

**SEFARI Response to:**  
**‘An Interim Discussion Document from the Scottish  
Government’s Agriculture Champions’**  
**January 2018**

**SEFARI** (Scottish Environment, Food and Agriculture Research Institutes) represents the collective of six Research Institutes, each with global capability, expertise and reputation was [launched](#) by the Cabinet Secretary for the Environment, Climate Change and Land Reform on 29 March 2017. These are:

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

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SEFARI is “**Leading Ideas for Better Lives**”. SEFARI delivers the Scottish Government’s Strategic Research Programme by working across the following subject areas:

- ) Plant and Animal Health;
- ) Agriculture;
- ) Land and Communities;
- ) Climate and the Environment;
- ) Rural Economy;
- ) Food and Drink Innovation;
- ) Healthier Foods;
- ) Science Education.

## **Response to the Interim Discussion Document from the Scottish Government's Agriculture Champions**

We welcome publication of the Interim Discussion Document by the Agriculture Champions, and recognise the time and investment they are making to attend events around Scotland, and lead discussion on the themes within their remit. The SEFARI response collates some of the relevant evidence, research and ideas generated through the Scottish Government's Strategic Research Programme 2016-2021 which is delivered by SEFARI.

Representatives from across SEFARI have had the opportunity to feed into the work of the Champions through Working Groups and wider conversations, and we look forward to continuing such dialogue. This response builds on that interaction, and draws on materials in each of the three main themes within the Strategic Research Programme, namely Natural Assets, Productive and Sustainable Land Management and Rural Economies, and Food, Health and Wellbeing.

SEFARI research is designed to deliver to strategies and policies of the Scottish Government relating to the remit of the Agriculture Champions. These include the Good Food Nation, Ambition 2030 of Scotland Food and Drink Partnership, Land Use Strategy, Forestry Strategy, Land Reform (Scotland) Act 2016, HydroNation, Climate Change, and many others. Some research outputs and activities deliver evidence in support of such policies directly from the Strategic Research Programme, and through the Centres of Expertise on [Climate Change](#) (ClimateXChange), [Waters](#) (CREW), or [Animal Disease Outbreaks](#) (EPIC) or through call down requests from the Scottish Government.

### **1. Timescale**

We welcome the focus on the timescale of 10 to 15 years (p2) for a strategy relating to agriculture. The Scottish Government Strategic Research Programme 2016-2021 comprises research on topics that span a range of timescales. Examples include analysis of historical data to inform present, short-term policy scenarios (e.g. simulating change to correspond with the beginning of post-EU CAP withdrawal) and testing of longer term scenarios pertaining to climate change (to 2050). We believe that thinking about issues across a range of timescales, including how short-term decisions might affect the strategy, and how the strategy might help respond to long-term, slower change variables, is an appropriate way to proceed.

Over time, the capability of Scotland's land to support different types of agricultural activity is expected to change. A strategy for farming should consider the type, extent and geography of such potential change so as to protect land, which in future may be considered as 'prime', from development or other uses which preclude the principle purposes of food production, and other public goods, such as natural capital.

We support the opinion that 'one size fits all' (p2) is not the most effective approach, whilst agreeing that there is a need for collective voices to represent the agriculture industry's strategic needs. We agree on the need to take account of the diversity of Scotland's biophysical and socio-economic landscape, and the challenges this can

represent, as well as the notable diversity of Scotland's farmers, land managers and those involved in the downstream supply chain.

When reporting on leadership skills, we encourage consideration of the recent reporting to Scottish Government on Women in the Farming and Agriculture Sector<sup>1</sup>. As the Agriculture Champions will know, this presents evidence of the challenges relating to women in leadership in agriculture, as well as access to training and career paths.

We support the focus on technical and social innovation and new instruments (p3). The Strategic Research Programme will be exploring how 'new' approaches such as [social innovation](#)<sup>2</sup>, local governance mechanisms, payments for ecosystem services and social impact bonds might complement existing incentive schemes. These accompany technical innovations, often in collaboration with industry partners, such as gene editing, new vaccines, new plant protection methods, digital agriculture, robotics, and disruptive technologies such as [Indoor Vertical Farming](#). There is also a strong research focus on innovation in the agricultural sector through automation and new developments in [Precision Livestock Farming](#) (and arable/crop equivalents).

SEFARI has a key role to play in the development and rollout of innovation in the agriculture sector – as such, we are involved in the management and delivery of the new [Make Innovation Happen](#) and [Rural Innovation Support Service](#) programmes which exist to support innovation across agriculture, land use, and food and drink supply chains.

Establishing links across sectors is important. An example is SEFARI research on seaweed as a soil improver and fertiliser - this is demonstrating the benefits of linking agricultural and coastal communities and industries. We can also point to work on novel crops, and productive and sustainable land management.

Such work is underpinned by research which aims to enable the generation of more sustainable agricultural land use across Scotland. This is being achieved through a mix of natural sciences in combination with social sciences, to both understand and value current and likely future land use systems. Further research is developing the science needed for Scotland to improve the efficiency and resilience of crop production whilst protecting the environment, and rural communities.

## 2. Public Value

Much of SEFARI research is relevant to the theme of 'public value'. One focus is on 'natural capital' (termed 'natural assets' in the Strategic Research Programme) and the ecosystem services and benefits provided. This means that we are considering how management of agricultural land and resources delivers these services and benefits to society. For example, at a national level [natural capital accounts](#)<sup>3</sup> for

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<sup>1</sup> Shortall, S., Sutherland, L.A, McKee, A and Hopkins, J. 2017. Women in the Farming and Agriculture Sector, Final Report to Scottish Government. pp. 187.  
[www.gov.scot/Resource/0052/00521489.pdf](http://www.gov.scot/Resource/0052/00521489.pdf)

<sup>2</sup> <http://www.simra-h2020.eu/index.php/simradatabase/>

<sup>3</sup> <http://www.hutton.ac.uk/sites/default/files/files/research/srp2016-21/NCA%20Primary%20Valuation%20Progress%20171009.pdf>

agriculture are being developed, alongside [macro-economic modelling](#)<sup>4</sup>, looking at impacts of changing diets on the agricultural sector, and wider economic indicators. At local levels, researchers are working in remote rural (Glen Creran), rural (Upper Deeside, Speyside) and peri-urban (Cumbernauld) settings to establish what local communities understand about their natural capital assets and how they benefit from them. We support the logic and principle stated of “...the public interest [...] lies in having security of food supply, produced from the most appropriate land, and safeguarding best land for food production wherever possible.”

Findings from the previous Strategic Research Programme (2011 to 2016) show the importance of taking account of both current and prospective pressures and constraints (e.g. relating to climate change) when considering its use. For example, actual and potential changes in climate have enabled assessment of [potential changes](#)<sup>5</sup> in the widely used maps of [Land Capability for Agriculture of Scotland](#) produced by the James Hutton Institute.

Through current research, emerging findings are of relevance to the concept of safeguarding the uses of land for food production. Such research includes illustrating the benefits of ‘survivalomics’ in which the importance of [genetic diversity](#)<sup>6</sup>, in both crops, trees, animals and livestock, ensures that Scotland is resilient to future pests, diseases and climate change; and how species adapted to nutrient poor soils can help extend the range of arable cropping for food security.

These developments apply to farmed livestock, in terms identifying and responding to changing patterns of endemic and exotic disease through enhanced disease surveillance, the development and deployment of novel diagnostics and vaccines and sustainable disease control strategies. It is also reflected in research focused on reducing greenhouse gas emissions from livestock through improved efficiency of livestock production, enhanced breeding and feeding, and reducing the burden of endemic disease. This work is led by Moredun Research Institute and SRUC, with delivery to policy teams utilising the Scottish Government [Centre of Expertise on Animal Disease Outbreaks \(EPIC\)](#).

Previous research mapped the delivery of [ecosystem services](#)<sup>7</sup> or public goods. In the current Strategic Research Programme, researchers are looking at how these services are ‘bundled together’, and where there may be trade-offs, particularly in light of increasing food production, woodland expansion, and/or peatland restoration; and between managing water quality and water quantity. This work seeks to connect historic agriculture payments with delivery of ecosystem services.

Research being carried out under the current Strategic Research Programme is designed to help land managers minimise trade-offs and maximise mutually beneficial

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<sup>4</sup> [http://www.hutton.ac.uk/sites/default/files/files/research/srp2016-21/RESAS\\_srp142\\_D1\\_Econ\\_analysis\\_of\\_agriculture\\_sector\\_using\\_augmented\\_IO\\_analysis\\_v3.pdf](http://www.hutton.ac.uk/sites/default/files/files/research/srp2016-21/RESAS_srp142_D1_Econ_analysis_of_agriculture_sector_using_augmented_IO_analysis_v3.pdf)

<sup>5</sup> Brown, I., Poggio, L. Gimona, A. and Castellazzi, M. 2011. Climate change, drought risk and land capability for agriculture: implications for land-use in Scotland. *Regional Environmental Change*, 11(3):503–518. doi:10.1007/s10113-010-0163-z

<sup>6</sup> <http://www.hutton.ac.uk/research/srp2016-21/wp131-biodiversity-and-ecosystem-function/crop-diversity>

<sup>7</sup> <http://www.arcgis.com/apps/MapSeries/index.html?appid=a1c9afe0f8594c3da68654f8124632fa>

interactions between agricultural production and woodland expansion, informed by findings on woodland connectivity (e.g. the minimum size and shape of woodlands required to ensure species dispersal and viability). The research also highlights where there are potential disbenefits that require mitigation (e.g. producing habitat suitable for wading birds and natterjack toads can increase [risk of liver fluke](#)<sup>8</sup> in grazing livestock). This work builds on a body of collaborative research into disease risk in the environment, which has implications for human health as well as that of farmed livestock and wildlife.

An example of the research of relevance to branding and heritage value (p4) is that which is highlighting the importance of landraces and other 'iconic' aspects of Scottish natural capital that are feeding into high value niche products e.g. [bere barley](#)<sup>9</sup> into craft beers and malt whisky.

### 3. Strategic Themes in the Interim Discussion Document

The six strategic themes identified in the Interim Discussion Document provide a useful set of headings with which to develop the narrative. It is important to raise awareness of how businesses are dependent on natural assets, as well as helping to produce them. For example, extensive agricultural grazing practices maintain species richness in many coastal areas that make up our varied and iconic Scottish coastline.

However, as noted in relation to natural capital (p6), some phrases can be off-putting. Previous work has considered problems of [terminology](#)<sup>10</sup> around the Ecosystem Approach (advocated in the Scottish Land Use Strategy). This is a theme repeated when surveying public sector organisations about [natural capital](#)<sup>11</sup> and also arises in conversations with [farmers](#)<sup>12</sup>. To assist with consistency and accuracy in meaning, outputs of such SEFARI research work is likely to be useful when developing the discussion.

Amongst other topics which could be taken into account is the influence of property rights on business objectives (e.g. short-term tenancies versus estates) and recognition of the different business models and objectives.

It has been noted that the Interim Discussion Document contains a relative lack of reference to monitoring of the farmed environment. Recent research on [monitoring](#)<sup>13</sup> suggests that Scotland has a strong focus on the state of our environment, driven by statutory requirements, but there is less of a focus on connecting how changes in management (e.g. through river basin management planning or adopting an agri-environmental measure), has led to such a change.

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<sup>8</sup> [http://www.hutton.ac.uk/sites/default/files/files/Fluke\\_poster\\_small\\_PS%2010817\\_MkIII\[1\].pdf](http://www.hutton.ac.uk/sites/default/files/files/Fluke_poster_small_PS%2010817_MkIII[1].pdf)

<sup>9</sup> <http://www.hutton.ac.uk/news/understanding-living-heritage-bere-barley-more-sustainable-future>

<sup>10</sup> <http://www.knowledgescotland.org/briefings.php?id=383>

<sup>11</sup> [http://www.hutton.ac.uk/sites/default/files/files/research/srp2016-21/Understanding%20and%20using%20the%20concept%20of%20Natural%20Capital%20in%20Scottish%20Public%20Sector%20Organisations\\_171114\\_final.pdf](http://www.hutton.ac.uk/sites/default/files/files/research/srp2016-21/Understanding%20and%20using%20the%20concept%20of%20Natural%20Capital%20in%20Scottish%20Public%20Sector%20Organisations_171114_final.pdf)

<sup>12</sup> <http://escom.scot/sites/default/files/resources/natural-capital-escom-report8-12-16final.pdf>

<sup>13</sup> [http://www.hutton.ac.uk/sites/default/files/files/research/srp2016-21/MEEM%20Technical%20Report%20\(Nov%202017\).pdf](http://www.hutton.ac.uk/sites/default/files/files/research/srp2016-21/MEEM%20Technical%20Report%20(Nov%202017).pdf)



There is a gap in the evidence base on how investing in natural capital through land management practices has delivered both private and public benefits. Answering that question would assist the quality of dialogue with land managers, and help with development of appropriate policy or legislative responses.

SEFARI also carries out research relevant to a 'change in mind-set' (p5-6; p7), including which of the regulatory and incentive [policy instruments](#)<sup>14</sup> used to help farmers protect or invest in natural capital are most effective when combined with advice and information provision; particularly when farmers can learn from their peers (e.g. Farming for a Better Climate (p7) is a case study being evaluated in the Strategic Research Programme).

We agree that there is a need for a new focus on soil health (p7). This is consistent with the recommendations of the UK Parliament Environmental Audit Committee Soil Health Inquiry. We can assist the Champions by briefing them on the issues raised by that Inquiry and their significance for Scottish farming. A relevant booklet produced by the Strategic Research Programme (2011-2016) is accessible [online](#)<sup>15</sup>.

Research on engaging farmers in monitoring their soils is also taking place to complement research on wider agro-ecological approaches (p7). In particular, research on [vegetation diversity to improve crop productivity](#)<sup>16</sup> may have relevance to reduced input farming (p7), suggesting that biodiversity and genetic diversity can co-exist or even improve productive capacity of commercial crops.

Ongoing SEFARI research with farmers is analysing when and why they wish to collaborate at a catchment scale, and how to support this [collective approach](#)<sup>17</sup> to their landscapes to the protection of soil, water and biodiversity as assets for their businesses. This reflects the recognition given in the Interim Discussion Document of the importance of farmers for protection and enhancement of natural capital (p6-7).

We strongly support the need to continue to focus on how to integrate policy for land use (p8). Ongoing [research](#)<sup>18</sup> suggests that the policy landscape is crowded, and whilst there are no overt policy conflicts, there are gaps and potential duplication that could be addressed. We agree that climate change adaptation and mitigation needs be considered as part of farming practice (p7). One example of relevant [research](#)<sup>19</sup> of this issue is on lifecycle analysis of the livestock sector, including [greenhouse gas emissions](#)<sup>20</sup>.

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<sup>14</sup> <http://www.hutton.ac.uk/research/projects/analysing-how-policy-instruments-shape-soil-water-and-biodiversity>

<sup>15</sup> Soils: Environment, Health and Society, A summary of research outputs supported or facilitated by the Environmental Change Programme of the Scottish Government's Portfolio of Strategic Research 2011-2016. pp24.

<sup>16</sup> [www.plant-teams.eu/](http://www.plant-teams.eu/)

<sup>17</sup> [www.hutton.ac.uk/sites/default/files/files/Summary%20of%20Glensaugh%20farm%20event%20\(Sept%202017\).pdf](http://www.hutton.ac.uk/sites/default/files/files/Summary%20of%20Glensaugh%20farm%20event%20(Sept%202017).pdf)

<sup>18</sup> [www.hutton.ac.uk/research/projects/analysing-how-policy-instruments-shape-soil-water-and-biodiversity](http://www.hutton.ac.uk/research/projects/analysing-how-policy-instruments-shape-soil-water-and-biodiversity)

<sup>19</sup> [www.hutton.ac.uk/sites/default/files/files/research/srp2016-21/RESAS\\_srp142\\_biv\\_Willcock\\_Sustainable\\_Supply\\_Chain\\_report.pdf](http://www.hutton.ac.uk/sites/default/files/files/research/srp2016-21/RESAS_srp142_biv_Willcock_Sustainable_Supply_Chain_report.pdf)

<sup>20</sup> [www.sruc.ac.uk/downloads/download/1299/distillery\\_by-product\\_use\\_and\\_greenhouse\\_gas\\_emissions\\_from\\_scottish\\_malt\\_whisky\\_production](http://www.sruc.ac.uk/downloads/download/1299/distillery_by-product_use_and_greenhouse_gas_emissions_from_scottish_malt_whisky_production)

## General comments

The following areas are examples of those in which research is being undertaken in SEFARI which could add value to the work of the Agriculture Champions.

- i) [Gaps](#)<sup>21</sup> have been identified in the current agri-environmental climate schemes, such as winter stubbles, pollinators, invertebrates and flora species/habitats (e.g. rare temperate rainforest bryophytes). Methods are being testing to improve both the coverage and the targeting of the schemes for the future.
- ii) Farmed landscapes are of importance in relation to Scotland's [cultural ecosystem services](#)<sup>22</sup> that also link to its international reputation and brand. This is an example of a topic which could be discussed in terms of risk (e.g. risk of adverse effects of farming systems), and how a strategy for farming manages such risks. This would be complemented by a positive approach to enhancing the benefits from farmed landscapes.
- iii) The Interim Discussion Document could initiate increased attention on connecting land use with health impacts. Such links include:
  - a. The prevalence of ticks increasing under climate change; and potentially with a decrease in sheep as alternative vectors to humans;
  - b. The efficient, sustainable and economic production of crops and livestock with optimal nutritional and health attributes for end consumer (human and animal);
  - c. The diversification, development and economic potential of new or underutilised crops and products to address changing health requirements and to address the potential impacts of climate change;
  - d. Reduction and/or valorisation of waste and of by-products including applications to non- food sectors contributing to a greener and more efficient sector whilst addressing Zero Waste Scotland challenges for a circular economy;
  - e. Meeting the aspirations of Good Food Nation by extending access across to all Scottish population demographics to the high quality food and products from our agriculture sector;
  - f. Supporting customer and consumer expectations for quality and provenance from Scottish agriculture production and through this contributing to growing the value of Scotland as the Land of Food and Drink;
  - g. The positive effect on mental and physical health of 'greenspace', including farmed landscapes where recreational opportunities are provided.

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<sup>21</sup>[www.hutton.ac.uk/sites/default/files/files/publications/Identifying%20Gaps%20in%20the%20current%20Agri\\_ver4.pdf](http://www.hutton.ac.uk/sites/default/files/files/publications/Identifying%20Gaps%20in%20the%20current%20Agri_ver4.pdf)

<sup>22</sup>[www.hutton.ac.uk/sites/default/files/files/research/srp2016-21/RESAS\\_srp141\\_D1\\_DataGapAnalysis\\_final.pdf](http://www.hutton.ac.uk/sites/default/files/files/research/srp2016-21/RESAS_srp141_D1_DataGapAnalysis_final.pdf)

- iv) The link between agriculture and other rural industries, particularly food production, tourism and recreation, is very important with respect to economic growth, public values, societal brands and raising awareness of natural capital.
- v) SEFARI Gateway is working to ensure improved access for primary producers and a variety of other agri-food interests to SEFARI research and expertise. Key benefits will be helping primary producers to retain more value. Research is also helping to provide enhanced understanding of shorter, often local supply chains. This is helping to address challenges set in Ambition 2030 of Scotland Food and Drink Partnership.
- vi) SEFARI Gateway is also facilitating research on related national challenges - including urban food, and alternative sources of protein. More information on this work is available if required.
- vii) Diversification into agri-tourism could stimulate additional economic activity and be a part of the leadership and training focus. [Previous research](#)<sup>23</sup> concluded that more commercial farmers could adopt the World Wide Opportunities on Organic Farms model to use volunteers to help deliver environmental management and monitoring on their farms.
- viii) Amongst other topics where expertise in SEFARI could be of assistance, is in the discussion about the advantages and disadvantages of 'payment according to outcomes' (p5).

SEFARI stands ready to assist in the ongoing work of the Agriculture Champions, and we look forward to further dialogue. One specific offer is that we could use our Think Tank mechanism, designed to explore and find solutions to grand national challenges, to feed into further work by the Agriculture Champions.

## ENDS

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<sup>23</sup>[www.knowledgescotland.org/briefings.php?id=228](http://www.knowledgescotland.org/briefings.php?id=228)



