://digitalpublications.parliament.scot/ResearchBriefings/Report/2021/8/19/fd352596-863e-4e0f-9a5e-84af26856d74-1>

Response to Questions

Section A: Baselining

- 1 Should agricultural businesses receiving support be required to undertake a level of baseline data collection?
- 2 Should collected data be submitted for national collation?
- 3 What are the next steps that can be taken to commit businesses to continuous improvement utilising the information presented by carbon, soil, and biodiversity auditing?
- 4 How can baselining activities be incorporated into common business practices across all farm types?

Response:

6 Question 1:

Collecting emissions data directly is not yet straightforward and will differ across different types of land use, although advances in technology may make it easier in future. Those receiving financial support should be making some baseline measurement (e.g. soil carbon and pH) and recording actions taken to decrease emissions and enhance biodiversity to enable scientists and regulators to extrapolate to carbon emissions. Optimising fertiliser use, decreasing tillage, managing animal health, and crop residue management practices are some examples of practices already being promoted. Quality assurance could be carried out by a national agency conducting spot checks at appropriate points to ensure that actions taken are delivering the desired reductions, although more research should be carried out to establish fair measures of activity across all land use sectors. In addition to carbon emissions and sequestration rates, other metrics (such as nitrogen-containing emissions and deposition) are equally important in terms of safeguarding biodiversity and local air quality.²

7 Question 2:

National collation of baseline data should be the default, given its importance in developing a full-scale picture of prevailing agriculture activities

and carbon mitigation practices across Scotland. This would complement the large-scale data collection which already takes place under the auspices of the Scottish Agricultural Census.

- 8 Land ownership in Scotland is complex, with landowners operating on a number of different spatial scales. Some private landowners have invested in very large tracts of land that have been largely reserved for recreational or rewilding³ purposes. Given the significant proportion of the total land which is under their control, the emissions from these landowners also need to be estimated. In addition, these large areas of land may contain suitable sites for peatland restoration and tree regeneration.

9 Question 3:

An effective information campaign and a gradual transition to accountability for taking action are required. There could be scope to integrate more innovative data gathering mechanisms (e.g. through the use of satellites and drone footage) within existing baselining activities, subject to the above caveats. The consultation document missed an opportunity to explore the increasingly pivotal role of technology in delivering agricultural and wider decarbonisation solutions.⁴ For example, gene editing can unlock new crop varieties that are more resilient to climatic effects and animal breeding, and feeding additives are offering solutions to reducing emissions. However, it is difficult to predict at this stage which of the many developing technologies will produce the best outcomes.

10 Question 4:

Baseline data collection will inevitably place skills expectations on farmers, who will be variably equipped to handle them. While larger farms are likely to have more capacity to gather baseline data, smaller farms and crofts may well struggle to find the time and resources to devote to data collection. An information and engagement campaign which makes clear what added value baseline data collection will bring and which demonstrates how to take samples and make measurements will be important.

² Royal Society. (2021). *Effects of net-zero policies and climate change on air quality* (DES7687). <https://royalsociety.org/topics-policy/projects/air-quality-climate-change/>

³ While there is no single definition of rewilding, Rewilding Britain defines it as ‘the large-scale restoration of ecosystems to the point where nature is allowed to take care of itself’. Rewilding Britain. (n.d.) *Defining Rewilding*. <https://www.rewildingbritain.org.uk/explore-rewilding/what-is-rewilding/defining-rewilding>

⁴ As an example, we highlight the Royal Society’s report on digital technology and net zero: Royal Society. (2020). *Digital technology and the planet: Harnessing computing to achieve net zero* (DES7035). <https://royalsociety.org/news/2020/12/digital-tech-vital-net-zero-royal-society-report/>

Section B: Capital funding

- 5 Should capital funding be limited to only providing support for capital items that have a clear link to reducing greenhouse gas emissions?
- 6 What role should match funding have in any capital funding?
- 7 What capital funding should be provided to the sector to assist in transformation change, particularly given that in many instances the support called for was directly related to productivity or efficiency, that should improve financial returns of the businesses concerned?

Response:

11 Question 5:

Capital investments to improve productivity and profits are also likely to decrease emissions, hence it will be difficult to set guidelines. Steep capital investments could be made more palatable by encouraging greater resource sharing between neighbouring or regional farms. Methane scrubbers, slurry injection, or the processing of agricultural waste going into anaerobic digestion which reduce nitrogen emissions could be prioritised. This infrastructure could also try to reduce the length of the supply chain, where appropriate.

- 12 Replacing farm equipment with new capital should be done with circular economy considerations in mind. A scheme could be implemented to ensure that equipment gets properly recycled rather than simply being discarded.
- 13 Even the most effective capital interventions will go underutilised if their uptake is not founded on sustained behaviour change. The farming sector, like many others who are facing the need for transformational change, exists on a spectrum, with some farmers ready and willing to adopt new technologies while others remain more reticent. To ensure that capital interventions are properly embraced, there should be a corresponding level of investment into the social science research necessary to understand farmers' motivations for either adopting or rejecting new approaches. Arguably, this behaviour change variable is far more difficult to predict and manage than the technological aspect of change. Social science research should also be undertaken at an early

stage in the process so that farmers feel they are respected and valued contributors to the process.

14 Question 6:

It was not clear in the question on match funding who would provide the match funding – the farmer or a third party. One possibility could be the selling of carbon credits for peatland restoration or forestry projects or the selling of soil carbon credits on the voluntary carbon market. Such an approach does, however, run the risk of double-counting if these credits are purchased by international bodies and claimed elsewhere at the same time that these offsets are being claimed in Scotland. To prevent this, a system similar to the Peatland⁵ and Woodland⁶ Carbon Codes could be used, whose credits are only applicable in the UK and cannot be purchased by foreign buyers.

15 Question 7:

Investing in accelerating the scale-up of new technologies could be an effective approach. Rewarding farmers who are early adopters or who operate collectively could also hasten the rate of uptake.

Section C: Biodiversity

- 8 Should all farm and crofting businesses be incentivised to undertake actions which enhance biodiversity?
- 9 What actions would be required by the farming and crofting sectors to deliver a significant increase in biodiversity and wider environmental benefits to address the biodiversity crisis?

Response:

16 Question 8:

Rather than incentivising activities that support biodiversity, such activities should be part of the minimum standards of care expected of farmers and landowners. This is reflected in the Scottish Land Rights and Responsibilities Statement,⁷ which lays out expectations for how the land should be treated and managed by landowners, land managers, tenants, and land users. Further, figures indicate that 40% of the land suitable for 'nature-based solutions' in Scotland is in fact managed land, underscoring the importance of ensuring its agricultural land is in harmony with nature.

⁵ Forest Carbon. (n.d.) *The Peatland Code*. <https://www.forestcarbon.co.uk/certification/the-peatland-code>

⁶ UK Woodland Carbon Code. (n.d.) *Homepage*. <https://www.woodlandcarboncode.org.uk/>

⁷ Scottish Government. (2017, September 28). *Scottish land rights and responsibilities statement*. <https://www.gov.scot/publications/scottish-land-rights-responsibilities-statement/pages/2/>

17 While ‘biodiversity’ can often be used as a catchall term, it is worth unpacking just what is meant by it within the context of this policy. Biodiversity can mean plant and animal species abundance but it can also refer to communities that can often escape our notice, from microbes within soil and water to lichen on rock. Depending on the organism or location in question, different methodologies will work best – in other words, there is no panacea that will lead to improved biodiversity in all locations in Scotland in all instances. The UK Department for Environment, Food and Rural Affairs (Defra) favours the concept of ‘biodiversity net gain’ as a more multi-faceted lens through which to view biodiversity and one which is useful to keep in mind when discussing interventions aimed at increasing it. Similarly, the *Farming for 1.5°C report*⁸ recognised the significant spatial variation that characterises Scotland’s land and proposed a more regionally-based approach to agricultural policy. It should be noted that one of the largest declines in botanical biodiversity is due to excess nitrogen deposition, and especially ammonia deposition from agricultural activities. Thus some of the greatest gains would be delivered by improved efficiency of nitrogen use in agriculture.

18 The question speaks about biodiversity enhancement, but the reality is that many markers of biodiversity have been in steady decline for decades. Before Scotland can look to enhance biodiversity, it should first look to reverse existing losses of key species. It also needs clearer and measurable targets for its biodiversity at the species, habitat, and ecosystem levels, on par with those set for greenhouse gas emissions and other environmental parameters.

19 Question 9:
Research into developing integrated legume-based systems is well underway in Scotland⁹ and could position it as a leader in this field. These systems come with multiple benefits, from improved biodiversity to the provision of nutritious food and animal feed to a reduction in fertilizer use,

and could have an important role to play alongside current arable farming systems. A shift away from monocultures and capturing the benefits of system interactions between livestock and crops could bring benefits to biodiversity. However, the wider supply chain of the associated produce needs to be considered, as distance to market for select produce will need to be reviewed.

20 Integrated pest management will also become an increasingly important approach to crop management and one which promises associated wins for biodiversity through the reduced use of harmful pesticides in favour of more natural solutions such as improved crop husbandry.¹⁰

Section D: Just transition

- 10** What do you see as the main opportunities for crofters, farmers, and land managers in a Just Transition to a net zero economy?
- 11** What do you see as the main barriers for crofters, farmers, and land managers in a Just Transition to a net zero economy?

Response:

21 Question 10:

It is important that conversations of just transition do not begin and end at the level of the individual farmer or crofter and instead consider the impacts on rural communities. The innovations required to contribute to net zero have the potential to bring benefits to rural communities contending with depopulation and limited economic opportunities, particularly for young people. Statistics indicate that only ten percent of working occupiers (or those who own or rent the farm and work on it) are under age 41¹¹, highlighting the urgency of attracting new entrants into the sector in order to keep it viable.

⁸ Farming for 1.5° panel. (2021). *Farming for 1.5°: from here to 2045*. <https://www.farming1point5.org/>

⁹ Cole, L.J., Baddeley, J.A., Robertson, D., Topp, C.F.E., Walkter, R.L., & Watson, C.A. (2021). Supporting wild pollinators in agricultural landscapes through targeted legume mixtures. *Agriculture, Ecosystems and Environment*, 323. <https://doi.org/10.1016/j.agee.2021.107648>

¹⁰ Adamson, H., Turner, C., Cook, E., Creissen, H.E., Evans, A., Cook, S., Ramsden, M., Gage, E., Froud, L., Ritchie, F., & Clarke, J. (2020). *Review of evidence on integrated pest management* (Project_27269). Defra. <https://pure.sruc.ac.uk/en/publications/review-of-evidence-on-integrated-pest-management>

¹¹ Scottish Government (2020, December 15). *Scottish Agricultural Census: final results – June 2020*. <https://www.gov.scot/publications/scottish-agricultural-census-final-results-june-2020/pages/12/>

22 Skills Development Scotland and NatureScot have looked at agriculture as part of their Climate Emergency Skills Action Plan¹² and Nature-Based Jobs and Skills Action Plan¹³, respectively. Common to both publications is the need to bring young people into the sector, especially those who might not be inheriting farms. Part of the challenge lies in updating perceptions about the sector and the types of careers and futures it can offer. Universities and colleges may have a role in helping to ‘promote’ the sector by offering programmes that are tailored to agriculture that also teach interdisciplinary or transferable skills such as business or conservation. ‘Meta-skills’ such as problem-solving and communication will also be important in helping farmers to adapt to the quick pace of change the sector is likely to experience.

23 Question 11:

Traditional land ownership in Scotland has been identified as one of the barriers to a just transition and there is already government policy to support an increase in community ownership. Other barriers include increasing uncertainty of income associated with more extreme weather events and the uncertainty of global markets.

Section E: Sequestration

12 How best can land use change be encouraged on the scale required for Scottish Government to meet its climate change targets?

Response:

24 Carbon sequestration can be achieved through various mechanisms, including through afforestation and reforestation projects. However, large-scale tree planting can be contentious from a biodiversity standpoint when it takes the form of monocultures such as many commercial timber production operations. Tree planting can also be counterproductive in terms of carbon sequestration and soil erosion if the siting and ground preparation, thinning,

and felling methods do not adhere to best practice. However, commercially grown wood occupies an important place in the circular economy as a sustainable alternative to traditional building materials and so Scotland will need to decide on the appropriate level of such forestry to encourage. Fortunately, there is a shift taking place towards integrating more native hardwood species into commercial forestry sites. Soil surveys have now been carried out across forestry land which should help in deciding which species are most suitable to a particular location.

25 In addition to forestry, restoring Scotland’s peatlands and wetlands – of which 80% are said to be damaged – will help to preserve the 1.6 billion tonnes of carbon they already sequester and ensure they continue to capture and store carbon over the long term. We therefore welcome the Scottish Government’s ten-year £250 million funding package to support peatland restoration.¹⁴ Other agroecological practices such as minimum or no tillage can also support carbon sequestration aims.

Section F: Productivity

13 Would incentives for farm plans specifically targeting flock/herd health, soil health, and crop health (for example) demonstrate real improvements in productivity over time?

14 Should future support be dependent on demonstration of improvements in productivity levels on farms?

Response:

26 Question 13:

Improvements in herd health and similar components of farm plans have the potential to contribute to progress towards net zero, but just having a plan in place is not sufficient. There is a need for more clarity on what it is that is being rewarded and that carbon reduction benefits can be measured.

¹² Skills Development Scotland. (2020). *Climate Emergency Skills Action Plan 2020-2025: Key Issues and Priority Actions*. <https://www.skillsdevelopmentscotland.co.uk/media/47336/climate-emergency-skills-action-plan-2020-2025.pdf>

¹³ NatureScot. (2021, August 5). *Nature-based jobs and skills Action Plan 2021-2022*. <https://www.nature.scot/doc/nature-based-jobs-and-skills-action-plan-2021-2022>

¹⁴ Scottish Government. (2021, June 5). *Funding to restore Scotland’s iconic peatlands*. <https://www.gov.scot/news/funding-to-restore-scotlands-iconic-peatlands/>

27 Question 14:

Future support should not be dependent on the demonstration of improvements in productivity levels on farms, or indeed on any other changes that will only become evident over time and indeed will not be equitable. One-off or delayed payments to incentivise a certain practice will not be enough to ensure that farmers are not disadvantaged in the shift towards a low-carbon society. This is especially true in the case of marginal upland farms which have been identified as some of the most suitable for peatland and woodland restoration and yet are also among the most economically precarious farming enterprises in Scotland. Farmers need to receive financial incentives both upfront and on a regular basis in recognition of their role as environmental stewards. Payments may be adjusted on the basis of monitoring data – for example, if such data reveals these farms are not sequestering sufficient carbon or are engaging in environmentally damaging practices – but a ‘wait and see’ approach that defers payments to some future date when carbon sequestration or biodiversity gain can be convincingly demonstrated is both inconsistent with a just transition and could compromise environmental targets by encouraging resistance.

Section G: Research & development

- 15 In light of ongoing research activities supported by the Scottish Government and the 2022-27 Research Strategy, are additional measures needed to ensure research is supporting the agriculture sector to meet its climate change targets?

Response:

- 28 Research is critical in confirming that Scotland’s efforts at decarbonising its agricultural sector are on the right trajectory. A critical assessment of agricultural research and development processes (e.g. around gene-edited crops) will help to expedite translational applications and ensure Scotland’s research providers are at the forefront of innovation. Research activities should maximise opportunities for co-design with farmers and rural communities and reflect the distinctive elements of Scotland’s SME-driven economy.

- 29 One positive development in the UK research landscape has been the rise of funding for collaborative team-led research projects in recent years, which – if appropriately designed – are well-placed to tackle the interdisciplinary and far-reaching issues that affect agriculture and land use.
- 30 While it is not mentioned in this section, we strongly support greater inclusion of social and economic sciences as a priority area for further research. Further, as mentioned in sections B (Capital funding) and H (Knowledge and skills), it should be introduced at an early stage to help engender confidence in the transformation process and to ensure any policies are informed by lived experience. In addition, integration of the natural, social, and economic research – with cooperation by industry – should help to improve the applicability of any research findings to society.

Section H: Knowledge & skills

- 16 What importance do you attach to knowledge exchange, skills development, and innovation in business?
- 17 What form should tailored, targeted action take to help businesses succeed?
- 18 Should continuing professional development be mandatory for businesses receiving public support funding?

Response:**31 Question 16:**

As mentioned under section A (Baselining), it will be important to support farmers to understand their role in hitting new targets for reducing carbon emissions and enhancing biodiversity, alongside food production.

32 Question 17:

While most of the knowledge and skills rhetoric portrays farmers as the intended recipients of this knowledge exchange, it is important to acknowledge that they and other landowners possess a wealth of experience and intimate knowledge of the local environmental context which can help to sense check and improve any planned national initiatives. Training should therefore be interactive and not just one-directional and include the facilitation of peer-to-peer learning. Land-based policy should be founded on a process of knowledge exchange between policymakers and agricultural communities, one in which they are invited and empowered to assist with the co-design of the policies which will impact them most directly. However, there is a balance to be struck between an appropriate level of system-wide applicability and the ability to customise policies to fit local conditions. For example, the EU-funded Scottish Rural Development Programme (SRDP) was criticised for being overly complex and therefore very difficult and expensive to monitor in practice, which eventually led to Scotland being fined by the EU for failing to deliver on its obligations under the SRDP.

33 Question 18:

There are multiple professions for whom continuing professional development is not only mandatory but a prerequisite for continued certification. As such, it would not be unreasonable to hold the agricultural sector to these same standards.

Section I: Supply chains

- 19** How can the green credentials of Scottish produce be further developed and enhanced to provide reassurance to both businesses and consumers?
- 20** Should farm assurance be linked to requirements for future support?
- 21** How can ongoing data capture and utilisation be enhanced on Scottish farms and crofts?

Response:**34 Question 19:**

On the topic of certification, it bears mentioning that any industry-led or self-certification schemes – particularly those purporting to accredit environmental compliance – can be a grey area whose credibility can be difficult to verify. Any green credentials should be independently assessed and awarded.

35 Question 20:

There should be an expectation that food produced in Scotland is of a high quality and assurance schemes may be necessary to achieve this. This is a point for discussion with the food and drink industry.

36 Question 21:

The concerns raised in section A (Baselining) with respect to skills demands apply here as well. Thirty seven percent of male and 30 percent of female working occupiers are over the age of 64 and this number has been increasing.¹⁵ This is a demographic which can find the use of computers and technology to be challenging or even intimidating. If Scotland is to expect farmers and crofters to collect sophisticated data, it must ensure they are properly trained and supported in doing so and that bureaucratic demands are lessened as far as possible.

¹⁵ Scottish Government (2020, December 15). *Scottish Agricultural Census: final results – June 2020*. <https://www.gov.scot/publications/scottish-agricultural-census-final-results-june-2020/pages/12/>

Additional Information

Any enquiries about this advice paper should be addressed to Daria Tuhtar (dtuhtar@these.org.uk).

Responses are published on the RSE website (<https://www.rse.org.uk/>)

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