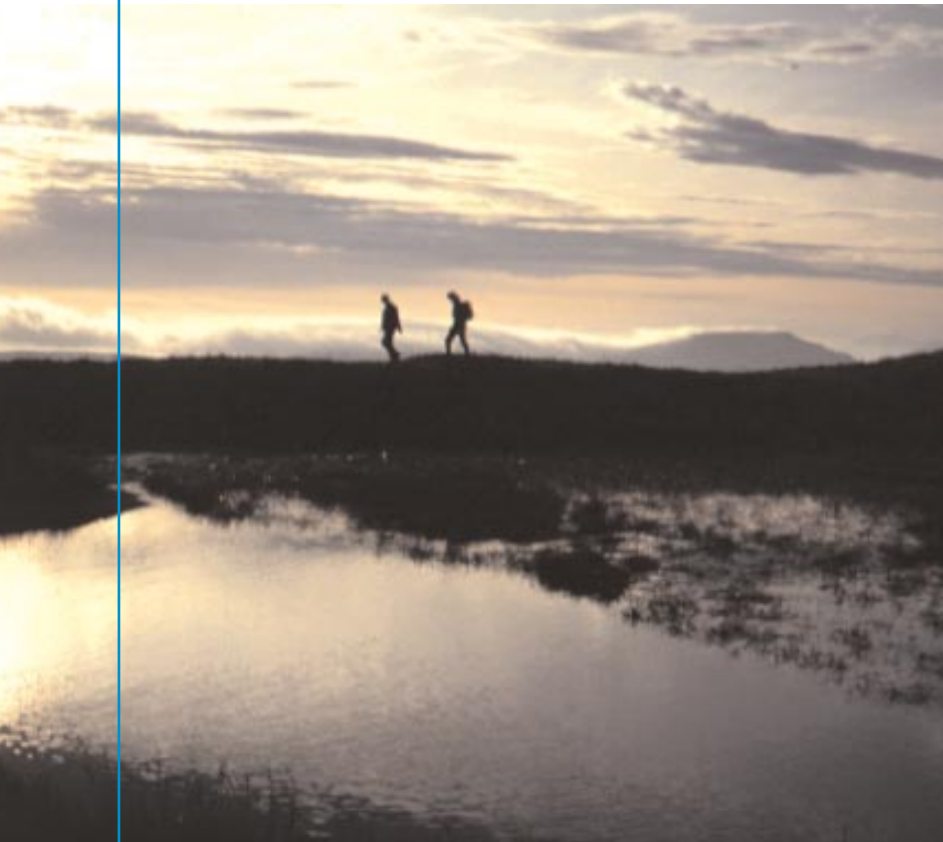


# **Aiming for Sustainability**



**- Can we keep on track?**

**A note on indicators, uncertainty and the “capital” model in sustainable development.**

Based on collaborative research by members of Lancaster and Bath Universities, funded by the Economic and Social Research Council



The **Natural Capital: Metaphor, Learning and Human Behaviour** research project ran between 2003 and 2004 under the auspices of the ESRC's Environment and Human Behaviour New Opportunities Programme. It comprised seminars and workshops involving economists, educationalists, philosophers, sociologists and opinion formers from the policy world, corporations and NGOs.

**This Note summarises key aspects of the project's work. It is written with particular reference to the current review of the UK Sustainable Development Strategy, but will also be of interest to policy-makers at other levels of governance, and to a broad range of stakeholders in sustainable development.**

The project has produced two substantial Working Papers, available in full on its website, and will publish these and other material in due course.

#### The core research team:

##### Robin Grove-White

Professor of Environment and Society, Lancaster University.

##### William Scott

Professor of Education, University of Bath.

##### Stephen Gough

Senior Lecturer in Education, University of Bath.

##### John Foster

Research Fellow, Institute for Environment, Philosophy and Public Policy, Lancaster University.

Project website :

[www.lancs.ac.uk/fss/projects/ieppp/naturalcapital](http://www.lancs.ac.uk/fss/projects/ieppp/naturalcapital)

Environment and Human Behaviour Programme website:

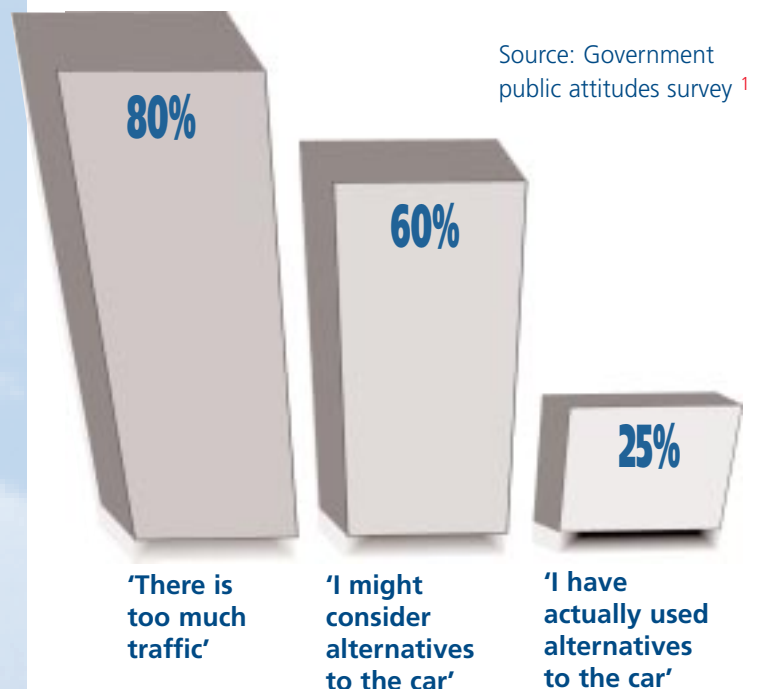
[www.psi.org.uk/ehb](http://www.psi.org.uk/ehb)



## Environment and human behaviour

The ESRC Programme supporting this research has been investigating why people behave as they do towards the environment, how they might adapt their behaviour in response to environmental change, and how public policy approaches could help.

A key datum here is the well-established fact that, while many people in the UK and other advanced societies now describe themselves as seriously concerned about the state of the environment, so far only comparatively few are making significant changes to their behaviour as a result. The size of this gap is illustrated in **Figure 1**.



**Figure 1**

Different explanations have been offered for this situation by economists, political scientists, social psychologists and educationalists.<sup>2</sup> Other projects within the Programme have explored some of the issues in a range of detailed contexts. (See the Programme website.)



Our own work has focussed on the **conceptual framework** within which everyone – individuals, institutions and government – tries to grapple with environmental and behavioural change. In particular, we suggest a new way of treating the central metaphor of **natural capital** to express our sense of what society should be doing and how we can tell if we are on track.

***This revised model has implications not only for environmental and development policies but also for broad educational policies and practices.***

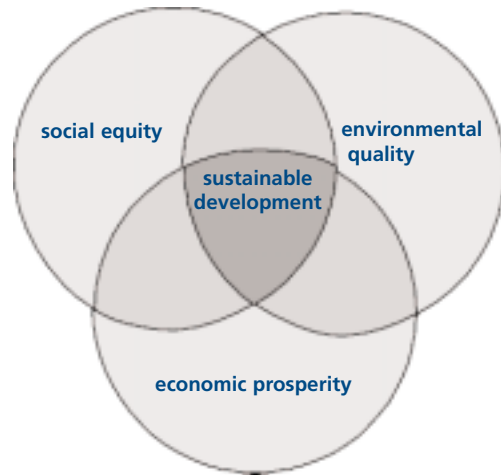
### **A Better Quality of Life**

This focus makes our findings directly relevant to current work on the UK Government's Sustainable Development Strategy, *A Better Quality of Life*. First published in May 1999, the Strategy is now under review in central government, with the aim of having a revised version in place by early 2005. A wide variety of stakeholders are to be consulted during 2004 as part of this review process.

The Strategy defines sustainable development as **"ensuring a better quality of life for everyone, now and for generations to come"**. It is a process of improving the human condition which can be continued indefinitely, without undermining itself. This is held to require the pursuit of four key objectives:

- social progress which recognises the needs of everyone
- effective protection of the environment
- prudent use of natural resources
- maintenance of high and stable levels of economic growth and employment.

In terms of **Figure 2**, society is on track for sustainable development when our actions further its broad economic, social and environmental goals at the same time.



**Figure 2**

### **Indicators : a compass for progress?**

To ensure that we get and keep on track, the Strategy includes an ambitious package of indicators. These are statistical measures of performance in various areas crucial to the achievement of the broader goals.

***"Talking about sustainable development is not enough. We have...to see how our policies are working on the ground. We must hold ourselves to account – as a government, but also as a country. All this depends on devising new ways of assessing how we are doing."***

**Tony Blair : Introduction to *A Better Quality of Life*.**

The full package includes about 150 such indicators, but 15 key or "headline" indicators, giving an overview, have been selected to comprise a "quality of life barometer". These are set out in **Table 1** (overleaf).

Another image for the way these statistics are used might be that of taking a compass bearing: if all the headline indicators can be lined up so that they are pointing the right way, we will know that we are pursuing a sustainable development pathway.



**Table 1. Headline Indicators : UK Sustainable development strategy <sup>3</sup>**

Themes and objectives	Ref no.	Headline indicators
<b>ECONOMIC</b>		
Our economy must continue to grow	H1	Total output of the economy (GDP, per capita GDP)
Investment in plant, machinery and research and development is vital to our future prosperity	H2	Total and social investment as %age of GDP
Maintain high and stable levels of employment	H3	Proportion of people of working age who are in work
<b>SOCIAL</b>		
Tackling poverty and social exclusion	H4	Children in low income households / adults without qualifications in workless households / elderly in fuel poverty
Equip people with the skills to fulfil their potential	H5	Qualifications at age 19
Improve health of the population overall	H6	Expected years of healthy life
Reduce the proportion of unfit housing stock	H7	Homes judged unfit to live in
Reduce both crime and people's fear of crime	H8	Level of crime
<b>ENVIRONMENTAL</b>		
Continue to reduce greenhouse gas emissions	H9	Emissions of greenhouse gases
Reduce air pollution and ensure air quality continues to improve	H10	Days when air pollution is moderate or higher
Improve choice in transport and access to services; reduce need to travel	H11	Road traffic
Improve river quality	H12	Rivers of good or fair quality
Reverse the long-term decline in populations of farmland and woodland birds	H13	Populations of wild birds
Re-use previously developed land	H14	New homes built on previously developed land
Move away from disposal of waste towards waste minimisation, reuse, recycling and recovery	H15	Waste arisings and management

The Strategy declares that:

“the Government’s aim is for all the headline indicators to move in the right direction over time...When the trend is unacceptable, the Government will adjust policies accordingly and will look to others to join it in taking action.”

This kind of serious commitment is very welcome.

But there is nevertheless a major problem with the whole approach. It is true that if the headline indicators are broadly negative, we can tell that the overall position is *not* sustainable. Unfortunately, this does not mean that when they are all positive the position

necessarily *is* sustainable. Indeed, it is even possible that positive indicator results will operate perversely to move us *off* a sustainable pathway.

**“The targets and indicators published in the sustainable development strategy provide useful information, but they do not answer the question of whether, as a result of government action, the overall result is progress towards sustainable development objectives.”**

**Dr Dieter Helm, New College, Oxford: Paper for the Sustainable Development Task Force**



### Critical capital

The reasons for this can best be explained in terms of the “capital” model which underpins the indicator framework. Society’s **capital** comprises the stock of assets and resources on which we depend for continuing human welfare. Traditionally “capital” has meant economic assets (such things as machinery and transport infrastructure), but more recently the idea has been extended to describe human and social resources (for example, the health or skills of the population) and environmental resources (such as the quality of air, water and other natural systems). Most of the headline indicators measure positive or negative changes in our stocks of these “capital assets”.

Of course all these changes are closely interconnected. More roads and more cars use up material resources and tend to mean lower air quality and more greenhouse gas emissions. Improving air quality means better health, particularly in poorer areas. But meeting stringent environmental standards can also mean fewer jobs in certain industries. Increases in one kind of capital must always be balanced against any associated decreases in others – trying to maintain or improve human welfare overall.

But in this connection it is vital to remember that the economic indicators in the headline package measure how far stocks of economic capital are expanding, while the environmental ones basically measure how far society is *restoring* or *defending* environmental capital which has been – and continues to be – used up or damaged in the process of economic growth. And it is often a real question whether we have done *enough* along these lines.

For example, a recent report in the scientific journal *Nature* <sup>4</sup> suggests that greenhouse gas emissions must not only fall, but fall very dramatically and very soon, to prevent global warming from killing off more than a million species by 2050. Such a swathe of extinctions would be likely to cause massive and unmanageable disturbance to the ecological systems on which all living creatures (including humans) depend.

Whether or not this particular projection is true (and it is certainly very well-documented), it emphasises how the environment is always the *bottom* bottom line. The other two goals are important, and in any civilised society they must be pursued, but there can be no material prosperity or social justice at all unless basic survival conditions are met.

Another way of putting this is to say that there are *critical* levels of environmental capital, below which human welfare will decline, perhaps very seriously, *whatever* happens to economic or social capital. And research increasingly suggests that many environmental capital stocks are either already below the critical level, or heading rapidly that way. <sup>5</sup> So, on this account, society could be improving the overall capital position on *all* the headline indicators, without restoring environmental capital sufficiently to compensate for the continuing pressures associated with keeping economic and social capital on the rise.

### Judgement, uncertainty and environmental constraints

How can policy-makers tell whether a set of positive headline indicator readings does show that we are on track for sustainability?

Some people (generally economists) hope that a single unified measure of total capital value might be devised. If the overall value of capital, in terms of its welfare yield (rather than just the stock of different assets), was being maintained, one could be reasonably confident that development was sustainable. But such unified measures typically involve assigning money values in non-market areas and assuming the substitutability of human-made for natural capital; as such, they are controversial, beset with technical problems, and not widely accepted. <sup>6</sup> What happens in practice is that policy-makers have to use the movements of the various indicators to inform *value-judgements* about whether overall welfare is improving.



Where such judgements have to be made about how much positive movement in the environmental indicators is *enough*, they will inevitably depend on assumptions about:

- future states of the relevant environmental capital stock;
- future technological developments, perhaps enabling us to increase the eco-efficiency and productivity of those stocks;
- future values (what kinds of environmental resource situation will matter to future people, and how much)

The trouble is that in the environmental arena such assumptions cannot just be read off from reasonably well-established trends. They range over possibilities which are not just uncertain but substantially indeterminate.

It is widely accepted that on a very broad range of environmental issues there is significant scientific uncertainty. Often we can hope to improve our knowledge of all the highly complex interconnections at work. But many environmental issues require decisions to be taken on the basis of very incomplete knowledge. Moreover, much environmental change is inherently unpredictable because its possibility is hidden by the scientific models used to predict and manage other kinds of environmental change. Nor are there scientific models for choosing *these* models – such choices inherit all the contingency of their social formation. And changes in underlying values are doubly unpredictable, because predictions themselves lead to actions which will change the environmental situations in response to which values will change. In such conditions, all environmental understanding, including scientific knowledge, must be recognised to be both provisional and socio-politically shaped.<sup>7</sup>

But then one must accept that policy-makers' picture of the likely future is not really independent of the many pressures which they are under now – including pressures not to make too many uncomfortable present changes for the sake of the future. And that

being so, it is quite possible that society will picture a sustainable future not as something which it might have to alter its present direction to achieve, but as whatever can be achieved without too much alteration in its present direction. Indeed, given how the Strategy and indicator package are now set up, this is an ever-present danger – as the highly authoritative Royal Commission on Environmental Pollution has recently commented. Policy remains finally driven by the importance of economic and social development: it is stressed repeatedly that curtailing economic growth is not an option. This is politically understandable. But it means that the green constraints which the Strategy acknowledges in theory, and does make a real effort to bring to bear, could fail genuinely to constrain actual practice.

*“Environmental, social and economic goals are different in character. In many interpretations of sustainable development, environmental considerations have been far too readily subordinated to economic and social interests. There has to be a recognition that the environment can impose constraints on human actions”.*

Royal Commission on Environmental Pollution: Twenty-third Report

### Environmental value as real option

Our research has been exploring an interpretation of the “environmental (or natural) capital” metaphor which may suggest a way round this problem. This involves recognising the value of environmental capital as comprising a significant **real option** component.

A real option is a feature of the structure or organisation of a capital asset which embodies the opportunity to make a future decision about how the asset is used, contingent on relevant circumstances at that time. This concept comes originally from financial markets, but recent innovative thinking has applied it to physical as well as financial assets.<sup>8</sup> As the example shows, building such features into human-made capital items usually costs extra, but buys us future flexibility.



*A good example of a real option would be a power plant with burners that can run on either oil or gas. This switching capacity provides managerial flexibility to respond to future fuel price fluctuations.*

*The “real option” element here is the set of material and organisational features which allow fuels to be switched. These are obviously going to be more complex and costly than for single-fuel burners. But their present value rises significantly with uncertainty about future conditions of operation. Importantly, this value doesn’t depend on present predictions which managers make about these conditions, but is all about being able to cope with them as and when they arise.*

*Of course, such value is only going to be realised if managers keep on top of fuel price movements and switch in anticipation at the right moments. Good intelligence and proactive management are vital to real option value.*

How is this relevant to environmental capital?

Very many ecological systems and services seem to contain a real option element: their natural capacity for self-regeneration. Environmental capital is in fact the only kind of capital for which there are conditions of use under which it doesn’t inevitably depreciate. For example, fish stocks harvested only up to a certain limit will renew themselves in time for next year’s catch; CO<sub>2</sub> emissions up to a certain volume can be absorbed and their effects neutralised by the Earth’s cyclical systems. The more effort is invested in trying to keep within these limits, the less depreciation in the natural asset there is. So the more sustainably we are able to use these resources, the more we are *buying time*. And buying time here is, again, buying *flexibility* – to learn how to use the resource ever more eco-efficiently as we go on, to bring new technological developments carefully to bear as they emerge, and to keep policy alert and responsive to changing public values.

It is this flexibility which could enable society, *over time*, to ensure that critical environmental capital is brought into balance with economic and social needs.

### An environmentally learning society

Pursuing this flexibility means continuing to push the existing headline environmental indicators in the right direction. But proper use can only be made of it if we are at the same time building a particular kind of individual and collective *learning capacity* in society. This is a capacity for what has been called “Type 3 environmental learning”<sup>9</sup> – the exploratory, reflexive and open-ended negotiation of emerging situations as individual activity, society and environment co-evolve.

We might think of this as a special form of social capital. **Crucially, however, the need for it provides a genuine environmental constraint on present policies.** We can tell whether we are building it up in the present without having to second-guess uncertain environmental futures.

Such capacity could be built through:

- a significant increase in the curricular emphasis and attention given to environmental issues at all levels of formal education;
- greatly increased recognition of the inherently provisional and dialogical nature of *all* knowledge and value-frameworks, including those termed “scientific”;
- the development of a widely-distributed and richly-conceived environmental “knowledge base”, in which information is commonly owned and widely accessible, and a variety of expert and lay perspectives mutually illuminate one another;
- equipping an increasing range of people to engage in discussion of the social, cultural and ethical dimensions of new technologies;
- a significant increase in real participation, open consultation and collective decision-making about environmental issues at all levels, both to facilitate the dialogue of expertise and lay knowledge and to ensure that wider public values are allowed to inform policy and decision-making at all stages.



**Table 2. Features and possible indicators of an environmentally learning society**

FEATURE	POSSIBLE INDICATORS (feasibility to be explored)
A widely distributed knowledge base	% of population with some kind of environmental study background at FHE level Measures of availability of relevant information
Encouragement of self-directed, exploratory and interdisciplinary learning at all levels	Component of quality assessment processes in formal education Participation in relevant adult education / continuing professional development courses
Expert and lay perspectives illuminating one another	Non-expert participation in scientific agenda-setting and advisory processes, and technological R&D
Resources for public judgement	Proportion of environmental study courses including a humanities and/or social science component People in environmental management positions with a wider than scientific background References to sustainable development in the media
Decision processes sensitive to public values	Extent of public engagement process on key environmental decisions
Review and reflexivity in institutional governance at all levels	Process, inclusiveness and periodicity of major strategic reviews

**An additional range of indicators?**

It would seem to follow that if environmental capital was being restored or maintained to the best of our present ability, social and economic capital was growing *and* this kind of social-environmental learning capacity was being deliberately and explicitly built up, then perhaps policy-makers *could* be reasonably confident that society was on track for sustainable development.

So our practical suggestion for the current Sustainable Development Strategy review is that some additional indicators measuring the progressive development of an environmentally learning society be investigated, with a view to incorporating at least one or two of them in the headline package.

This is of course something which could be done not only at the UK level, but also at the levels of the devolved administrations and of regional and local governance to which sustainable development

responsibilities are being increasingly rolled out. It is also clearly relevant not just to environment and sustainable development but also to education policy, and presupposes a more dynamic kind of relationship among these than has perhaps obtained hitherto.

What such indicators might look like lies at the very limit of the research work which we have so far been funded to do. Some initial ideas (and they are no more than that) are set out in **Table 2**.

**We are very keen to find partners in government and among stakeholders at all levels for further work to develop the ideas and practical proposals sketched in this Briefing Note.**

**Contact the project coordinator:**  
**John Foster**  
**Institute for Environment, Philosophy and Public Policy**  
**Lancaster University Lancaster LA1 4YG**  
**Tel: 01524 593385 / 016977 46269**  
**j.foster@lancaster.ac.uk**

- 1 Quoted in Blake, J. "Overcoming the Value-Action Gap in Environmental Policy", *Local Environment* 4, 3 (1999)
- 2 See the special edition of the journal *Environmental Education Research* 8.3 (2002)
- 3 Available together with much supporting material at [www.sustainable-development.gov.uk/uk\\_strategy/](http://www.sustainable-development.gov.uk/uk_strategy/)
- 4 *Nature* 427, 145 - 148 (08 January 2004)
- 5 Ekins P, Simon S, Deutsch L, Folke C, and de Groot R, 'A framework for the practical application of the concepts of critical natural capital and strong sustainability', *Ecological Economics*, 44, 165-185. (2003)
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- 8 Amram, M. & Kulatilaka, N. *Real Options: managing strategic investment in an uncertain world* Boston, Mass. :Harvard Business School Press (1999).
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