A COORDINATED AGENDA FOR MARINE, ENVIRONMENT AND RURAL AFFAIRS SCIENCE (CAMERAS) (2011-2016)

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I welcome the opportunity to be able to comment on the CAMERAS initiative being developed by the Scottish Government. There is much in the consultation document that is to be welcomed and supported. If the background policy context is somewhat labyrinthine, the theme of integration of science in order to support sustainable development in Scotland comes through clearly.

The notion of sustainability was adopted by the Scottish Office 15 to 20 years ago. Unfortunately this was cosmetic rather than substantive, with little obvious effect on policy. Not least of the barriers was the difficulty of persuading groups within Departments to co-operate, let alone the Departments themselves. If sustainable development is at last to be taken seriously it can only occur if it does permeate the Government as a whole. It is very encouraging to read in the Paper that there is a genuine commitment to integration. However, a serious limitation of the Paper is that it is confined to the Marine/Environment/Rural domain. Real sustainability has to involve more than that and I hope that one outcome of this consultation might be to persuade Ministers to take not just the hop and the step, but the jump as well. One means of achieving this is suggested below.

"Scale" is a word that comes up time and again in relation to Scotland and its administration. The half-empty brigade always see small scale as a major disadvantage – for a variety of reasons, some justifiable. But the half-full view stresses that small scale offers opportunities of integration of effort, both within the administration and in the Scottish science community, that are unachievable in even the UK and certainly in wider international contexts. Given that sustainability is all about achieving an integrated view, Scotland has a real potential advantage to lead the UK and start to catch up with, and in some areas lead, other nations further afield.

There is some confusion in the Paper over what questions to answer. In Section 4, respondents are invited to "*consider and comment on the headline themes, policy issues and questions outlined in Section 3*", but the further questions that are intended to help formulate a structured response (1 to 24) do not in many cases seem to relate obviously to those in Section 3. To maintain the confusion, my response below is based on the four broad areas that respondents have been invited to consider. I have labelled these *A* to *D*. Within *A*, I deal first with Questions 1 to 7 in Section 4 (relating to the headline themes); then to the Policy Issues questions that appear in Section 3. The

response to *B*, *C* and *D* is not subdivided. However, I respond first to Question 25, which invited general comments.

General Comments

There are four main weaknesses that I see in this paper.

> it begs the question of how sustainable economic development will be recognised
>
> linked with that, there is too little emphasis on the interpretation of scientific information for policy use as opposed to the gathering of scientific "knowledge" (eg data, models)
>
> it is too negative about the impact of climate change on Scotland
>
> it proposes no structure or structures that will ensure that within-government agencies (or equivalent) will actually work towards the common good rather than to their own agendas

Sustainable development has always been a tricky notion to deal with at close hand. At the broadest level (leaving the world no worse for our children) and at the intermediate level (less CO_2, more renewable energy, more re-cycling, conserving resources) it is relatively easy to go along with. But at the detailed level the lack of information, and conflicts, become apparent. "Optimal" re-cycling strategies seem to be being continuously revised as information is gained about the advantages and adverse impacts of different processes; renewable energy is fraught with difficulties in comparing wind, tidal and biofuel strategies over time, when optimal solutions will need to reflect national and local considerations – and may be quite different in each case; seemingly obvious strategies such as windfarms and new hydroelectric schemes are opposed vigorously because of their potential impact on landscape or wildlife; and discouraging the flying of off-season vegetables from Africa (to reduce air-miles) could impact adversely on the development effort made over years by the aid agencies working with populations having a comparatively minute carbon footprint. By what criteria will optimisation of sustainability be assessed?

Interpretation The generation and gathering of knowledge on which to base policy development is essential, but on its own that is a sterile operation. The crucial step is to interpret that knowledge for policy makers so that "sustainably optimal" policies can be developed. It is essential that the analysis involved is transparent. This is a huge challenge given that scientific, economic and social dimensions have to be taken into account (as is recognised in the Paper). In addition, whilst scientists of whatever kind tend to caution when drawing conclusions and generalisations from their own or other published work, often only too aware of the limitations of the work their

conclusions have been based on, policy makers seek much firmer guidance that can be translated into robust policies or even legislation. Bringing these cultures together is part of the interpretive challenge.

Climate change The context for the Headline Theme in the Paper (Local Responses to Global Change) I agree with, but the policy issues section in relation to climate change comes over as overwhelmingly and disappointingly negative. Of course there will be problems, but all the forecasts seem to suggest that Scotland will be one of the fortunate areas of the world with opportunities as well - which are not restricted to the field of renewable energy. In fact the development of renewable energy should be occurring in response to other drivers of global change almost irrespective of climate change! Mitigation will only take effect in the long term. Change will continue to occur as a result of past action, and adaptation is a challenge for the medium as well as for the long term. However, exploitation of those advantages that climate change might bring will, arguably, be a key factor in the future sustainable economic development of Scotland. Research and sustainability analysis will have a crucial role to play in opening up this field.

Structures It is encouraging to think that the *"cross-cutting approach to Government provides a strong driver and exciting opportunity for the scientific NDPBs and agencies to work more closely with Government to co-ordinate their scientific activities in support of the purpose"* (sustainable economic growth). With the agencies in particular, which are meant to be the instruments of Government policy, this sounds as though they could still be tangential to the central purpose rather than subsumed within it. On the one hand, the Fisheries Research Service already faces the real-life conflict of conserving fish stocks in the face of pressure from commercial fishing, whilst fish species migrate in the oceans in response to climate change. Sustainablity has a dynamic that is obviously recognised.

Departmental/sectoral boundaries within the Scottish Government should not be allowed to interfere with the establishment of a new, highly "intelligent", mixed-culture central group (eg the Office for Sustainable Development) that would have overall responsibility for analysing, interpreting, advising on and prioritising sustainability issues across the interests of the Government. The Office could commission work from appropriate research providers and/or even have a dedicated research unit (the Sustainability Assessment Unit) at a University or Institute to support them in their task. The Office would also have the responsibility for ensuring that the aims and work programmes of the Government NDPBs and agencies were genuinely integrated within a central sustainability theme, thereby constraining those inclined to follow tangential agendas.

The Office should not be peripheral, as so many specialist groups have been in the past, but of sufficient scale and standing to be absolutely central to the operation of Government in Scotland. If Scotland is serious about becoming sustainable that is the minimum that is required.

Specific questions

A consider and comment on the headline themes, policy issues and questions outlined in Section 3

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 overlying structure to the Co-ordinated Agenda?

These are helpful as far as they go. They beg the question of how sustainability can be recognised, assessed and compared between options – or optimised. In other words, who will develop, apply and interpret sustainability analysis to support the Scottish Government in its aim of promoting sustainable economic development? Sustainability analysis needs either to be handled separately as a theme in its own right or built into the science underlying both themes, but should not be overlooked. Without that capability the whole sustainable development debate founders.

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

See the response to Question 1. In addition:

(i) it is not clear what is meant by "Local" in Local Response to Global Change, or in what sustainability context a local issue might be resolved.? If "local" simply means "Scottish" in this Paper it would be better to say so; otherwise policy has to recognise that "local" can have a very elastic meaning.

(ii) it is really important that other global issues are not drowned out by the climate change clamour. The near-crisis in 2008 when world oil and food prices reached unprecedented peaks was only partly associated with climate change. Oil prices rose because world demand was outstripping supply; grain prices rose because supply was hindered by drought (possibly climate change related), also in a context of rising world demand. Recession has de-fused the situation for the time being but economic recovery around the world could soon result in a repeat scenario.

(iii) so far as Scotland's natural assets are concerned, "knowledge and understanding" are not sufficient without interpretation.

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

Probably not. Increasingly there will be conflict between uses for land, fresh water and the sea for energy provision, food production, supply of structural materials, industrial and chemical feedstocks, buildings and transport, water storage, waste disposal, flood prevention, recreation, nature conservation ……. There has to be a sensible, structured way to assess competing claims in a sustainability context, and that should be science-based. For the Scottish Government seriously to get its act together (and not, for instance, approve a new airport runway whilst at the same time demanding reduced carbon emissions), will be a major policy challenge.

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

Who knows? It seems likely, but the one certainty about horizon scanning is that you get at least part of the answer, if not most of it, wrong. Flexibility is the key to being able to accommodate changing requirements as the need arises over time.

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

This is an absolute necessity. These strategic resources are held partly within Government and its agencies, but also partly within the Main Research Providers and others. In the past, financial support for these strategic resources in the MRPs had to be disguised under various research projects because it failed to fit into the prevailing research expenditure classification. It is essential science and may or may not involve research. Recognising it in its own right is a major step forward. These resources provide a platform on which much sustainability research will be based, as well as providing a capability to deal with unexpected threats. Building on and improving these resources should now be a specific and explicit concern for the Scottish Government.

6. What facilities, resources and data do you think are important for Scotland to maintain? 7. Are there other resources that Scotland needs to acquire to support future policy development?

Long-term data sets, intellectual expertise and facilities are mentioned in the Paper. Long-term monitoring is an additional activity that may fit into this Theme. Intellectual expertise has different facets – the capacity to maintain a breadth of disciplines even in unfashionable areas of science is one requirement; the accumulation of corporate knowledge is another. The latter seems to have been undermined in recent years but it does help to avoid having to re-invent the wheel whenever “novel” problems arise.

Policy Issues

In a changing world how can the major risks to Scotland’s natural assets be identified and strategies adopted to manage these?

"Natural assets" is not defined here but in its widest sense covers a diverse range of physical, biological and abstract entities, from coal to wind to brains and brawn to landscape. The negative tone adopted in the Paper is unfortunate, concentrating as it does on risk rather than opportunity. Risks could come in many guises, from loss of intellectual capacity (immigration of our best talents) if career paths and salaries are insufficiently attractive in Scotland, to some new pest or disease of grasses that might devastate cereals and grasslands. The question is unanswerable.

The Paper focuses on climate change but this might be the least of Scotland's challenges. Increased sea level, warmer winters and/or summers, decreased summer rainfall in the east, and more storm events may well have their impact – indeed it might even be positive. The Scottish landform will still be approximately the same, with some sea encroachment possibly. It will still be largely covered in managed vegetation, though the flora and fauna can be expected to change in species and extent (despite SNH). Scotland's food, fish and forestry production effort will continue though in a new world context of changing (and almost certainly increased) food and fuel demand. There will still be the same inter-mixing of land and water in the mountains and islands, and intense production in the lowlands. People from other environments will still want to come and see the landscapes and seascapes, and the built heritage; and most will not be bothered about windfarms or actual changes in the biodiversity. Many will still seek adventure and they will surely be able to find it. The human talent will still be the same unless people are induced to move elsewhere - but Scotland may remain rather a good place to stay. The real challenge is to anticipate the opportunities and be ready to exploit them as the world changes.

How can we assign economic and societal value to our natural assets and include these in policy and planning decisions?

Research has been done in this field for years and I would not presume to know what the best methodology should be. What has changed over recent years is the entry of voluntary organisations to the property market to protect the assets that those organisations think important. The Royal Society for the Protection of Birds, the Woodland Trust, the Scottish Wildlife Trust, the John Muir Trust and the National Trust for Scotland, for instance, now have significant land holdings that are managed for their own purposes, and this may provide a more direct market valuation than has been possible in the past of certain of Scotland's natural assets.

In the face of competing pressures and threats how can Scotland's natural assets (eg land, water, biodiversity etc) be protected for future generations.

Competing pressures over land, water and sea use there certainly will be, though these may come from opportunity rather than threat. The holy grail is to develop a structured sustainability analysis methodology that proposed change can be subjected to, so that anticipated loss can be weighed against long-term sustainable gain – and this should certainly be developed as a policy tool. In reality, it remains what is to some the surprising truth that most

land managers manage their land to make profit, and respond to the perceived market or to the various carrots and sticks that manipulate the market. One aspect of this is the ever-extending role of farmers, who now may have some windmills on their farm, be contemplating a small hydro-electric scheme, be producing crops interchangeably for food, feed or fuel, and keep a headland or two for wildlife. This sort of flexibility is surely the way ahead. Preserving a very limited number of sites for specific biodiversity or landscape value reasons is probably justified, but promotes a "museum" mentality. Change is the overlying context, and adaptation, not preservation, should be the response.

How can we improve Scotland's economic and environmental performance?

This was obviously written before the banking crisis hit Scotland!

The Paper acknowledges that *"Science is rooted in innovation and it routinely generates new ideas and opportunities for commercial development".* The irony is that innovative science is not routine and cannot be supplied on tap – it is essentially a blue-skies activity, often involves lateral thinking, and is sometimes very quirky, challenging even "conventional" science and the scientific establishment. Sadly the Scottish Government seems to have decided that all the research it commissions directly should now be policy-related – which probably kills innovation from this sector of science at a stroke unless the very best people are still allowed some freedom. Hopefully the education sector will be less restrictive with its research funding.

How can we ensure that Scottish based food production can contribute positively to the health and well-being of Scotland's people?

It isn't as simple as that! Even if Scotland's producers were to come up with more fibre and less saturated fat, people might still choose to avoid these foods. Education is surely the key to raising demand; supply will follow so long as there is a market there – ie if these foods can compete with "conventional" fare on price, and/or if Government requires that food supplied at public institutions (especially schools) meets new high nutritional standards. Otherwise food produced for a specific nutrition-related purpose will remain a niche sector. That could be an increasing possibility if farmers see the flexibility of multi-purpose crops as their preferred option.

How can science make a contribution towards reducing the levels of inequality and disadvantage amongst Scotland's people?

Pass

How can innovation be stimulated to find novel solutions for uniquely Scottish challenges?

By providing funding for it!

B suggest ways in which the Marine, Environment and Rural science funded by the Scottish Government can achieve greater coherence with the wider science base in Scotland and internationally to ensure effective and efficient interchange of knowledge to help Scotland grow and prosper in an undoubtedly challenging future

and

C express your views on how the delivery of the Scottish Government's future needs for scientific evidence in the Marine, Environment, Rural Affairs and related areas could be developed and improved

and

D suggest how to facilitate the exchange of knowledge between the different organisations commissioning or undertaking research in support of the Scottish Government's Marine, Environment, Rural Affairs and related policies to ensure effective and efficient delivery of science into policy

I see these as closely related.

The first challenge (and it is within the Government's control) is to ensure co-ordination of science (not just research) within the Marine/Environment/Rural group, and then across the Scottish Government. Linking in with the Education funding is a problem because that research is not commissioned. Outwith that, there is only so much that can be achieved by Government because of the time and effort required for co-ordination at a detailed level – and because co-ordination with organisations funded from other sources is, by its nature, not totally under the control of the Scottish Government. Genuine co-ordination of science across the Scottish Government would actually be a major achievement and should be the priority for a first step. The Office of Sustainable Development, proposed above, would go some way towards promoting co-ordination within Government.

However, the thought that links all three of the above topics is co-ordination of research effort. There is an interesting organisation in India, the Energy and Resources Institute (TERI, headed by Rajendra Pachauri, Head of the IPCC) that might provide a model for joined-up effort in Scotland. The Institute embraces diverse topics from energy to environment and biotechnology, all directed towards achieving sustainable development; and there is a University attached to the Institute. As it has grown it has increased its contacts and co-operation with overseas organisations, and currently has an office in London, serving Europe. The key in a sustainability context is to include energy along with land, water and sea-based research – one cannot sensibly consider Rural, Environmental and Marine questions without including energy. The opportunity to initiate something along these lines in Scotland is obvious. Much of the relevant expertise is already present in the form of the Macaulay Institute, the SCRI and SAC, together with relevant University strengths covering, for instance, energy, the social sciences and economics.

The Scottish Government has already proposed a merger between the Macaulay Institute and SCRI. It should not stop at that. Establishing an associated University - even if it were a virtual one involving the relevant parts from different Scottish Universities, would still leave the new entity mainly funded from a single source (the Scottish Government) and would promote co-ordination of thinking and effort across the whole sustainability field. International co-ordination could be expected to increase as the organisation's reputation grew.

The creation of an institute with a new purpose, building on the strengths developed in the past, would provide motivation for the merger of the Macaulay Institute and SCRI, would place Scotland at the forefront of sustainability research, and would provide the knowledge and, possibly, interpretation necessary for policy development within the Scottish Government. The new Institute/virtual University would be the obvious place to house the Sustainability Assessment Unit proposed above.

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