SUSTAINING SCOTLAND'S ENVIRONMENT

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SUMMARY

1. This chapter assesses five components for sustaining Scotland's environment: data, understanding, interpretation, policy development and new mechanisms, and a way forward is set out. It is written from the perspective of the Chief Executives of the two statutory environment bodies in Scotland.

2. Data availability have increased and it is now possible to detect longer term trends with positive and negative effects on the environment. It is essential that long runs of data are maintained, data gaps are filled, data requirements are reviewed rigorously and are made more accessible.

3. Understanding of the environment has increased. However, it is often compartalised. More work is required to improve understanding of how environmental systems work, and the services which they provide.

4. Interpretating environmental information is essential for improving policy and action. Rigorous and objective analysis is required. Composite indicators of environmental change should be developed.

5. Policy needs to be developed in a more integrated way to achieve the greatest environmental benefit. A number of achievements and failures in Scotland are identified. Fundamental reform of the agriculture support mechanisms is the most necessary policy reform.

6. A longer-term vision, supported by all relevant stakeholders, is essential. Ways of achieving this approach are set out.

22.1 Introduction

This Chapter provides an overview and interpretation of the major issues for sustaining Scotland's environment.

The conference proceedings in the earlier chapters of the book focus particularly on the state of Scotland's environment, including its natural heritage, addressing trends in relation to air, land and water, as well as specific issues, such as biodiversity and the marine environment. The

opening chapters by Raymond Young, John Markland and Kevin Dunion and the closing chapter by Tim O'Riordan raise wider issues relating to the sustainable development agenda in Scotland from a number of significant perspectives: integration of policy, vision and strategic direction, measures of progress and new structures of governance. These two aspects of trend reporting and policy critiques are very closely related as improvements in policy and governance cannot be taken forward unless there are high quality data about trends in key environmental parameters, and there is objective assessment of the trends using the most up-to-date scientific knowledge and methodologies. The interaction between scientific evidence and policy change has never been more important. It is essential that the development of policy and governance structures is informed by the outcomes of scientific investigation. This point is developed further in the concluding section of this chapter.

Scotland has two statutory environment bodies: SNH and SEPA. These bodies work together effectively to secure Scotland's environmental assets of air, water, land and soil, landscape, landform and wildlife and to safeguard the processes and systems which support and sustain them. Also both organisations have statutory sustainable development duties which give them wider roles to integrate the careful use and management of environmental assets with the social and economic needs and aspirations of society. As Chief Executives, we welcome the fact that the conference on which these proceedings are based was jointly organised by SNH and SEPA, and that four of the key chapters represent joint effort by our colleagues. Such corporate working is critical to helping to address important environmental issues and define strategies and put in place appropriate actions. It is also recognised that there are many other stakeholders, in the public, private and voluntary sectors, which have important roles in working with SNH and SEPA to achieve their environmental objectives and the contribution which they make to a more sustainable and integrated Scotland.

This chapter considers the issues emerging from the preceding papers under the headings of data, knowledge, interpretation, policy and mechanisms; and concludes with our views on the way forward.

22.2 Data

A great volume of data on the state of Scotland's environment and its natural heritage, has been accumulated over the last decade. As a result, it is possible to detect trends in key parameters relating to air, land and water, and relating to species and habitats. The papers in this volume note that trends are very variable with some implying environmental improvement, some indicating a more or less steady state, and some indicating a deteriorating situation. The papers analyse the trends themselves and consider, with the data available, the amount of understanding we have about their causes.

Data collection is therefore critical to identify both positive and negative trends. There is a sub-theme through many of the papers that there is "not enough data". More information can always be used but there are limits to what can be collected. Several papers make the key point that the data must be used with caution and objective interpretation must be ensured. For example, do data show real anthropogenic effects or does it reflect long term natural changes? The papers on fisheries and marine waters demonstrate the uncertainties which surround interpretation. If a different perspective is taken, such as a geologist's concept of time, then climate change takes on a different perspective. Overall the conclusion is that good data are essential if proper policy decisions are to be taken, a point which the Minister made in her speech.

There are three key points about data:

(1) It is essential that long runs are maintained so that trends can be detected. Without this approach our knowledge could be overwhelmed by short-term variations which are insignificant in the longer term. Short runs of data, whilst of some assistance, are less valuable.

(2) There is a need to ensure that gaps in data about the environment and the natural heritage are identified and efforts made to fill them. There are a number of significant data gaps information on landscape change, the variety and classification of species at the genetic and unicellular levels, public attitudes towards the environment, the economic costs and benefits of environmental management, and the broader economic benefits of the environment to society. Plugging these gaps is essential to enable a more comprehensive overview of all of the three elements of sustainable development.

(3) There is considerable variation in data availability. Rich data exist on some topics, such as the number, distribution and trends in vertebrates and invertebrates. Is all of this material really needed, or can some be collapsed into meta-data sets to give a broader prospective of changes, for instance, in particular habitats? Are all of the bird monitoring data currently available required? It is suggested that data need on this topic is rigorously reviewed. At a time when there are demands for more data sets and the resources for data collection and analysis are not increasing, rigorous scrutiny of the purpose of continued collection of data is vitally important.

It is only relatively recently that many organisations have become aware of data availability. Efforts to ensure that these data are effectively catalogued and that quality is assessed has had to be undertaken. Too often in the past data were regarded as the property of those individuals in public bodies who were responsible for its commissioning or its collection. This can no longer be the case given the importance of the use of data to inform the broader policy process. In addition, excuses can no longer be made about the difficulty of release of data because of the statutory demands through Freedom of Access to Environmental Information Regulations and the availability of web-based systems. The major challenge, therefore, for all who are custodians of data is to ensure that its quality is properly assessed and it is made accessible to all potential users, particularly through CD Rom and web-based systems.

It is recognised that there can be risks in releasing data about the environment and natural heritage. Some of the material is sensitive because of the locations of scarce species and some of it is sensitive because it could lead to litigation by individuals who feel that they might be treated unfairly. These risks need to be assessed, but in the majority of circumstances the decision has to be to release data and make them accessible to all.

22.3 Understanding

The amount of investigation and accumulation of knowledge about the environment and natural heritage of Scotland are at an all time high. So what is the state of Scotland's environment and natural heritage? Sometimes it can be difficult to remain optimistic when looking at environmental issues. Many of the trends of the last 20 years, on whatever topic, wherever in the world, are negative. There is no doubt that on a global scale the pressures on the environment have grown exponentially. Even in Scotland, there are depressingly negative trends for species and habitats, often reflected in declining populations of birds, fish or flora. One of the key questions is "do we understand the science well enough to make a difference: either to hold the line, or to make improvements?"

The papers in this book indicate that we do know quite a lot about the quality of land, air and water, and about habitats. The following are good examples of reversing negative impacts:

- international and local controls on emission of SO_x and NO_x are showing real reductions and therefore benefits for Scotland;

- effective control of point source pollution into water is a success story, balanced by the bigger challenge of managing diffuse pollution. Data for Scotland's marine and fresh waters show this; and

- habitat improvements have stopped the decline in quality of some rivers and woodlands.

A lot is also known about ecosystem functions, as the integral of the interaction between species, and between species and their habitats, and the flows of energy, water and other substances. The level of understanding is improving about the importance of "environmental services", ie the role which water, air and soil play in providing services to civil society in terms of productive media for food and fibre, and a wide range of species, and in terms of the supply of that essential nutrient of life: water. The complex concept of "carrying capacity" is regarded by many as one of the most critical limits of the environment to provide services to civil society and to natural systems. Despite all of the research which has been undertaken on these basic concepts, much more needs to be done to ensure that they are quantified in such a way that they can be brought into consideration alongside issues relating to society and business. Explaining how ecosystems function and how the ecosystem approach proposed as the principle mechanism for implementing the Convention on Biological Diversity can be applied in practice are vital tasks for the scientific community. Improving ways of measuring the contribution of the environment and also the limits to its capacity in providing services for society is equally vital. Alongside this scientific effort, there needs to be a much stronger effort to explain the concepts so that they are readily understood by civil society, and in particular, key decision-makers - politicians themselves and those who advise them. Without this explanation there is a risk that policies will fail to safeguard the environment and will, ultimately prove costly and damaging.

For instance, there is insufficient knowledge and acceptance of the services which ecosystems provide for society's benefit. It is essential to communicate better the ecosystems services of long-term natural capital for food and fibre; and the services of erosion control which allow the soil to be retained within the natural system and so enable society to benefit from reduced flood risk to farmland and settlements.

New concepts and new approaches are being developed and it is essential that these are taken forward in a Scottish context. An ecological and environmental footprint analysis of the activities of civil society is one which has not been addressed. Considering the environmental footprint of urban society on rural areas and rural society on urban areas is but one angle on this issue. Considering Scotland's ecological and wider environmental footprint on the rest of the UK, on Europe and, more especially, on the developing world is something which needs urgent consideration. It is unlikely that decision-makers and the wider population really think about these matters, either when they are purchasing out-of-season fruit and vegetables which have been produced in developing countries such as Kenya, or when taking a foreign holiday in developing countries in Africa or Latin America or South East Asia, for example. Put another way, the concept of environmental justice needs to be considered much more fully. This is an important element of the sustainable development equation because it means not only what is being done by civil society to nature itself but also the equitable sharing of environmental resources (a key plank in the Convention of Biological Diversity) between civil societies.

Residents in industrialised areas readily understand the problems of environmental injustice in the management, for example, of major river systems like the Nile or Ganges which cross international boundaries. However, they often fail to recognise the environmental injustice of the management of similar river systems in countries like Scotland. On the Tay, for instance, the UK's largest river in terms of its level of discharge, the residents of Perth consider that environmental justice is achieved if flood barriers are erected along the banks of the river through the City. However, real environmental justice would be achieved if the flood banks upstream of Perth were removed and, at the same time, the fields on the floodplain were allowed to flood, and the methods of cultivation and seasonal exposure of soils and increases in drainage were moderated upstream. Farmers would be asked to play a role as flood plain managers. Equally, environmental justice means not putting the unpalatable developments next to deprived communities rather than next to upper and middle class communities. More

particularly, it means giving all members of our society in Scotland an equal chance of access to environmental resources and the enjoyment of our natural heritage.

The challenge, therefore, is to develop the concepts of ecological footprint and environmental justice much more in a Scottish context, recognising our dependency on the wider world, and then applying the results to the decision-making process. That way, linkages between the environmental resources of the country and social well being and economic development should be more easily defined.

22.4 Interpretation

Interpretation of material on trends in the environment and natural heritage, within the context of existing and new scientific and allied concepts, is another vital part of the process of advising on the policy and practice of sustainable development from an environmental perspective. The "state/pressure/trend" model is now a well-accepted one and has formed the basis for environmental audit work by both SEPA and SNH. In recent years these organisations have covered the majority of their remits with SEPA publishing seminal statements on air, water and soil (SEPA 1999, 2000, 2001) and SNH on trends in the natural heritage (SNH, 2001). The amount of new knowledge and its more effective interpretation and presentation has increased understanding very significantly. It is interesting, for example, to contrast SNH's 1994 report on "The Natural Heritage of Scotland: An Overview" with the recently published report on "Natural Heritage Trends Scotland 2001"; the latter clearly demonstrates how data are more readily available, knowledge has increased and performance in interpreting it and making it more accessible has substantially improved.

The challenge, as always for public bodies, including SEPA, SNH and research institutes, is to maintain the highest level of objectivity possible. This is the way to ensure that debate about policy formulation and review is properly informed. It also helps to correct some of the misunderstandings

which are deliberately put into the public domain by particular interest groups which look at things from a very narrow perspective and ignore much of the relevant information and its interpretation. Take, for example, the position of seals. There is substantive evidence that seals do prey upon Atlantic salmon but some commentators maintain that this is so significant that it fully justifies a cull of these populations. This fails to take into account both the protected status of both of the species of seals – common and grey - under the European Union Habitats Directive and the scientific appraisal of the many factors which have an impact on the salmon population: changes in water circulation patterns, salinity and temperature in the North Atlantic, intercepting fisheries offshore and near the coast, hybridisation with releases from salmon fish farms, river engineering works which have an impact on the spawning beds being the major factors. In addition, it is often a concern of those involved in the research community that there is insufficiency of data or its quality is not of the highest level. Whilst these are valid concerns, perfection in data availability and data quality can never be reached. As a result, it is very important that the research community can indicate the levels of confidence which can be given to information which has been used in analyses.

It is a truism that the environment does not recognise political boundaries. Hence any indicators of environmental health, and of economic and of social well being, need to be framed in a context which allows comparisons between countries and regions. Consequently it is misguided to seek independent indicators, of sustainable development, for example, as proposed by the Scottish Executive, (Scottish Executive, 2001). The set of 147 UK indicators for sustainable development set out in the DETR paper “A better quality of life” should form the basis (DETR, 1999). The approach taken by the National Assembly of Wales in examining that larger data set, utilising those indicators which are relevant for Wales seen in the UK and wider contexts, and modifying slightly others to ensure that they are relevant to a Welsh contexts (National Assembly of Wales, 2001) is preferred by many commentators in Scotland to the proposals in the Scottish Executive paper “Checking for Change” (Scottish Executive, 2001). A thorough review of the UK set of

indicators to consider their relevance for Scotland and to ensure that Scotland can be placed within a European context is important.

There is also a challenge in developing composite indicators for the environment. In another paper, Michael Usher argues the case for using composite trends for bird species associated with particular habitats as one way forward. This is an appropriate approach. If it could be developed for other sets of species and other environmental factors then this would be beneficial. In addition, there is a challenge to the environmental community in developing composite indicators on similar lines to those which have been developed by economists for instance the various measures of unemployment and gross domestic product. Whilst this is not easy, it is a better approach to that suggested in "Checking for Change", of taking carbon dioxide emission as the one single measure of environmental quality as this only reflects one part of the environment.

22.5 Moving Policy Forward

Now is a period of very fertile policy development, particularly since the establishment of the Scottish Parliament and the Scottish Executive. There are new policies for a variety of areas including agriculture, enterprise, tourism, social justice, culture, and wildlife conservation. Whilst most of their individual aims are laudable, if they are inspected in detail to see how they match with the expectations emanating from the UNCED Summit in Rio and even from the Scottish Executive's own social and environmental sustainability ambitions, then many find them wanting. In addition, these policies seem to have been drawn up in isolation whereas the practice of sustainable development demands a much more integrated approach: in the words of the UK Government "joined up Government".

There seems to many to still be an insular approach, which is commonly called a "silo" mentality, in relation to particular sectors, such as agriculture, and in relation to other areas of Government business, such as enterprise. If the integrated approach demanded by sustainable development is to be

achieved then the barriers need to be broken down once and for all. This does not mean abandoning policies for supporting particular sectors but it does mean ensuring that support for one sector does not have untoward effects on other aspects within the sustainability equation. Therefore, any new policy must be put to the tests of its environmental, social and economic costs and benefits before it is finalised. In a sense, this is the equivalent of the "triple bottom line" approach within the business community by checking out the environmental sustainability and social well-being components alongside business viability.

What can be done about trends that are environmentally damaging? How can society ensure that the right actions are taken? The key ultimately lies in government policies at national and international levels, hence the inclusion of Jim Currie as a speaker at the Conference was far from accidental. He set out very clearly the value of engagement with the EU and the importance of providing information to the EU for use in the development of environmental protection policies and evolution of the EU sustainable development strategy. He also stressed importance of getting the timing right. The advice given by SNH and SEPA to the Scottish Executive as their environmental advisors has an important role to play in this situation.

Policy changes that were adopted in the 1980s and 1990s have made a difference to environmental quality and habitats. There is a mildly encouraging picture in relation to acidification. Changes in forestry management practices and woodland planting have led to positive benefits. Protection and improvement of water quality is a success story across Scotland. The absolute necessity for further reform of the European Commission Agriculture Policy is well recognised, as is the complexity and difficulty of carrying it out. This is possibly one of the greatest challenges to all parties interested in the environment. How do we get "win/win" successes? The moves towards beneficial land use policies should hopefully be encouraged through the Water Framework Directive where a much more integrated approach will have to be adopted.

Part of the problem in the past, in Scotland and many other industrialised countries, is the issue of organisational cultures. Inevitably within the public service risk aversion and caution, rather than pro-activity, tend to be the order of day. Seeking to move forward organisational cultures is a major issue: this cannot be resolved quickly but requires leadership within those organisations at all levels if it is to occur.

Looking at the situation in Scotland over the last 12 years with respect to the evolution of thinking, policy and action on sustainable development gives a rather mixed picture, with both high and low points. Obvious high points were the fact that a Secretary of State was prepared to give a major speech on sustainable development in September 1989 to a predominantly business audience. This was followed a year later the by the government, and supported by all parties in the House of Commons and House of Lords, giving the first statutory duty of sustainability on a public agency: SNH in the Natural Heritage (Scotland) Act 1991. Other high points were the publication of policy statements by SNH on its approach to sustainable development in 1994; the legislative provision for SEPA of a sustainability duty (Environmental Protection Act, 1995); the publication of the report of the Advisory Committee on Sustainable Development in Scotland in 1999; the prominence given to sustainable development by the new administration elected in 1997 and in the "Programme for Government" document in 1999 (Scottish Executive, 1999); the decision by the Minister for Environment and Planning in 2000 to refuse permission for the Lingerabay superquarry application on sustainability grounds.

However, there have been equally some low points, including the fact that SNH was rebuked by Government for wishing to take into account sustainability considerations in its advice on the proposed second Forth Crossing. More fundamental is the fact that the sustainable development strategy for Scotland relates only to Waste, Energy and Transport (WET) and fails to take into account wider environmental matters or economic and social issues and policies and the fact that the proposed indicators for sustainable

development remain wedded entirely to the narrower WET strategy. Indeed, the strategy fails to recognise the relevance of one of the major outcomes of the UNCED Summit in Rio - the Convention on Biological Diversity, despite the immense commitment at national and local level in Scotland for biodiversity conservation. In addition, there is the total failure to address the issues and practical steps set out so cogently in the Report of the Secretary of State's Advisory Committee on Sustainable Development published in 1999.

Optimists like ourselves, in 1990 felt that by the end of decade a great deal would have been achieved in relation to sustainable development policy and practice but this has proved not to be the case. Rather there has been a series of setbacks. The case for a vision for sustainable development in Scotland, for the adjustment of the relevant policies and for new mechanisms to ensure its implementation is still having to be made by former members of the Advisory Committee on Sustainable Development in Scotland, and members of the UK Sustainable Development Commission.

22.6 Mechanisms for delivering new policies for Sustainable Development

At present, the policy mechanisms available have not evolved sufficiently to allow the integrated approach demanded by sustainable development to be delivered effectively. Although there are many schemes which are positive and provide a challenge, there is still a great deal of subsidy and compensation within Government financial mechanisms. As has been argued in the case of nature conservation, these must now be regarded as outmoded. It is encouraging that new approaches that rely upon positive financial incentives are being put into place. Contracts on behalf of society between Government and its Agencies and those delivering goods and services are an obvious way forward. As has been argued in the "Strategy for Scottish Agriculture" (Scottish Executive, 2001) the idea of Land Management Contracts is much more likely to deliver a range of goods and services provided by farmers and farmland to civil society than the current regimes which are based predominantly on price and production support. Whilst this

will require fundamental reform of the European Union's Common Agriculture Policy and therefore agreement by Member States, there are opportunities within the subsidiarity arrangements already agreed by the EC for much greater progress to be made in Scotland. Continuing the agricultural example, it is clear from talking to many farmers that they would be prepared to play a much wider role than food production, that they would be prepared to be stewards of biodiversity, of soil and water resources, of the cultural and landscape heritage of the countryside, of access to the countryside and, where appropriate, of managing floodplains and creating greater carbon stores. Multi-facetted land management contracts with farmers to cover these issues has to be the way forward. However, the present sub-division of the agriculture budget in Scotland is not amenable to this. Of the total of around £550 million per annum only one twentieth is devoted to direct environmental payments: does this mean that the environment represents only one twentieth part of the agriculture support regime? Many hope that this is not the case and would welcome a much greater and much faster increase in the programme of support for agriculture to deliver the wider range of environmental benefits.

Basically, the challenge is to move from a culture of compensation to a culture of paying for outcomes. More generally, economists have always argued that the taxation system is by far the most effective instrument for delivering outcomes of benefit to civic society. It is hoped that the government will explore these issues and implement changes: certainly the approaches to landfill have been very effective.

22.7 The Way Forward

There is no single recipe for taking matters forward.

Most fundamentally, many papers in this volume indicate the need for a clear vision for Scotland: a vision for a sustainable Scotland. At present there is no such over-arching vision, other than that stated in the partnership for Government document of the Scottish Executive. Whilst this has positive

elements, it needs to be teased out much further. A polluted, degraded, overexploited environment, where carrying capacity is exceeded, and where natural regenerative ecological and physical processes are abused, will lead ultimately to economic collapse and social upheaval. This is as applicable in Scotland as it is in the developing world. On the other hand, a healthy Scottish environment is an absolute necessity to the economic and social wellbeing of the country. This is not only to support our principal industries such as tourism, distilling, food production, petrochemicals and electronics but also for the intrinsic, aesthetic value of an attractive environment. This can be as variable as having a high quality river flowing through an area of urban deprivation or an area of highly diverse and attractive scenery in a rural setting.

As a starter for debate on this issue set out below is a possible vision for the future:

> "Sustaining Scotland means recognising that
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> - human society and its natural environment are accepted to be inter-dependent;
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> - people are an intrinsic part of the environment;
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> - the environment is recognised as a capital asset for society; and
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> - the environment can be used for human benefit provided that this is within its carry capacity, that undue risks are not taken and that the functioning of natural systems are not significantly impaired" (Crofts, 2000).

To achieve a vision there needs to be a meaningful process to involve all relevant interests. Bodies like SNH and SEPA have sought to develop visions but, in hindsight, perhaps have consulted after they have firmed up their own views as opposed to using a much more collaborative and interactive process

with other key constituencies in the formative stages. The advent of the Institute of Contemporary Scotland and the Scottish Civic Forum provide ample opportunities nationally to stimulate such a debate. At the local level, the community planning process provides an important vehicle, provided that it fully embraces the Agenda 21 process.

Leadership is required nationally and locally by politicians, by public servants, and by public bodies to ensure the culture change necessary within organisations to achieve the integrated approach to deliver sustainable development. Involvement of all parts of civil society is equally essential. A vision for the future, developed through proper participative measures, is required both at the national level and in the various component parts of Scotland. Allied to this, policy needs to be better integrated and needs to be tested against the environmental sustainability, social well being and economic prosperity criteria of sustainable development. New instruments which seek to deliver positive outcomes for society and the environment are required, including potentially reform of the taxation system and other incentives. More objectivity is also needed in getting over the messages arising from the measurement, monitoring and assessment of trends in the environment and the natural heritage so that the debate about vision, policy and its implementation are better informed than it is at present.

Public attitudes to the environment are also critical. Environmental awareness has risen rapidly since the late 1960s, not just in the public mind but also at corporate and political levels. This culminated in the tremendous awareness around the time of the UN Conference on Environment and Development at Rio in 1992 and the recognition of the need to integrate environmental, social and economic issues in policy making and decision taking.

The 1990s were a highly optimistic time, one when sustainable development was coming of age. Then suddenly momentum seemed to be lost. Public buy-in to environmental issues seems to have shifted. There is intense ambiguity in personal and societal behaviour relating to environmental issues.

Environment is widely perceived as “something negative which stops people doing what they want to”, and yet surveys show that the public does expect the environment to be considered by policy makers and government.

There is public detachment from the causes of environmental problems and their solutions. At its simplest, the majority of the population does not make the connection between the goods placed in the supermarket trolley every week, the packaging and other wastes that conveniently leave the premises through the wheelie bin, and the planning application for the new incinerator or landfill at the end of the road. Somewhere along the line the connections are neither being properly explained, nor the links made.

There is also the feeling of hopelessness that pervades the major environmental issues. What *can* individuals do about climate change? What difference can a person’s small actions make, either positively or negatively? Against this rather depressing background, both SEPA and SNH have key roles as advisors, providers of information, commentators and in SEPA’s case, regulators.

Finally, it is essential that scientists and others in the research community play their part in explaining the concept and practice of sustainable development and the various aspects of the environment and natural heritage which are part of it. The Conference on which these proceedings are based had a predominantly environmental audience. Whilst this is very valuable for the participants, in future conferences it is our hope that there will be a much more diverse audience so that those in the environmental business, in both public and voluntarily sectors, reach out into a wider world. That way the validity of the environmental component of sustainable development will become increasingly recognised and the debate about a sustainable Scotland much better informed.

References

Advisory Committee on Sustainable Development. 1999. *'Scotland the Sustainable'*. Report of Secretary of State for Scotland's Advisory Committee, Edinburgh.

Crofts, R.. 2000. *'Sustainable Development and Environment: Delivering benefits globally, rationally and locally'.* Scottish Natural Heritage, Occasional Paper, 8.

Department of Environment, Transport and the Regions. 1999. *'A better quality of Life'*. Cm 4345, London.

National Assembly of Wales. 2001 *'A sustainable Wales – measuring the difference: indicators for sustainable development in Wales'*. National Assembly of Wales, Cardiff.

Scottish Environmental Protection Agency. 1999. *'Improving Scotland's Water Environment'*. SEPA Statement of the Environment Report, Stirling.

Scottish Environmental Protection Agency. 2000. *'Air quality report'*, SEPA State of the Environment Report, Stirling.

Scottish Environmental Protection Agency. 2001. *'Soil quality report'*. SEPA State of the Environment Report, Stirling.

Scottish Executive. 1999. *'Making it work together: a programme for Government'*. Scotland Executive, Edinburgh.

Scottish Executive. 21001. *'Checking for Change'.* Scottish Executive, Edinburgh.

Scottish Executive. 2001. *'Sustainability indicators for waste, energy and travel for Scotland'*. Scottish Executive Central Research Unit, Edinburgh.

Scottish Executive. 2001. *'A forward strategy for Scottish agriculture'.* Scottish Executive, Edinburgh.

Scottish Natural Heritage. 1994. *'The Natural Heritage of Scotland: An Overview'*. SNH, Battleby, Perth.

Scottish Natural Heritage. 2001. *'Natural Heritage Trends, Scotland 2001'*. SNH, Battleby, Perth.