

**RURAL ECONOMY AND CONNECTIVITY COMMITTEE**  
**SUBMISSION FROM THE CENTRE FOR KNOWLEDGE EXCHANGE AND**  
**IMPACT**  
**THE DRAFT CLIMATE CHANGE PLAN (RPP3)**

**BACKGROUND**

1.The **Centre for Knowledge Exchange and Impact** exists to improve the flow of research findings and expertise between the Scottish Government funded **2016-2021 Strategic Research programme (SRP)** on **environment, land, food and agriculture**, and policy, commercial and public users. The Centre's remit includes **internationalisation** - the UN has asked about entering into a partnership - and the Centre also improves understanding in how and why research is commissioned and used. The Centre is undergoing a branding exercise, and will re-launch in spring 2017, with a digital presence.

2.The **SRP is delivered by six Research Institutes**, each with **global** capability, expertise and reputation:

- [Moredun Research Institute;](#)
- [Scotland's Rural College;](#)
- [The James Hutton Institute;](#)
- [Royal Botanic Garden Edinburgh;](#)
- [Biomathematics and Statistics Scotland;](#)
- [The Rowett Institute.](#)

3.These Institutes work together, and with partners, to deliver **unique and globally distinctive multi and increasingly trans-disciplinary research**. The Centre draws staff from the Institutes and acts as a trusted knowledge broker through:

- Identifying where the SRP can **support policy solutions**, and facilitating appropriate conversations – across Programme for

Government, for environment and rural policy, and other policy areas (e.g. transport, health, planning);

- Delivering **solutions on national and grand global challenges** through a **Think Tank** (e.g. urban food, biodiversity targets);
- Funding a Fellowship Programme to **shorten the gap between evidence and decision takers** (e.g. Cairngorms National Park, Scotland's Futures Forum);
- Funding innovative activities to improve reach of the SRP and **showcase Government funded research** (e.g. Showcase Film to play at John Hope Gateway, Royal Botanic Garden Edinburgh).

## **THE SCOTTISH GOVERNMENT'S CLIMATE CHANGE PLAN**

4.The Centre for Knowledge Exchange and Impact is pleased to have the opportunity to contribute to the Rural Economy and Connectivity Committee's consideration of the Draft Climate Change Plan. As stated above, the SRP is delivered by six Research Institutes. Of these, three are responding individually to the calls from Parliamentary Committees on the Climate Change Plan (The James Hutton Institute; The Moredun Institute; Scotland's Rural College). This submission does not seek to replicate those, rather it gives a broader picture of where the SRP links with the areas of interest for the Committee. The Centre for Knowledge Exchange and Impact also works alongside the Centres of Expertise on climate, water, animal disease, and the Parliament will see a separate response from ClimateXChange in that regard.

5.This response focuses on the areas the Committee is interested in, though the SRP links across many policy areas. The Centre for Knowledge Exchange is also submitting evidence to Environment, Climate Change and Land Reform Committee – that response is more environment focused, but we have included some such references where appropriate in this response.

### **Overview, development of draft Climate Change Plan**

6.The way that the SRP is configured, over a five year period, means it uniquely contributes to the longer term ambitions of the Climate Change Plan, and its underpinning evidence base. The Centre for Knowledge Exchange and Impact is building on work already ongoing through the SRP, linking scientific and other analysis with policy development in the Scottish Government. It is also worth noting that there have been two previous five-year long iterations of the SRP, and in some cases it is research decisions and investments made then which are coming to fruition, or will do so.

7.As a general point, whilst this Plan is focused on mitigation, it is clear that some measures to improve adaptation can also have mitigation benefit, and vice versa. It is important these two areas of research and policy develop in tandem. An example would be work ongoing considering the strength of grass and crop roots. The end point of such research may be a change in crop or grassland habitat at vulnerable points in the landscape – e.g. reducing the risk of landslides onto the transport network - but also offering the opportunity to grow crops or grassland which could link into other climate mitigation measures (for example peatland restoration).

## **Rural Affairs**

8.The SRP is intrinsically linked to many aspects of rural life, with work contributing to many activities which take place in the rural environment, but which have implications for the choices and challenges faced by individuals both in a rural and urban context – for example food choices and associated health implications. In the rural context, however, examples of particular work developed through the SRP include:

- a) Exploring how changes in population of remote rural areas of Scotland affect the social, economic and ecological resilience of these areas;
- b) Improving understanding of the impacts of climate change and associated adaptation requirements for rural industries. Quantifying the risks of extreme weather and resilience can be important – if, for example, a business is less focused on making sure it does not flood, it may have more capacity to consider how to reduce its environmental impacts, or develop input to the circular economy;

- c) Researching human health benefits of Scotland's primary produce.

### ***Wider Rural Economy***

9. More specifically, the SRP includes work on the wider rural economy, such as:

- a) Providing analysis, evidence and policy support on the drivers of change within Scotland's rural economies and how policy makers and business can adapt for a more resilient economy;
- b) Targeting Economic Development within rural communities (e.g. a newly developed index of socio economic performance);
- c) Supporting innovation within Scotland's food & drink SMEs (e.g. working with Scotland Food and Drink, and the Food and Drink Federation to enhance SME access to research and innovation.
- d) Providing supporting evidence for CAP policy and Scottish Government negotiations with the European Commission.

### **Agriculture**

10. The SRP works on issues across the physical and policy landscape. Fundamentally this includes agriculture, where work takes place on topics as diverse as breeding animals in order that they produce less greenhouse gas emissions, to work on crops which require less energy or nutrient inputs. Work under the SRP includes:

- a) Improving understanding of impacts of management practices (such as muirburn) and changes in management (such as long-term agricultural intensification) on soil carbon sequestration;
- b) Developing of a Digital Soil Map for Scotland including risk mapping (e.g. for soil erosion);
- c) Developing indicators and measures for how nutrients cycle through soil – together with testing on barley and grassland;
- d) Contributing to more efficient production systems, healthier soils and more sustainable crop rotations;

- e) Exploring how what is known as “High Value Nature Farming” practices and restoration of degraded peatlands impact on improvements in biodiversity targets and reductions in GHG emissions;
- f) Exploring relationships between diet, grazing behaviour, genetics and control of infectious disease on greenhouse gas emissions, to underpin sustainable production of livestock in Scotland;
- g) Supporting rural and climate policy together (e.g. efficiency and sustainability of Scottish beef industry);
- h) Developing tools, techniques and best practice to allow the Scottish food and drink industry to reduce or valorise waste;
- i) Analysing the relationship (supply and demand) between Scottish exports and imported products; and the implications of these on sustainability, economic growth, food supply network resilience and food security;
- j) Supporting the rural economy through crop innovation (e.g. Barley, Wheat, Potato, Raspberry, Blackcurrant, Blackberry);
- k) Conducting plant health research helping underpin the rural economy (e.g. barley disease warning scheme; ash dieback prediction; plant root mechanics for soil stability);
- l) Enhancing livestock breeding approaches for improving quality, health, welfare of animal, and reduced environmental impacts.
- m) Supporting policy and improving economic resilience through livestock disease management and enhanced animal welfare;
- n) Preventing human disease through an improved understanding of how pathogens interact with the environment and the human food chain and links between human diet and health;
- o) Developing new products for improved plant and animal health such as the first vaccine in the world that combats worms in sheep.

## **Land Use, Land Use Change and Forestry (LULUCF)**

11. Whilst this policy area is one in which the Environment, Climate Change and Land Reform Committee called for evidence, it also links heavily into the rural affairs policy area. Whilst the policy area sits separately from other policy areas in the Plan – not least for reporting reasons - in the physical environment the links between

policy areas are critical. This is even more important as the LULUCF sector is due to see a dip in its sequestration potential. Examples of work undertaken through the SRP include:

- a) Improving measurement of greenhouse gas (GHG) uptake and release in peatland/moorland ecosystems, including identification of 'GHG hotspots';
- b) Investigating consequences of environmental and climate change on species, habitats and ecosystem health, and to manage them such that their resilience is enhanced;
- c) Examining natural assets (such as soils, water, biodiversity) to illustrate where we are living beyond planetary limits;
- d) Developing a model for quantifying material and energy flows from production and consumption of biomaterials within Scotland.

## **Forestry**

12. Whilst there is some forestry related work in the SRP, this relates to other work on land use. Clearly the role of forestry and woodland in sequestration is vital, and the Draft Climate Change Plan affords an opportunity to improve how research findings from the SRP and others, such as Forest Research, link together in this policy area.

## **Water**

13. The SRP includes work relating to the interplay between climate change and water. This links fundamentally to the rural environment and includes:

- a) Informing the regulation of river flows from hydropower schemes to optimise economic and environmental benefits;
- b) Exploring impacts of urbanisation upon catchments at the interface between urban and rural environments in, and explore opportunities to use green infrastructure to improve water quality and flows;

- c) Identifying catchments and conservation areas most vulnerable to environmental change, and evaluate measures to mitigate the impacts of increasing water temperatures upon aquatic organisms;
- d) Developing novel statistical techniques for detecting and predicting sudden ecological changes (tipping points), and interpreting high volumes of data from environmental sensor networks;
- e) Incorporating information on catchment management and resilience into decisions on operation of and capital investment in drinking water and waste water treatment.

## **Conclusion**

14. The role of the SRP is to provide research and expertise to support the development of policy, changing business practices, and behaviour change in Scotland and beyond. As such it is a key tool available to aid in the delivery of Scotland's climate change targets.

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