SUSTAINABLE DEVELOPMENT AND ENVIRONMENT: DELIVERING BENEFITS GLOBALLY, NATIONALLY AND LOCALLY

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Foreword

Some people believe that sustainable development is merely a philosophical concept, others believe that it will disappear from view in a relatively short timescale. Yet others consider that it is concerned with traditional forms of development, ie economic activity which has led to phrases such as “a sustainable economy” and “sustainable tourism”. My own perspective is much different from these. Sustainable development is an important philosophical concept about the future of human kind and the link between society and its natural environment. It is also the basis for practice locally to ensure that economic, social and environmental issues are considered together in seeking solutions to the problems of today. I also believe that the environmental component of sustainable development can be wrongly classified as a constraint or a deterrent to development. This is far from the case as the environment provides many of the assets for the health and well-being of society now and in the future. We must ensure that we use these assets in a way which provides benefits to society without impairing the functioning of natural systems or incurring the gross loss of natural resources. The price of failure, at a minimum, will be the constraint of opportunity for future generations. At a maximum it could mean the destruction of key ecosystems and, as a result, lead to substantial economic and social dislocation.

There are many actions which could be taken to help ensure that policy is developed in accordance with the principles of sustainable development. The advent of the Scottish Parliament is a major opportunity to put sustainable development at the heart of policy making. I had the privilege and pleasure to chair the Secretary of State for Scotland’s Advisory Group on Sustainable Development during the period in which we published “Scotland the Sustainable” earlier this year. Our advice to the Scottish Parliament was wide ranging and I hope that steps will be taken to ensure that the right structures, educational policies, targets and priorities can be put in place as we set out in our Report[1].

Roger Crofts’ stimulating paper provides a wide-ranging analysis of the constraints to and the challenges for achieving sustainable development. It is clear that there is no one single solution and that changes in attitudes and behaviour, in the way policies are set and resources deployed, and in the use of a scientific and technical knowledge are all required if we are to make progress. His eight challenges of sustainable development are worthy of consideration and debate and I hope that this Occasional Paper will stimulate such debate, particularly in Scotland.

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Introduction

The achievement of sustainable development offers a major opportunity for the statutory conservation and countryside agencies in Britain. I argue that the environment is a key element of sustainable development and that environmental interests must play more active part in achieving sustainable development. The key is integration. Two connections are needed: to link **nature and landscape** together and to link both with **people.** Both of these connections must be at the heart of new approaches locally, nationally and globally. The old adage 'think global, act local' remains relevant, but I argue that when we act globally we should be influenced by experience and practice locally and nationally.

I shall examine the "lessons from the past" and draw out from them four challenges of sustainable development for environmental interests. I shall then examine "visions for the future" and set out four further challenges of sustainable development which these visions present. I will then examine new approaches underway in Scotland, in which Scottish Natural Heritage has a key role. In each one I shall set out the expected sustainable development benefits and assess the extent to which each is addressing the eight challenges identified earlier in the paper.

Throughout the paper I shall use the definition of sustainable development as the total integration of the trilogy of increasing economic prosperity, achieving social well-being and equality, and improving the stewardship of the environment.

I take the dividing point between the past and the future as 1992. This was the period when the aims and purposes of statutory nature and landscape conservation and the means of achieving them were redefined and new institutional structures were put in place in the UK. It was also the period when new visions were set globally at the UN Conference on Environment and Development in Rio which are now being actioned nationally and locally.

Lessons from the past

When one hears of nature conservation experts being burnt in effigy or reads headlines such as "Birds halt development", "People should come first", "Industry fears over nature reserve plan", it is clear that nature and people are seen as opposites. There are many and complex reasons for this stand-off. I will summarise those most pertinent to the achievement of a more integrated approach which the sustainable development agenda demands.

Sectoral policies and the deployment of resources have tended to be the order of the day. There has been insufficient attention given to the impacts on the environment of policies and resource deployment for housing, enterprise, energy, transport, agriculture, forestry, fisheries and even the environment itself. Improvements are certainly noticeable, especially in forestry and, more recently, in transport and agriculture. However, many areas of policy and resource deployment remain woefully short of a multi-objective approach which recognises the environment as an intrinsic element of equal standing with economic and social elements. Take for example where the Common Agriculture Policy ensures economic and efficient production of food but fails to secure either a high level of environmental stewardship or the provision of social benefits to rural communities. Even when the environment is considered, it is often marginal. All too often,

environmental policy and environmental resources are expected to mitigate the effects of what are seen as environmental problems. An excellent example is the lack of integration of agricultural and environmental policy when applied to the management of wild geese on intensively farmed land; an increase in over-wintering populations is seen both as an agricultural problem and a conservation success and yet no comprehensive and integrated solution has been achieved.

The separation of nature conservation from landscape conservation and access to the countryside in policy, resource deployment and institutional structures existed for over 40 years. It is pertinent to ask how can environmental interests expect other sectors to embrace a more integrated approach when none existed in the natural heritage sector for such a long period?

The **institutional structure** which develops, approves and puts these policies into action is frequently insular and confrontational (what is now called the "silo mentality"). Each functional sector has developed its own **institutional ethos and culture,** and, as a result, a certain **professional preciousness**. Attempts to merge cultures and to bring about a more flexible approach to decision-making have in the past been woefully lacking. More complex structures and more flexible working practices are an essential element in achieving sustainable development.

Many attempts to place environmental considerations at the heart of decision making have been made through the use of **environmental evaluation methodologies**. But there has been limited acceptance of them. It is recognised that the values which society might place on the functions and services provided by the environment for society are rarely easy to measure or compatible with tried and tested economic measurement techniques. Those who seek to measure everything in monetary terms do place environmental considerations at a disadvantage and this means that progress is often slow. Much good work is now being undertaken by ecologists and economists in this very complex field (see Vaze, 1998)**.** And there is now a stronger political will, as exemplified by the publication of headline and core indicators by the UK Government embracing environmental, economic and social factors (DETR, 1999). There remains the need to speed up the development and use of new techniques. This is best achieved through collaboration between academic disciplines and sponsorship by a variety of agencies with different functions. Hopefully, the result will be that the outcomes are accepted and used by decision-makers, whatever their sector of operation.

The poor **communication** between environmental experts and others has been a handicap. There are inevitably, for instance, communication difficulties between the language of scientists and that of economists. The position has been exacerbated by the capacity of technical experts to confuse their knowledge with their own **value systems.** On all too many occasions we have seen in the past information and knowledge being confused and mixed up with a set of personal values which can sometimes detract from the argument for change. For example, arguments concerning potential collapses in wild species populations often ignore the underpinning objective population viability analyses. Similarly, arguments about job losses due to the designation of a wildlife site frequently ignore the economic benefits which the site can provide. The media in its normal conflict-seeking mode of operation has sought to exploit and, indeed, exaggerate differences between the

"sides". More collaborative working is necessary, using everyday language so that experts identify the shared values which the sustainable development ethic demands.

The **skills** required to deal with the complexities of the environment within the wider context of sustainable development are extraordinarily wide. Traditionally, environmental organisations have tended to employ experts on, for example, species populations, habitat monitoring and management, and landscape aesthetics. These experts are still needed. In addition, there is the need to engage those with skills in community participation, project management, resource planning, economic evaluation and analysis of economic forces, amongst others. Environmental organisations, therefore, must ensure that they employ, or have access to, the requisite range of skills. In addition, management should ensure that existing staff have the capabilities to do the job now required of them.

The pressures on the statutory conservation agencies since their establishment fifty years ago have changed. One of the most significant changes, in the context of sustainable development, is the **balance of effort** between protected areas and work in the wider countryside. The impact of post-war policies, fuelled particularly by the EU Common Agricultural Policy, has meant very substantial losses in biodiversity since 1945 (Wynne, et al., 1995), when Sir Arthur Tansley wrote his seminal book "Our Heritage of Wild Nature". Protected areas have become an even more important instrument of environmental policy (IUCN, 1997). The amount and rigour of legislation attached to them has increased accordingly, especially under the EU Habitats and Species Directive and the enabling UK Habitats Regulations. In this context, the ability of the statutory agencies to engage effectively with **key stakeholders** has been hindered by imposed timescales. As a result, there are all too many examples of conflict between the local community and environmental organisations when there should be shared recognition benefits which the environment can bring to the local communities (The Scottish Office, 1998). Positive approaches to stimulate financially new forms of management are beneficial but clash with the now out-moded compensatory regime borne of the "voluntary principle". Pressures to maintain the current status of ecological health ignore the natural, and often unpredictable, dynamics of natural systems. Scientific analysis is not always in a position to provide guidance on management solutions. Much excellent policy advice on the wider countryside has been given over many years by the current statutory conservation bodies and their predecessors but resource restrictions have meant fire-fighting on protected areas has tended to be the order of the day. New approaches to help cope with this situation, embracing ecosystem management at different geographical scales (see below), have been introduced by a number of agencies (Crofts, et al., in prep).

A variety of approaches by the statutory conservation agencies would help to address these points. Successful argument for using a complementary range of Government policies and resource mechanisms to achieve society's objectives for protected areas is essential. More people-friendly and inclusive approaches to conservation are required, both set down in statute and applied in practice. More training in collaborative working with people is needed. More scientific endeavour orientated to the understanding of natural processes and functions and the implications for managing and manipulating them would also help.

Finally, in this brief survey, is the issue of how **society,** and communities and individuals within it, **values** the environment. Reference to any opinion polls shows consistently that health, education and employment are top of the poll and as a result are highest on the political agenda. Environment has a generally low rating. Those environmental issues undertaken by the statutory conservation agencies tend to be lower than those of the statutory environmental protection agencies. A clear connection between environmental protection and human health and well-being is an important part of the explanation. And yet individual incidents concerning wildlife - a stranded sperm whale, persecution of hen harriers or peregrine falcons, or reappearance of otters in rivers, or ospreys nesting in the Highlands of Scotland - evoke a strong, and positive, public and media reaction. At the same time, we are still bedevilled by the uninformed views of those who wish to intervene to "re-balance nature" by removing some species in order to support economic ends, or those who wish to preserve and protect the furry and the cuddly and ignore the natural imbalances which do occur when society intervenes in natural systems. Perhaps the lesson is for the environmental movement to act in a more concerted way across the voluntary groups and within Government agencies and through integrating organisations such as IUCN. The action is to demonstrate good practice on the ground to increase understanding of the value and benefits to people of a well-stewarded environment.

Perhaps these issues are best epitomised by just two illustrations. On the map of the whole of Scotland (Figure 1) the marine environment is by far the largest area and yet there has been little activity in terms of protected areas work by conservation agencies there; the concentration of effort has been on the terrestrial protected areas. The consequence was that, unfortunately, the public perception was negative. Newspaper headlines with which we are all so familiar claim that: 'People should come first', 'The Chief Constable is driven from his home by a plague of bats', etc. The notion that people are really the endangered species, therefore, grew in force during the period.

There are many lessons which can be drawn for the environment and environmental bodies from this rapid review of forty years. I have identified four lessons which I style "challenges of sustainable development".

The key challenge from the writer's perspective (having been engaged in re-defining the objectives for institutional structures and the culture of statutory conservation, and then leading their implementation in Scotland) is to ensure that **people** are fundamental. Society can have all of the appropriate policies, all of the relevant scientific knowledge, all of the necessary fiscal instruments but unless people are involved in the decision-making about the environment, who are committed to it at all stages and at all levels, then progress will be slow. Put another way, nature and landscape conservation, enhancement, understanding and enjoyment (to paraphrase the primary purposes of the separate nature and landscape conservation bodies) cannot be achieved if society in its various manifestations is ignored or dictated to. The **first challenge of sustainable development** is to ensure that people are involved at all levels and at all stages in decision and action. Bringing together effectively and constructively environmental interests with others in the form

of representative bodies, public institutions, local communities and individuals, has to be the major lesson from the first forty years and the challenge for the future.

The **second challenge of sustainable development** is to press for a greater integration of environmental, social and economic interests in policy development and resource deployment. Programmes with multiple objectives, along with the strategic assessment of the environmental component of each programme, are critical features if the challenge is to be met. Ensuring the acceptance of environmental considerations means that the methodologies for assessing and appraising a policy need to be an integral part of the decision-making process.

The **third challenge of sustainable development** is to secure the availability of all of the skills and competencies which are required to ensure that environmental issues are addressed fully and communicated effectively to other stakeholders.

The **fourth challenge of sustainable development** is to ensure that wildlife and landscape protection and enhancement is undertaken everywhere, and is not restricted to protected areas.

In summary, the **first four challenges of sustainable development** are:

- **ensuring that people (representative bodies, public institutions, local communities and individuals) are involved at all levels and at all stages in making decisions,**
- **pressing for a greater integration of environmental, social and economic interests in policy development and resource deployment,**
- **securing the availability of necessary skills and competencies, and**
- **ensuring that wildlife and landscape protection and enhancement are undertaken everywhere, and not restricted to protected areas.**

Visions for the future

The “Visions for the future” are, perhaps ironically, those determined at the Rio Earth Summit in 1992. They were the culmination of a formative period of intellectual activity. The World Conservation Strategy of 1980, perhaps the seminal environmental document of the 20th Century, argued for a new approach based on the key objectives of maintenance of essential ecological processes and life-support systems, preservation of genetic diversity, and ensuring the sustainable utilisation of species and ecosystems (IUCN/UNEP/WWF, 1980). These concepts were developed and encapsulated ultimately in the Convention on Biological Diversity with its key objectives of the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising from the use of genetic resources (Glowka, et al., 1994).

Parallel and complementary thinking was being developed, stimulated by the desire of some industrial nations to bridge the “North/South gap” and the recognition that

western industrialised nations' values were always being imposed on developing countries. The Report of the World Commission on Environment and Development (WCED, 1987) placed people at the heart of the agenda and coined the term "sustainable development" - bringing together the environment and development with the focus clearly on people "whose well-being is the ultimate goal of all environment and development policies". This is epitomised in the sub-title of the Commission's Report "From one earth to one world" signalling integration and cohesion of the key issues affecting human survival on the planet. This carefully analysed and argued vision, along with the further work by the environmental movement in the form of "Caring for the earth" (IUCN/UNEP/WWF, 1991), provided the basis for the Rio Declaration on Environment and Development which set out 27 principles (UNCED, 1992). This suite of agreements set a new vision, a new baseline and a new challenge for everyone: integrating people and their environment globally, nationally and locally.

In Europe, the European Union responded with the signing of the Amsterdam Treaty with its provisions on sustainable development and environmental assessment at the heart of decision-making. The EU Council of Ministers approved the EU Biodiversity Strategy. The Council of Europe set in train the pan-European Biological and Landscape Diversity Strategy. In the UK, the Government published strategies on sustainable development (DoE, 1994a), biodiversity (DoE, 1994b) and climatic change, established round tables, panels and advisory groups on sustainable development to stimulate debate and lead to action: the former easy, the latter at times intractable, especially where there was a lack of political will.

In Scotland, a new statutory agency was established in 1992 (Rifkind, 1991; SDD, 1991). Scottish Natural Heritage was formed in the context of new international thinking on Sustainable Development (SNH, 1993). The key drivers were: to bring decision-making on Scotland to Scotland, to integrate nature conservation with landscape conservation and access, to provide a more cohesive approach to the natural heritage, to create opportunities for positive action for the natural heritage, and to provide a greater understanding of the processes affecting the natural heritage and its better management (see Crofts, 1994a and 1994b; SDD, 1991).

Its remit has three significant elements as far as sustainable development is concerned. First, the enabling statute brings together for the first time the protection and enhancement of nature **and** landscape. Second, it has a specific remit on sustainable development: "SNH shall have regard to the desirability of securing that everything done, whether by SNH or any other person, in relation to the natural heritage of Scotland is undertaken in a manner that is sustainable" (Natural Heritage (Scotland) Act, 1991, Section 1(1)). This was a first for a statutory body in the UK. And, third, it has a specific focus on people as encapsulated in its balancing duties "to take into account as may be appropriate in the circumstances of: the needs of agriculture, fisheries and forestry; the need for social and economic development in Scotland or any part of Scotland; the interests of owners and occupiers of land and the interests of local communities" (Natural Heritage (Scotland) Act, 1991, Section 3 (1)). This is most poignantly emphasised in its mission "working with Scotland's people to care for our natural heritage". In the words of its founder Chairman, Magnus Magnusson, "Our task is to secure the conservation and enhancement of Scotland's unique and precious natural heritage, and to help people to enjoy it

responsibly, understand it more fully and use it more sensibly and sensitively, so that it can be sustained for future generations" (SNH, 1994). He also emphasised that "Conservation and development are interdependent. Conservation keeps our actions within the earth's carrying capacity; development enables people everywhere to enjoy healthy and fulfilling lives. As we strive to achieve a proper balance between the two, our partners in action are farmers, crofters, foresters, land owners, planners, local communities, conservation bodies, recreation groups..... for environmental issues there is no "them" and "us": we are all in this together" (SNH, 1992).

In 1999, we have the devolution of natural heritage policy and action to the Scottish Parliament, and also to the Welsh Assembly. This creates the opportunity for tailor-made solutions for addressing nature and landscape and people in each country. At the same time, it also presents the challenge of ensuring there is due recognition of the international value and importance of the environment in the constituent parts of the UK.

To summarise, the essence of the new accords is a **vision for the future** which calls for a world:

- **where human society and its natural environment are accepted to be interdependent,**
- **where people are an intrinsic part of the environment,**
- **where the environment is recognised as a capital asset for society, and**
- **where the environment can be used for human benefit provided that this is within its carrying capacity, that undue risks are not taken and that the functioning of natural systems is not significantly impaired.**

The institutional, legal and administrative mechanisms were set in place in the early 1990s to support the achievement of these ideals. Making them a reality, however, is not a straightforward task (Crofts, 1991). To assume that the new international accords of 1992 were all about human benefit and that the environment was purely for human exploitation would be a fundamental mistake. For those people who think the accords were all about a 'sustainable economy' and a 'sustainable society' and not a 'sustainable environment' then I am afraid they have got it wrong. And, therefore, it was very encouraging for us working in Scotland to find in the 'Partnership for Scotland', the coalition document between the Liberal Democrats and Labour Parties, the phrase 'environmental sustainability'.

A number of new approaches are being promoted which should help to deliver the vision in practice (Holdgate, 1996).

Biodiversity has become a major theme. The 59-point 'Biodiversity: the UK Action Plan' (DoE, 1994b) touched all parts of Government which it needed to and was, at the time, a major step forward. In practice, however, most progress has been made by Government and non-government environmental bodies working together. Those aspects which could be delivered by this sector were the order of the day and countless Species Action Plans were at the forefront of endeavour. Only recently have Habitat Action plans begun to take a more prominent role. I am of the view that a vast number of Species Action Plans and a few Habitats Action Plans do not make

a Biodiversity Action Plan. Even now some key elements of the Convention on Biological Diversity have insufficient attention paid to them: genetic diversity (as opposed purely to species and habitat diversity defined on a largely non-genetic basis), sustainable use of key biological resources, such as fish and wood, and the role of protected areas. A broadening of action by Government and its agencies is urgently needed. Fundamentally, this must result in the local biodiversity action plans and the processes associated with their development feeding into and influencing local Agenda 21 plans. If they do not, then I consider it will be a major failure.

Soil, air and water provide a resource base for civil society and they can also provide specific **environmental services and functions** for society: the living, natural capital. Take, for example, wetlands (mires, fens, salt marshes and river floodplains) and their role in the UK. They are part of functioning natural systems. Unfortunately, they are too often regarded as a hindrance to farming or house construction or other development, which need to be controlled through drainage. Stopping floodplains flooding to protect arable farmland means that the run-off in the channels will be faster and that flood banks downstream are likely to be overwhelmed causing substantial damage with a high cost of reinstatement. Wetlands are, therefore, important natural regulators of water movement. They also serve as sinks for waste, as well as wildlife sanctuaries providing both spiritual refreshment and recreational enjoyment. Defining such functions and services and ascribing a monetary value to them provides the basis for a new way of assessing the environment alongside those features which are more susceptible to measurement by normal economic indicators (Costanza, et al., 1997; Daily, 1998).

The same approach can be taken for many other services (see table below) such as erosion control, soil formation, genetic resources, food production and recreation. It is possible to analyse the interaction and dependencies between the various components of an ecosystem, and to ascribe quantitative and non-quantitative values for society. Such approaches provide an aid to understanding the complex dependencies of society on the functioning of natural systems. More engagement on these approaches would yield benefits to decision-makers.

KEY ECOSYSTEM SERVICES AND FUNCTIONS

Ecosystem service	Ecosystem Function	Society Benefit
Soil formation	Support soil formation processes	Long term natural capital for food and fibre maintained
Erosion control	Retain soil within system	Greater natural production capacity, less use of artificial production stimulants
Water regulation	Regulation of hydrological flows	Reduced flood risk to farmland and settlements, provision of wildlife sanctuaries and recreational use, waste sink
Landscape and biological diversity	Retain diversity of life forms and landscapes	Emotional, health, recreational, and economic benefits and more wildlife

The basic scientific approach which calls for individual elements of the environment to be recognised as part of wider functioning systems was restated recently in the Fountainbleu Accord (IUCN, 1998). It is welcome news that there is a renewed interest in **understanding ecosystems** as an intrinsic element of planning and managing the natural dynamics of the environment (Budianski, 1996; Maltby et al, 1999). The ecosystem approach, as it is now labelled, is “a method for sustaining or restoring natural systems and their functions and values. It is goal driven, and is based on a collaboratively developed vision of desired future conditions which integrates ecological, economical and social factors. It is applied within a geographic framework defined primarily by ecological boundaries” (U.S. Inter-agency Ecosystem Management Task Force, 1995).

Identification of the sensitivity of the environment to change is a complementary approach developed by geomorphologists almost two decades ago (Brunsden and Thornes, 1979). Recognition that environmental changes do not always follow a steady or consistent path but cross response thresholds from which there is not necessarily any return to the previous state provides a more accurate approach to assess change. This approach properly reflects what happens in the real world. Careful collection of data and testing how the measured changes can be interpreted and what they mean: pulse or steady change, large or small scale change, short term or long term effect, provide a more systematic basis for decision-making on responding to and mitigating environmental change.

In our visions for the future we are prompted, therefore, to ensure that the dynamics of natural systems, including the fact that they are inherently unstable, do not necessarily change in a predicable manner and have a value for society, are taken into account when society seeks to intervene.

It is important to address the functioning of environment systems at the appropriate **geographical scale**. This has become known as the "bioregional approach" (Miller, 1996 and 1999). It is defined as dealing with the functioning of ecosystems, which includes people, at an appropriate geographical scale. It has been applied to the Central American Cordillera, the Serengeti and nearer home is being applied to the Tweed basin, the Loch Leven catchment in Fife, the whole of Scotland and also in many European countries (Crofts, et al., in prep.). The bioregional approach seeks to lessen the isolation of protected areas by recognising that every part of a region plays a different part in the functioning of the whole, and should not have an adverse effect on the areas of highest protection. It recognises that there are gradations in the protection for species, habitats and landscapes from core zones of high protection, through buffers, to corridors which connect them, and placed within a wider matrix (Figure 2). Human settlements and economic activity are embraced within the bioregion to ensure that there is a connection between human needs and the functions and services provided by the environment within the region.

A critical aspect of ecosystem management at different geographical scales, as now practised, is that humans are integral components of the ecosystem: they influence the system while also being affected by it (McNeely, 1999). This has very substantial implications for the processes of deciding on objectives and outcomes, and determining strategies and plans. People as key stakeholders can no longer be ignored. Although engagement of stakeholders prolongs the decision-making process, it provides long-lasting results compared with possible immediate but short-lived gains if there is no engagement. Defining who the stakeholders are is crucial - local communities, owners of land and other property, organisations with statutory responsibilities, and democratically-elected representatives of communities. Local interests, although vitally important, are not the only legitimate stakeholders. National government and its agencies, along with representative and membership organisations with specific interests and responsibilities are equally important. Effective processes which allow for the full engagement of these stakeholders must be part of the approach. In turn, stakeholders should accept that the achievement of shared objectives and outcomes must be part of the deal of engagement.

Defining agreed objectives and sharing desired outcomes amongst stakeholder interests is a critical part of the sustainable development agenda. The broader the objectives and outcomes, then the wider the stakeholder base must be, and so the more challenging it becomes. It is essential to identify the values which are shared and those which are not, and from the common values seek to define objectives and monitor their achievement. It is important to balance the three elements of sustainable development in this context to ensure that one does not take over the others. Recognition that some values can be mutually supportive is also important, such as aesthetics with naturalness, enhancement and restoration with local economic worth.

A managed approach, which allows reaction to particular problems or allows adaption to reach desired end points, is necessary. This cannot be undertaken without adequate scientific information and knowledge of the environment and informed interpretation of the status and trends of the constituent parts. Taking full account of the dynamics of the environment at different spatial scales, and identifying the limits of acceptable change and carrying capacities of the environment are all critical.

To arrive at desired outcomes, there must first be discussion and agreement on the action required and the means of taking it forward. The full engagement of those stakeholders with the ability to deliver new approaches and mechanisms and their political willingness to adapt to changing circumstances are essential components. A variety of measures, with fiscal instruments arguably the most powerful, alongside regulation, statutory duties, statutory or voluntary codes of practice, must all be part of the toolkit.

From this review of the visions for the future to achieve sustainable development there are a number of key lessons: promote environmental functions and services, engage all stakeholders throughout the process of decision-making and action, have clear goals and the means of achieving them, aided by the use of the best available knowledge and information, obtain quickly the necessary knowledge and information where there is a critical gap, use flexibly different tools and mechanisms, and work at the appropriate geographical scale.

From these points I draw four further challenges of sustainable development:

The **fifth challenge of sustainable development** is to establish frameworks for decision-making and action at the appropriate geographical scale which bring together all of the elements of the environment, including nature and landscape, protected areas and the wider countryside.

The **sixth challenge of sustainable development** is to ensure that the strategies within each geographical area have clear goals and meaningful indicators to measure progress and that they are shared by all stakeholders.

The **seventh challenge of sustainable development** is to ensure that the services and functions which the environment provides for society are better understood and accepted.

The **eighth challenge of sustainable development** is to ensure that appropriate scientific knowledge of the environment is available and accessible to all.

Putting the ideal into practice

The eight challenges of sustainable development from an environmental perspective form the basis for reviewing practice. A great number of initiatives are in place in many countries. Five of these which are led, facilitated or involve Scottish Natural Heritage are reviewed here. In each case the contribution to sustainable development and the processes and mechanisms used are described briefly. The

outcomes to date are then assessed against the eight challenges: Figure 4 summarises the assessment.

(1) Natural Heritage Zones

A new framework for the delivery of SNH's work locally and nationally is currently being developed - styled Natural Heritage Zones. The planned benefits for sustainable development from this programme will be: to clarify the environmental contribution to sustainable development locally through the local Agenda 21 process, local Biodiversity Action Plans and Community Plans; to identify environmental opportunities which will bring social and economic benefits locally; and to engage stakeholders in vision and objective setting and ensuing action.

Scotland has been sub-divided into 21 zones which have similar natural and cultural attributes. Each zone has been defined on the basis of a variety of factors, including species distribution, climate, soils, topography and landscape character (Mather and Gunson, 1995; SNH, 1998a; Usher and Balharry, 1996). For each zone, all relevant data are analysed in order to aid the development of a vision for the next quarter of a century and the opportunities for and means of achieving it. From this material a prospectus for each zone is drafted. Thereafter, engagement with key stakeholders is undertaken. Simultaneously, national assessments of the status of key elements of the natural heritage are developed. The material from these assessments and from the zonal prospectuses is then used to identify national policy objectives. Again, engagement of key stakeholders is an important part of the process of agreeing these objectives.

Only an interim assessment of progress can be made as this is a four-year development programme is at the half-way point. The clear gains in terms of the challenges of sustainable development are: embracing the whole landscape in which the role of protected areas is given a wider context; the approach is applied at the appropriate geographic scale in relation to natural features, deliverable solutions and stakeholder perception; and the appropriate environmental data has been assembled. It is acknowledged that a greater degree of communication with stakeholders is required to articulate clearly the goals and the means of achieving those goals. More critical in the development work is the engagement of people - including the key stakeholders. This is essential if the policies and resources of others are to be harnessed, and where appropriate modified, to achieve a truly integrated approach: this activity is still at an early stage.

(2) Loch Leven catchment

The Loch Leven catchment in Fife has local value for recreation, wildlife and its contribution to the economy and is internationally significant for its breeding, migratory and wintering wildlife, particularly wildfowl, and its brown trout fishery. Nutrient enrichment through phosphorous deposition in the loch itself demanded action within the catchment. Although some action had been underway for two decades, statutory agencies and local interests recognised that a more concerted effort was required.

The planned benefits for sustainable development were to achieve sustainable management within the catchment through the development of an integrated catchment management plan with the specific objective of reducing phosphorous input.

The process used was to establish a steering committee of key stakeholder interests and for the public agencies to join together and appoint a project officer. Four working groups, dealing with water quality, river management, planning and development, and agriculture and forestry, were established with representation of key stakeholder interests. Extensive consultations were carried out leading ultimately to the publishing of a catchment management plan (Loch Leven Catchment Management Project, 1999). The plan includes 62 recommendations with planned implementation directed at key statutory bodies. The clear outcome is an agreed plan by the stakeholder interests as a framework for future action.

An assessment against the eight challenges of sustainable development shows that all of the challenges have been met and that implementation of the strategy will ensure action agreed by the parties is undertaken and progress monitored. The quality of the local environment has been recognised as important in its own right. All stakeholders have recognised that they have a role to play in improving environmental quality. The integrated approach as an effective means of dealing with the issues has been recognised and acted upon. Finally, there is a recognition that to achieve the desired outcomes requires effort by all stakeholders committed over a long period of time.

(3) The Cairngorms

The need for an integrated approach to the management of the Cairngorms Mountains and their surrounding glens and straths has been recognised for a long period of time. In 1991 the Government began a new initiative which, through various manifestations, is ongoing. The planned benefits for sustainable development are the reversal of environmental, and specifically ecological, degradation and the delivery of benefits to local communities without damaging the environment. Better protection was required for key environmental assets, especially in the montane and sub-montane zones and in the native woodland zone. Opportunities also needed to be provided for economic development within the context of a high quality environment. All thinking and action had to engage the key constituencies of interest.

Government determined that action was required and established a Working Party comprising key stakeholder interests and supported by technical experts. After an intensive period of activity, the outcome was a detailed analysis of the situation and a shared vision (Cairngorms Working Party, 1992). Following a hiatus in decision-making, the Government established a Cairngorms Partnership but took a rather more detached role in the identification of the key stakeholders. After an intensive period of data gathering, analysis (Cairngorms Partnership, 1996) and consultation throughout the area and further afield, a Management Strategy was drawn up and agreed (Cairngorms Partnership, 1997). Following a further delay, a new Partnership was eventually established with the remit to deliver the Management

strategy. It is too early to judge the outcome of this stage, suffice to note that there are many actions underway some of which stem from the Management Strategy.

Parallel with the establishment of the second Partnership was work undertaken by SNH, at the request of Government, to draw up detailed proposals for the establishment of a National Park for the Cairngorms. In addition to gathering the best available experience from other developed countries (Bishop, et al., 1998), extensive consultation exercises were held, consultation papers drawn up (SNH, 1998b) and circulated widely, and meetings and seminars undertaken. The outcome was a clearly stated aim that the purposes of a Cairngorms National Park should be environmental, social and economic and that all of these could be developed in a co-ordinated and integrated manner, with the proviso that in the case of dispute long-term conservation of the natural resources would be favoured (SNH, 1999).

Assessing progress against the eight challenges of sustainable development shows a reasonably positive picture. The one key missing element is the recognition of the provision of environmental services and functions, although work on landscape sensitivity and planned work on water should go some way to filling this gap. There remains a need to ensure a real balance of interests and not just to provide something for each constituency. A clearer definition of the area is essential which is geographically integral, only then can coherent policies and actions be delivered. The need for a clear mandate to the given to the new Partnership as a whole for the delivery of the agreed strategy, building in all stakeholders, is also needed. Strategic actions flowing from the management strategy rather than specific disconnected projects is also critical.

(4) Focus on Firths

In Scotland, as in other parts of the UK, the maritime environment has been given little attention as an asset and until quite recently virtually ignored from an environmental management viewpoint. The major Firths are areas of high environmental quality, have internationally significant concentrations of wildlife, a diversity of economic activity and dependent social communities. The planned benefits of sustainable development are to promote a joint approach for the delivery and implementation of marine protected areas under the EU Habitats and Species Directive and the EU Birds Directive, to bring about a shared approach to economic benefit through tourism, and where appropriate, for industry, and to maintain traditional fishing activities. The UK Biodiversity Action Plan, published in 1994 (DoE, 1994b), identified a target for the drawing up of strategies for the key Scottish firths: Moray, Forth and Solway, by the end of 1998.

A series of fora were established for each of the three firths, together with subsidiary fora for the inner firths for the Moray Firth: Dornoch and Cromarty (SNH, 1995). The fora comprised initially of the core constituents but these were extended progressively as more stakeholders opted in to the process. In each case a full time project officer was appointed, initially funded by key public sector interests led by SNH. Newsletters to communicate progress, and topic papers to seek views on key activities, functions and other issues were produced.

The outcome is that strategies have been achieved (e.g. Solway Firth Partnership, 1998), or were in an advanced state by the deadline (e.g. Forth Estuary Forum, 1998). The pace of activity has been high and has engaged many interests in a productive way. The rate of progress has varied due to local circumstances dependent upon the perceived degree of threat to specific interests of this more planned approach, the size and complexity of the stakeholder interests and the size of the area.

Good progress has been made when assessed against the eight challenges of sustainable development. The key message is that a good deal of time is required to address new areas and topics and to bring together stakeholders who would not normally work together. Now the challenge is to ensure that the strategies are transformed into action plans with required changes in policy and the disposition of resources, and clearly defined measures of measuring progress put in place. The services which the environment can provide have not been fully built in to the strategies and this remains a worthwhile challenge to be met.

(5) Duthchas

The Highlands and Islands of Scotland is perhaps the most challenging for achieving sustainable development. The aim is to help to bridge the gulf which often is perceived to exist between protection of the environment and securing development to benefit local communities. An experimental approach is currently underway partly funded by the EU LIFE Environment programme. It is entitled 'Duthchas' - emphasising the place of communities in their future and the connection of people with their land. The planned benefits for sustainable development are to find practical solutions for achieving development in remote rural communities based on the natural and cultural heritage resources.

The initiative is being undertaken in 4 locations, representing different community and heritage circumstances. In each, a full-time project officer has been appointed as a facilitator. The project is overseen by a Partnership of nineteen public bodies and is led by a full-time Project Co-ordinator. The plan is for all interests to work together, assess assets, focus on key issues, plan for the future and undertake actions.

The project itself is only just one a year old and it is too early to check progress against the eight challenges of sustainable development. Integration of policies and resources, definition of goals and means of their achievement, contribution of environmental services and functions, and availability of appropriate environmental know-how have still not yet been tested. The project itself was born out of a long process of progressive engagement between the key stakeholders and agreement of the objectives and means of implementation. Already key issues which have to be resolved have been identified. Local participation has to be supported by the provision of hard social, economic and environmental information if the definition of objectives is to be well founded. Aligning the strategies of public bodies which work at a national level so that they support the local processes remains a challenge. A process to resolve inevitable differences in view between local people, and between local interests and public agencies is essential. All of this takes a great amount of

time and effort. Pushing forward faster than key stakeholders wish risks undermining the process and failing to achieve the benefits.

Conclusion

International experience and recent experience in Scotland shows that there are a number of critical factors for the success of initiatives which seek to place the environment, alongside social and economic aspects, to deliver sustainable development in practice (Figure 5). There needs to be flexibility of policies and associated instruments for delivering them and a need to modify institutional structures and to evolve the cultures of the organisations and the staff within them. There is a need to plan and manage at the appropriate geographic scale bearing in mind environmental functions, services and dynamics. Engagement of stakeholders in determining outcomes and the means of achieving them is vital, with an inclusive process throughout. Best available knowledge and information should be used at all times. Focused and strategic effort on key knowledge gaps where these are impeding advancement is required. Adaptive management is usually the best approach, with a process of monitoring and scientific assessment of the outcomes against the values and objectives being a critical part of the process.

Good progress has been made in a short time. There remains a need for greater effort to focus on environmental resources as an essential and dynamic asset in the sustainable development equation. The need for shared visions and outcomes for the use and management of the environment is critical. In addition to improved methods of evaluating the environment, we also need to apply structured and integrated approaches to ecosystem dynamics, functions and services at appropriate geographic scales. There are many challenges but it is clear that if we can move towards meeting these then the environment will become the essential practical element of sustainable development and, thereby, provide benefits locally, nationally and globally.

In Scotland, sustainable development with environmental sustainability as a key element has been agreed as a priority by the Scottish Executive for the Scottish Parliament. New machinery is required to follow up the work of the Advisory Group on Sustainable Development (AGSD, 1999) and take the agenda forward with the active engagement of all interests, including statutory environmental bodies.

Overall, as TC Smout (1999) put it so appositely in his recent Ford's lecture "...changes demand more than political will, however, important though that is. They also demand a reduction of a sense of aggrieved self-righteousness on all sides."

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Figures

1. Places protected for nature conservation (SSSIs) in Scotland 1992.
2. Schematic diagram of integrated planning.
3. Natural Heritage Zones: integrated planning and decision-making
4. Natural heritage initiatives in Scotland: a sustainable development assessment.
5. Diagrammatic views of sustainable development.