

DISCUSSION SUMMARY

The UK National Ecosystem Assessment

Held at The Royal Society on 13th July, 2011
The Foundation is grateful for the support for this meeting from
the Department for Environment, Food and Rural Affairs

- Chair:** **The Earl of Selborne GBE FRS**
Chairman, The Foundation for Science and Technology
- Speaker:** **Professor Robert Watson CMG FRS**
Chief Scientific Adviser, Department for Environment, Food and Rural Affairs
- Respondents:** **Mr Meurig Raymond MBE**
Deputy President, National Farmers' Union
Professor Michael Grubb
Senior Research Associate, Faculty of Economics, University of Cambridge

PROFESSOR WATSON said the Assessment (NEA) was independent, compiled by many scientists, and its work had been peer reviewed. It had reviewed changes in ecosystems over the past 60 years and looked forward to the next 50 years, focussing on economic assessment and options for response. He summarized the analysis and key findings of the Report.

He illustrated the links between drivers for change (demographic, economic, socio-political, management and environmental factors); ecosystem services (air, water, living things); goods (benefits from ecosystems that have value); and human well-being (economic, health, social values). The report took into account the full range of monetary (market and non-market) and non-monetary values of ecosystem services. It looked at the eight broad habitats in the UK (mountains and heaths; enclosed farmland; woodlands; fresh waters; coastal margins; semi-natural grasslands; marine; urban) - showing the goods and services derived from each, distinguishing between provisioning, regulatory and cultural services. It looked at the distribution of habitats throughout the UK, noting that 40% was enclosed farmland, largely in the SE and SW of England, producing 70% of food. 18% of the UK is classified as mountains, moorlands and heaths. These are largely in Scotland and Wales and contain roughly 40% of the UK's soil carbon and meet 70% of drinking water demand. Biodiversity underpins the functioning of all ecosystems; it is in constant flux, largely due to human activities.

The report was structured around ten questions, and the key findings resulting from considering them:

1. What were the state and trends of UK ecosystems and services? There had been a marked change in landscape over the last 60 years, affecting all ecosystems. Enclosed farmland showed increased productivity with decline of biodiversity (birds) and soil quality. Woodlands areas had increased, coastal margins and marine had deteriorated.

2. What were the drivers causing these changes? They were the increase in farmland, the exploitation of natural resources, pollution, invasive species and (marginally) climate change. The drive to increase productivity had led to management changes; air and water quality had improved.

3. How do ecosystems affect human well-being; who are those affected, and how are these effects managed? Society in general benefits from the full range of provisioning, regulatory and cultural results - more food at less cost; carbon sequestration by woodlands; the effect on physical and mental health. But we have insufficient evidence about links between changes in ecosystems and health. Benefits are unequally spread spatially,

and management is often localized. Human well-being and quality of life includes health and social collective needs.

4. What vital UK provisioning services are not provided by UK ecosystems? We are not self sufficient. Biomass flow through the economy is 150m tonnes - domestic production 100m tonnes. 60% of water demand comes from overseas. Policy changes and economics could well effect this balance.

5. What is the public understanding of ecosystem services? Most people do not understand the concept of ecosystem services, although this is changing. Provisioning services such as food, and cultural services such as recreation are valued.

6. Why should we encompass economic values of ecosystem services into decision making? The economic, health and social benefits stemming from these services are central for human well-being. If the services are omitted from the economic framework, there will be less efficient resource allocation.

7. How might ecosystem services change under plausible future scenarios? Six "storylines" were considered - (1) green and pleasant - conservation a priority; (2) nature - creation of multifunctional landscape; (3) local stewardship - sustainability in immediate surroundings; (4) go with the flow - let current trends continue; (5) national security - self sufficiency (6) world markets - economic growth. 1 and 2 resulted in significant gains in a broad range of ecosystem services compared with 5 and 6. Land use change and pollution were major factors.

8. What are the implications of plausible futures? Agricultural production, change in greenhouse gas emissions, access for recreation, urban space amenity and biodiversity were considered. Reliance on market prices would yield an inaccurate assessment of economic value of different services. 5 and 6 yield economic gains on market values; 1 and 2 yield more if all economic gains are taken into account in the long run. There are specific spatial differences.

9. How can we secure continued delivery of ecosystem services? We must get the valuations right to cope with increasing pressures. We need an enabling framework including technology, regulation, finance and behavioural change. EU regulations have helped, but management must be more resilient to change, more integrated with a multi-functional approach. Everyone has a part to play.

10. Have we advanced in our understanding of the influence of ecosystem services on human-well-being; what are the knowledge constraints on decision making? We do have sufficient information, but need to refine it and use holistic models. We need to understand better how health and social values are linked to ecosystem services, and to account for them in decision making.

Overall, PROFESSOR WATSON concluded, the Report shows where we are, and where there have been some improvements, but it also shows that we have great potential to improve our ecosystems to deliver services which should be properly valued.

MR RAYMOND welcomed the assessment; the NFU (National Farmers' Union) had participated in the peer review. The NFU agreed with the view that global demand for food would increase because of population increase, urbanization and rising incomes, and that the UK should help to meet world needs. The assessment's endorsement of sustainable intensification of food production was very important. Use of technology by farmers and land management was vital and this should be underpinned by further applied research, knowledge transfer and better understanding of the effects of climate change and biodiversity. While he appreciated the need to value environmental and health benefits, as the assessment had tried to do, he was concerned that the model used in the assessment was too simplistic as it compared market prices for provisions against environmental valuations. But it should not be assumed that farmers got market value for food, and the model was insensitive to dynamic changes in market prices, such as the reduction in the value of woodland, as the acreage planted increased, and abrupt changes in livestock prices. The NEA was a good start, but the valuations need to become more robust and, in particular, be aware of significant changes in future provision prices.

PROFESSOR GRUBB also welcomed the NEA as a good start, but his concern was that the approach through economic valuation was too narrow to lead to effective policy results. Putting a value on a good did not lead to a policy decision to prioritise it. Economic valuation depends on the existing context when it is drawn up. If that context does not attach importance to the goods being valued, it will not lead to policy changes. Such valuations do not recognize dynamics of change and the importance of long term stability. For example, people can accept, and adapt to, very wide variability in weather, so they are unlikely to be too concerned with threats of climate change in the future. Most people don't know about threats to ecosystems, and don't care. It is only when impacts become severe "rise above the noise" that they will contemplate inconvenient decisions. Sustainability is for the benefit of all; failure to achieve it could result in major disruption and instability. As much mitigation of dire effects as possible must be done, but, ultimately, as in defence, people will accept that failure to deal with threats could lead to disaster.

The following points arose in discussion:-

1. Professor Grubb's concern that the analysis used in the NEA would not necessarily lead to effective policy change was widely shared. The dangers to health, social amenity and life style which the assessment indicated could follow from deterioration of ecosystems were understood by few outside the scientific world. Indeed, few would even know what the word "ecosystem" meant. People found it difficult to accept that gradual deterioration of systems might result in a "tipping point" when disaster follows (as in the examples in Jared Diamond's "Collapse") They are unlikely to support action which meant that services which they now get free, they have to pay for it, even although it is widely accepted that free supplies lead to waste (e.g. India's policy of providing free water). If the assessment is to lead to action, a major communication exercise with the public is essential.

2. There was support for the view that regulation must play a major role in supporting incentives and driving behavioural change, particularly where the public were not aware of the way in which individual choice could lead to social harm. But economic incentives and regulation must work together. Unless coordinated there was a danger that they could work at cross purposes.

3. The demand for food, particularly animal protein, will grow rapidly as incomes increase in China and South East Asia. This is driven in part also by population increase, but mostly by desire to

match US and European lifestyles. The demands on global ecosystems to meet such demand will lead to severe problems unless global efforts are made to change processes for provisioning and effect behavioural change. Among changes needed is the acceptance of GM crops to deal with water shortages, pollution from pesticides, and demand for fertilizers. But UK consumers are not yet willing to accept them (although they already absorb much GM crop content). This is a good example of communication failure between scientists and the public.

4. There is a need to be more explicit about drivers of change, and the concept of "thresholds" or "tipping points". These are poorly understood, partly because they arrive at different times, and are often localized, so wider populations do not accept them, particularly if they have to pay taxes, or accept regulations.

5. What was the evidence base underlying some of the economic assessments? For example, attempts to plant forests in Caithness, had proved disastrous; suggestions that more woodlands be planted in Wales implied that good farmland would be diminished. But it was argued that the Caithness experiment failed because of the wrong choice of tree, and tree planting in Wales could be increased by use of marginal land unsuitable for farming. What was important in Wales was to deliver an incentive to plant woodland by allowing landowners to make a rational choice of land use, by incorporating a value for the carbon sequestration of woodland.

6. While we need to assess economic values to secure good asset allocation, and promote understanding that it can lead to improved ability to garner self interest as a motivator, we should be wary of losing the moral high ground. Altruism is a powerful motivator, and should lie behind many global initiatives to produce adequate food supplies.

The message from the discussion was a warm welcome for the NEA but grave doubts about its ability to be a major force for policy change without a much greater campaign of public education. The services from ecosystems were not externalities, to be thought of after economic analysis, but crucial elements in human survival. Biodiversity underlies all of them, and failure to maintain it will lead to economic trials but to major destabilization of society.

Sir Geoffrey Chipperfield KCB

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