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A CO-ORDINATED AGENDA FOR MARINE, ENVIRONMENT AND RURAL AFFAIRS SCIENCE (CAMERAS) (20011-2016) FUNDED BY THE SCOTTISH GOVERNMENT

A Response from SAC

20 March 2009

Headline Themes

1. ***Do you agree that the two broad categories of 'Local Responses to Global Change' and 'Optimising the Potential Of Scotland's Natural Assets' are helpful in providing an overlaying structure to the Co-ordinated Agenda?***

In broad terms, yes.

The phrasing of descriptions behind the headline themes does, however, tend to focus more on physical assets than on Scotland's people as assets, and to see Global Changes as largely challenges ('Scotland will not escape...') rather than as a mixture of challenges and opportunities (eg IPCC predictions of opportunities for food production in North-West Europe). In developing the programmes of research that follow from this consultation it would be good to see a balanced research programme that gives strong emphasis to the social as well as biological/physical dimensions of protecting assets and the encouragement (and achievement) of sustainable economic growth. There should be strong emphasis on the element of 'Optimising the Potential' to bring forward approaches, processes, products and policies that will drive a vibrant rural and marine economy in harmony with environmental goals.

A bolder approach to post 2016 will be needed to take advantage of the growing opportunities. It may also be socially responsible to consider the global consequences of local change e.g. the impact on developing countries when developed countries alter their trading habits.

2. ***Are the descriptors of these set out in Section 3 (and Annex 3) comprehensive?***

No.

The 'Local Responses to Global Change' theme almost completely fails to identify opportunities that may arise from global changes of the various kinds indicated in the document. The recent vision for a productive agriculture for Scotland (as expressed by Richard Lochhead at the Oxford farming Conference 2009) needs to be seen in the context of a rapidly changing agenda for food supply and security. The CAMERAS approach is falling behind broader policy developments that see food production and supply security as of growing importance. Other research agendas (eg BBSRC's new strategic priorities) are more in tune with these new priorities. CAMERAS should be more explicit in identifying the need for more research in the use of

land for efficient production of food to enable Scotland to exploit the opportunities that will arise in this area especially. We recognise that there is some reference to this in the section on 'Optimising the Potential...' but the emphasis is far too modest. These new issues interact with the opportunities (and challenges) that will come to Scotland as a result of the changing climate.

The two main delivery themes do not mention the role of Knowledge Exchange in the realisation of the themes. Understanding 'social and economic behaviours' and how to influence them will be crucial to the delivery of helpful outcomes from the science implied in the themes. KE, and how to achieve it effectively (i.e. with desirable impact) is part of this, but is not mentioned. It may also be useful to consider how changes in food produced in Scotland could affect the nation's health through changes in eating patterns and diet.

The descriptors fail to pick up clearly enough three important areas of policy and practice:

- Land-use conflict for different purposes (food, energy etc.)
- Costs and benefits of different kinds of land management ('environmental resilience')
- Implications of the loss of livestock from upland/hill areas

3. Do these cover the major policy challenges where science can contribute as you see them?

Our response to Question 2 covers this point.

4. Are they likely to remain broadly relevant over the longer time horizon (well beyond the 2016 focus of this Coordinated Agenda)?

Yes, but the relative importance of different aspects will change.

The biophysical, demographic and trade implications of changing climate will evolve steadily over several decades. The imbalance between Energy demands and supply will become more marked. The consequences of the recent economic downturn can also be expected to last well beyond 2016 and will interact with the longer term impacts of changing population, population demands and climate.

5. Do you agree with the description of support for the National Capability Theme set out in Section 3 (and Annex 3)?

Not completely.

The description does not emphasise enough the importance of maintaining a skill base that can both help to protect Scotland's interests in the face of challenges and to exploit opportunities to help to drive sustainable economic growth. There are several areas of skill (see responses to 6 and 7 below) that

are not readily available outside the MRPs and other institutions in the CAMERAS domain to provide the Scottish Government with the required comfort.

6. ***What facilities, resources and data do you think are important for Scotland to maintain?***

With respect to the specific interests of the CAMERAS agenda:

Facilities to:

- Carry out systems studies at appropriate scales (e.g. farm scale) that allow integrated evaluation of knowledge about system components in a systems context
- Contain animal and plant diseases for research where such facilities are not readily accessible elsewhere to Scottish scientists
- Measure and find ways to control emissions that contribute to Climate Change from livestock, cropping and other land-management systems
- Do research with farmed livestock (especially when under control of ASPA)
- Support whole organism and system-level studies with molecular level information (high throughput methodologies; 'omics')

Resources to:

- Provide data collection, collation and management systems that will enable 'single entry, multiple use' approaches to data interrogation and use. For example an integrated approach to the alignment of genetic, health, movement, production and other records for farmed livestock would offer the potential of giving Scotland a world lead in the ability to design and deliver high value (economically, socially and environmentally) products for sustainable economic growth.
- Train future scientists in the skills that will be needed to deliver practical outcomes in the areas that will drive sustainable economic growth
- Translate new knowledge and understanding into practical outcomes
- Underpin future research e.g. genetic resources for animal and crop research

Resources in the form of people and teams with specialised skills that would be difficult or impossible to replace should also be carefully considered in this respect.

Data on:

- Animal and crop diseases
- Genetic resources for agriculture (plant, animal, microbial)
- Rural demographics
- The rural economy and land use

- Soils
- Climate
- Ecosystem goods and services
- Animal welfare

A list is attached of specific resources in our own organisation that we believe are important to maintain.

7. Are there other resources that Scotland needs to acquire to support future policy development?

The list we have provided for 6 above includes some elements that exist only in part at present. Many current resources are distributed and fragmented; there is a case for a more coordinated and sustained approach to funding. This will, we hope, be a feature of the capability support that is described in the CAMERAS document.

Access to wider genetic bases for crops would be helpful in designing crops for future systems of production.

A more coordinated resource to support policy over time (through education and training as well as more immediate delivery), and to make a major contribution to the 'seventh sector' of the growth economy would be to create 'A Rural University for Scotland'.

Trying to provide many resources may lead to dilution of resources to important areas. In some circumstances, it may be more efficient for Scotland to have well defined access to large scale or expensive resources that are already in existence elsewhere. This will require agreement at national level to ensure that the current resource in question is maintained, well funded and available to Scottish scientists when required.

Policy Issues

8. Have we correctly identified the key policy issues and the associated scientific opportunities in Section 3?

The main policy issues have been mentioned, although sometimes very briefly. This makes it difficult to assess the weight, or priority, that is being given to different issues. For example, there is mention of 'globally traded commodities' but no mention of the policy implications in this area of the recent downturn in the world economy, which is likely to influence the rural and marine sectors throughout the outlook period for the CAMERAS document. Also food supply chain security is not mentioned explicitly – yet it is clearly coming to be a dominant policy issue. Little weight appears to be given to demographic issues; in the longer term (beyond 2016) these could have a very marked impact on Scotland's rural sector and overall economy.

It is difficult to comment on scientific priorities as there is no indication in the CAMERAS document as to the relative priorities that might be ascribed to the various issues that are mentioned. Those that are mentioned do cover, at a very broad-brush level, most of the major issues that we would identify, subject to our comments on Question 2, and the comments immediately above.

Across a range of scientific activities there is both a need and great opportunity for Scotland to translate discoveries from the so-called biological revolution into tools and systems that will sustain sustainable economic growth and other societal/environmental benefits.

In general the document lacks ambition for Scottish Science as a contributor to economic development in its own right. We hope that the excellence of the strategic and applied science base that is currently present in Scotland will continue to be supported as a national strength for sustainable economic growth.

9. Are there additional issues that should be included?

Yes.

Food supply chain security and the impact of future global demographic movements for Scotland; greater emphasis on translational science to reap the benefits of new biological discoveries.

10. What do you think will be the most important influences on Scotland's future in the Marine, Environment, Rural Affairs and related areas?

In the short to medium term:

- The global economic situation and especially the pattern of recovery
    - because this will set the overall economic climate in which the rural and marine sectors will operate
- The 2013 reform of the Common Agricultural Policy
    - because this will determine the operating framework for most of the land-based industries in Scotland and the rest of the EU
- The increased volatility of climate
    - because this is already placing new demands on the land using industries (for example through exaggerated limits of water availability (drought; flooding) and the incursion of new diseases).
- Social and demographic changes that relate to land industries
    - because ageing farming populations, lack of succession, lack of skills and labour and shifts to more part-time are creating many of the farming and associated biodiversity issues (some of which may be offset by an increase in unemployment in other sectors).
- Social attitudes to agriculture

of high cost or high risk) are, and continue to be, accessible for use by Scottish based scientists.

For example, in support of disease research, information from, and access to, remote facilities for the study of Category 4 diseases may continue to be sufficient.

The use of resources developed elsewhere should be encouraged strongly so that capital investment in Scotland will add most effectively to the international scientific community and be targeted at work that Scotland needs and cannot be done elsewhere. Having a copy of an existing resource means money is not available for resources that are not available elsewhere.

16. In the time frame for CAMERAS (2011-16) what new emerging areas of science are likely to mature and become available for more general use or application?

Micro and distributed capability for information capture (eg 'magic dust') may evolve to provide much enhanced capability for monitoring eg environmental or disease events.

Genome-wide methodologies for evaluating genotypes, and facilitating the understanding of phenotypic behaviour should be available.

Visualisation techniques for complex systems.

17. Do we have the expertise available to be able to use these new opportunities?

Potentially yes.

Realisation of the potential value of developments in micro-technologies will call for closer interactions between CAMERAS natural scientific community and those in the micro-electronic and physical sciences.

18. In which areas does Scotland need to be self-reliant?

Scotland needs to be self-reliant in:

- The local interpretation of science for policy. This would include interdisciplinary and modelling capabilities that are targeted at specific Scottish interests, for example the ability to achieve the 15 National Outcomes, set as targets for the next 10 years.
- Areas where Scotland is distinctive in a both European and UK sense, For example, Scotland has an upland and mountainous character and a long tradition of pastoral land use systems that differs much from the rest of the world, and these create a different blend of other issues, for example, many biodiversity, climate change and hydrological issues which differ from further south.

- Areas where it has particular wider policy needs – importantly health and urban and rural deprivation issues - and distinctiveness in its land use connecting farming to other industries, notably rural tourism and forestry, that differ significantly from that in the rest of the UK

Delivery

19. Knowledge Exchange is essential for scientific activity to achieve impact. Do you agree that KE should be an explicit and integral aspect of the delivery of this Coordinated Agenda?

Yes.

Scientific activity is only really of value when applied for economic and social benefit. Research on how to improve the effectiveness of KE is justified as part of this. KE strategies need to be organised at a sufficient level of aggregation that the interconnections amongst a range of scientific and stakeholder interests are captured effectively in the engagement process.

20. How can we continue to improve the integration of evidence from a diverse range of sources into forms that are accessible to end-users?

Support specific integrative activities that are geared to be accessible to a range of end-users (for example the SAC Rural Policy Centre; knowledgescotland). Enhance modelling capability and translational research to support the integrative objectives. Support activity to understand the impact, outcomes and risks for the policy stakeholders. Coordinate KE across the MRPs with clear lead responsibilities. Appoint KE Champions at MRP's who liaise with KE lead. Train MRP staff to do KE better. Appoint professional KE staff ie staff who want to do it, not scientists who don't. Design good KE with clear policy outcomes from conception of the R&D, not as an afterthought once science is done. Commission research to find out how to measure the impact of KE effectively. Integrate researchers with consultants and teachers – SAC!

21. How can we reconcile the requirement for science to be responsive and flexible to short-term demands while at the same time ensuring that longer term strategic research continues to progress our knowledge and understanding?

The dual funding mechanism that has been employed in the University sector may be a helpful analogue here. The suggested Support for Nationally Important Capability and Resource could be expanded to include support for flexible-response capacity along the lines of the current CRF. The emergency response funding that has been used alongside the Epidemiology Centre of Excellence is an effective model.

22. How can we ensure that the two-way flow of knowledge from science to policy and from policy to the academic community is optimised?

By providing a single, easy to access focus for outputs (that are directly related to clearly defined policy outcomes) from the R&D programmes, and which also allows users to comment on such material (e.g. develop further the knowledgescotland programme). This could be coupled with targeted review workshop events to encourage two way flows of information.

The scope of engagement should be broad enough to capture the interests of NGOs and other, wider, policy audiences.

23. Are there alternative structures/systems or new approaches/ organisations that could enhance these flows?

There are a number of features of the knowledgescotland project that might improve these flows. These should be evaluated carefully over the course of the project and, where benefits are identified, given ongoing support.

Centres of Excellence, carefully selected, could offer very efficient vehicles for improving these flows. 'Sustainable Farming Systems' and 'Living with Climate Change' would be centres worth considering.

24. Are there science delivery models which could provide examples of good practice for Scotland to follow?

Possibly – although many observers outside Scotland have a very high respect for the delivery model already in place amongst the MRPs.

The USDA model for linking science and policy is impressive; Scotland would need to consider carefully the costs of reflecting that model.

General Comments

25. We would also welcome any other general comments you may have on any of the issues raised in this document.

a) The Higher Education sector is now recognised as the seventh key sector for contributing to sustainable economic growth in Scotland. The document does not mention this in Section 1. It may, however, be germane to the key objective (Aims & Objectives para 2) of 'enabling the organisations involved to progressively align and integrate their individual activities in support of high level priorities'. Whilst the CAMERAS consultation does not specifically ask for comment on the delivery mechanisms for programmes of research it might be appropriate to consider the advantages, for achievement of this 'key objective', of moving towards a more fully integrated delivery structure as suggested by the RSE:

(http://www.rse.org.uk/govt_responses/2008/effective_government.pdf)

b) It is important that the delivery of this strategy does not undermine the strategic strengths of Scotland's science network.
c) Scotland needs to make sure that it remains well positioned to access broader national and international funding streams to add value to CAMERAS.