



ESRC
Global
Environmental
Change
Programme

Steps into uncertainty:

Handling risk & uncertainty
in environmental policy-making

Special Briefing No 6

June 2000



“green alliance...”

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a revolution from
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Background

This report summarises a joint project by Green Alliance and the Global Environmental Change Programme (GECPC) of the Economic and Social Research Council (ESRC). It is based on the following events and publications:

October 1999: publication of *The Politics Of GM Food: Risk, Science and Public Trust, a GECPC Special Briefing*.¹

- This report is a research-based analysis looking at why the handling of risk and new technologies has caused such political difficulties, followed by a series of recommendations on how the UK Government could change its handling of the GM debate, and how future problems could be avoided.

December 1999: GECPC seminar on *Practical Responses to Uncertainty and Divergent Values in Environmental Appraisal*.

- GECPC researchers, policy-makers, industry and NGOs came together for this seminar, a closing workshop for a two year GECPC fellowship conducted by Andy Stirling. It gave representatives coming from different perspectives the opportunity to share ideas about the treatment of scientific uncertainty.

March 2000: Green Alliance / GECPC seminar on *Handling Scientific Uncertainty In Environmental Decision-Making*.

- This seminar provided a chance to explore new research, hear from policy-makers about their experience of these issues, and seek consensus on practical ways forward for developing policy under uncertainty at a UK level. It brought together GECPC researchers with representatives from government departments, NGOs and business. Sir Robert May, the Government's Chief Scientific Adviser and Phil Wynn Owen, Director of the Regulatory Impact Unit in the Cabinet Office gave presentations alongside GECPC academics, industry, media and NGO representatives.

April 2000: Green Alliance / GECPC / EFB seminar on *Handling Scientific Uncertainty In European Environmental Decision-Making*.

- The second Green Alliance seminar focused on the treatment of scientific uncertainty at a European level. It was held in conjunction with the European Federation of Biotechnology Task Group on Public Perceptions of Biotechnology. Michael Meacher, the UK Environment Minister, spoke alongside European policy-makers, academics, NGOs and business representatives. The seminar was a two-day, professionally facilitated dialogue process, which allowed participants to explore areas of consensus as well as dissent, and to work toward conclusions on how to develop policy under conditions of scientific uncertainty.

April 2000: GECPC Programme Final Conference.

- This major conference brought together a wide spectrum of people to look at the most important insights to have emerged from GECPC research. A report entitled *Risky Choices, Soft Disasters*² was launched, summarising key lessons from social science research in the area of environmental decision-making. The report highlights the problem of 'soft disasters', environmental and political crises which come about gradually, because of the slow emergence of evidence about unexpected negative effects of a new technology or practice.

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This report was written by Rebecca Willis and Beatrice Rose.

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Introduction

Some of the most difficult environmental issues that policy-makers face are those where there is scientific uncertainty - uncertainty about cause, about effect, or about remedy. Uncertainty is inherent in issues as varied as genetic modification, climate change, and the safety of mobile phones. Standard decision-making tools, based on quantifiable information, are inadequate in the face of scientific uncertainty, when solutions are complex, value-laden and long-term. As research by the Global Environmental Change Programme has shown, failure to address the complexity of these issues results in 'soft disasters' - 'environmental and political crises that emerge only slowly but at high costs to society, not least the erosion of public confidence'.²

Designing a regulatory system which is able to understand, communicate and adapt to uncertainty and complexity is an immense challenge for policy-makers. How do we build uncertainty and ignorance into policy decisions? Can we, as a society, decide what sort of technologies we want? What if the consequences are irreversible? If policy-makers are open about uncertainty, do they risk provoking a public outcry?

These questions were at the heart of two seminars held by Green Alliance in March and April 2000. The seminars brought together policy-makers, academics, business people and NGOs to discuss how to deal with scientific uncertainty in government, at both a national and European level. (See *Background*). They provided a forum for policy-makers to discuss approaches to scientific uncertainty with academics from the Global Environmental Change Programme.

The briefing is organised around five themes which arose from the seminars and research findings. Each of these themes was identified as an essential component of any policy response to scientific uncertainty.

Theme 1: Involving the public: a revolution from below?

- Why there should be greater public involvement in policy-making in cases of scientific uncertainty, and how this can be achieved effectively.

Theme 2: What does precaution mean?

- The extent to which a precautionary approach is desirable in policy-making, and how such an approach might be formulated.

Theme 3: Using science: who makes the rules?

- The role of science and scientific advice in policy-making, and ways to improve government handling of scientific information.

Theme 4: The big picture

- The need to place decisions within the wider policy context, and mechanisms and processes to achieve this.

Theme 5: Looking forward

- Looking forward, to prepare for future trends, and looking back to learn from past experience.

For each of these themes, the briefing explores *Perspectives* - views, opinions, consensus and dissent between academic, government, business and NGO perspectives - and *Steps Forward* - suggestions for practical, incremental improvements in the way scientific uncertainty is handled in government.

Steps into Uncertainty draws on these seminars, but is not intended as a complete representation of the views of participants. The 'Steps Forward' are recommendations emerging from the seminars, from GECP research and from Green Alliance work.

Designing a regulatory system which is able to understand, communicate and adapt to uncertainty and complexity is an immense challenge for policy-makers.



Involving the public: A revolution from below?

Power sharing: Stakeholder decision-making in Jersey

At the UK seminar, an example of stakeholder decision-making was presented. People in Jersey have been engaged in drawing up a sustainable development strategy for the island. In a climate of growing disaffection with democratic processes in Jersey, stakeholders representing a wide spectrum of society were involved in a series of deliberative processes.

Through a sequence of focus groups, citizen workshops, and a sustainability forum, the stakeholders gained a genuine sense of ownership of the process. Parliamentarians are now committed to implementing the recommendations of those involved, resulting in an ambitious power sharing arrangement.³

the denial of uncertainty leads to distrust and backlashes.

High-profile political controversies like GM food, BSE and Brent Spar, as well as widely publicised scientific uncertainties and disagreement over health issues like vaccination and the safety of waste incinerators, have had a profound impact on public confidence in the ability of politicians and experts to make decisions on complex issues involving scientific uncertainty. There is a danger that every new crisis will erode confidence further, and damage the legitimacy of both science and the political process. Increasingly, issues of environmental risk are seen as political problems, to be tackled by society, not just science. People are interested in, and concerned about, the wider impacts of new technologies, and are asking to be involved in decisions that might affect them. There is growing recognition that participatory approaches are a necessary part of good decision-making, and of rebuilding public trust in the regulatory system.

Perspectives

The seminars revealed a striking degree of consensus about the need for greater participation in decision-making. There was much discussion of how the public can be meaningfully engaged in the policy process. Many policy-makers recognise the need for greater dialogue and openness as a means of building trust and legitimacy. They talk of the 'culture shift' that would be necessary if bureaucracies were to take the values and attitudes of the public more fully into consideration. This recognition is reflected in a number of initiatives by Government departments in the UK to establish wider consultative mechanisms, such as the DETR's stakeholder forum on chemicals policy. The Government's recently established Human Genetics Commission (HGC) and the Agriculture and Biotechnology Commission (AEBC) have as a part of their remit the involvement and consultation of stakeholders and the public. In addition, the new Office of Science and Technology's guidelines on science in policy-making place greater emphasis on the need to involve consumer groups and other stakeholder bodies.

There are, however, differing perspectives about how to present uncertainty. Government and industry may fear that any departure from a public position of 'absolute safety' will cause panic and loss of trust. But, academic research shows that the public are prepared to and routinely do cope with risk and uncertainty, and that it is the denial of uncertainty that leads to distrust and backlashes. Many policy-makers accepted this point, arguing that ways must be found to communicate uncertainty and complexity more openly, and to allow two-way dialogue.

Academic researchers have developed a wealth of tools and techniques for involving the public. Methodologies include citizens' juries and panels, consensus conferences, deliberative polls and multi-criteria mapping.² Policy-makers, however, feel that applying these techniques to national and European policy would be extremely challenging. The cost and logistical difficulties involved in scaling up these techniques are considerable. Against this, any calculation of cost must be weighed against the cost of inaction, in terms of loss of public trust - this was shown clearly in the case of BSE.

Communicating complexity

There was much discussion at the seminars about the challenge of communicating the complexity of issues like genetic modification. Oversimplification of issues, and the language of 'absolute safety', results in public distrust and panic when unanticipated consequences occur. During the BSE crisis the phrase 'no evidence of harm' was widely used, and was very damaging when harm did, in fact, occur.

Statements made about science by government and industry often slip from 'probably won't' to 'will not', particularly under the soundbite pressure of the media. Worryingly, this language has been reappearing in the recent GM food controversies.

The media could play a role in informed public discussion. But it faces an inherent tension between informing and entertaining the public. Hype may sell more stories but does little to encourage informed debate.

Equally politicians must be open about the politics behind some 'scientific' advice, such as the difference between determining the level of a hazard, and the acceptable level of that hazard, and should be willing to have those value judgements aired in public.

There is also still much debate about why to involve people. Is it a question of *transparency* - telling people why decisions have been made - or *involvement* - with the public somehow being incorporated into actual policy-making? Do these methods aim merely to expand the traditional consultation process, making it more thorough and systematic, whilst leaving Ministers and their government departments to make the final decisions? Or could we be seeing a more radical departure from traditional models of policy-making, where there is a contract with those involved to co-determine policy?

There was agreement amongst UK seminar participants of the need to clearly delineate the objectives of these participatory techniques. The aim of a consensus conference, for instance, may simply be to explore the scope of agreement and disagreement among informed lay persons - it would not necessarily require their conclusions to be accepted. But this must be made explicit to avoid those involved feeling disillusioned and disenfranchised. Past consensus conferences, for example, have not had a clear impact on the policy process.⁴

Whether or not a radical role for participatory approaches is envisaged, there are clear benefits in adopting more inclusive approaches. Firstly, industry and scientific research would be better informed by public opinion and concerns, allowing a greater degree of predictability for both industry and the public. Secondly, whether or not consensus is reached, participatory techniques expose the range of opinions amongst different individuals and groups. Taking account of dissent is, in itself, a valuable function of participatory approaches. (See Theme 4 for further discussion of this point)

In terms of where these participatory methods should be developed in government, there is a tricky balance between centralising expertise in one government department or unit which might lead to a 'participation ghetto', and diffusing knowledge and skills throughout government, with associated problems of communication, co-ordination, continuity and lack of feedback.

Steps forward

- Where participatory methodologies are used in policy-making, the objectives and responsibilities of the forum or process should be clearly delineated.
- The new Agriculture and Environment Biotechnology Commission (AEBEC), the Chemical Stakeholders' Forum, Human Genetics Commission (HGC) and the Sustainable Development Commission in the UK are examples of initiatives which could be very effective in involving the public in decisions involving scientific uncertainty. They must be given the opportunity to be bold and experimental. They should consult widely, using participatory processes and tools, and feed results from consultation processes into policy-making. There is a need for this process in all areas of scientific uncertainty, and similar institutions will be needed in other policy areas.
- The Cabinet Office could create a 'Participation Point', a central unit within Government acting as a centre of best practice and expertise in participatory techniques. The Participation Point would act as a focus for links to process experts within each Department, and to external expertise which could be used as necessary. It would provide continuity for civil servants who move between policy areas.
- In order to build the necessary skill base within Government and Agencies for implementing participatory approaches, training and investment will be required. This could be linked to the 'Participation Point', and organised through the Civil Service College and the Centre for Management and Policy Studies in the Cabinet Office. Civil servants who take on board new techniques for involving the public and gathering intelligence on the values and views of the public should be given appropriate recognition through this process.

issues of environmental risk are seen as political problems, to be tackled by society, not just science.



What does precaution mean?

Assessing the risks

At both seminars, there was considerable discussion about the role and scope of risk assessment. Academic work ² has shown that a statistical risk assessment is only fully valid when we have a clear idea of possible outcomes, and of the probability of these outcomes occurring. With genetic modification technologies, for example, we often do not have this information, and technical risk assessment tools become problematic.

In conditions of uncertainty, risk assessments depend greatly on the assumptions made by the assessors, and the variables that they factor into the risk equation. Behind the number crunching are built in values made in the framing of assessments. This 'framing' has important consequences for the policy outcomes.

Where possible outcomes are irreversible or persistent, as with certain chemicals, for example, this needs to be explicitly considered in any process of risk assessment. The importance of understanding how risk assessments have been framed again demands total transparency of the risk assessment process.

The precautionary principle is defined in the 1992 Rio Declaration on Environment and Development as "Where there are threats of serious irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation". ⁵

The precautionary principle or 'a precautionary approach' is enshrined in much environment and health policy and law at a UK, European and international level - from the sustainable development strategy, to the European directive on GMO releases ⁶, to the recently signed Biosafety Protocol. What this means in practical policy terms, however, is unclear. The European Commission's Communication on the Precautionary Principle, published in February 2000 ⁷, attempts to codify the essential elements of precaution in EU policy and to set a predictable framework for its application. At the centre of debates on precaution is the question of what role science, and scientific evidence, should play in the process.

Perspectives

There is considerable debate and disagreement between academics and policy-makers over the nature and indeed legitimacy of the precautionary principle. Some academics at the seminars saw precaution as a 'state of mind', citing that responsible institutions should foster a culture of precaution, but that it could not be pinned down into set prescriptions for policy-makers. Given its presence in law and policy statements, however, many policy-makers saw a clear need to establish mechanisms to implement a precautionary approach, and felt that using the precautionary principle as an operational tool was, though difficult, achievable.

Industry representatives expressed the need for greater clarity in the use of the precautionary principle, to prevent it being invoked in an unpredictable or discriminatory way. They wanted to 'use precaution with discretion'. Links to liability were also discussed, with NGO representatives claiming that if an industry were truly acting in a precautionary manner, they would have nothing to fear from strict liability regimes, and should not need to oppose them.

There was consensus around the fact that a precautionary approach means putting scientific evidence in context, and considering not just scientific evidence or the lack of it, but also how this evidence is framed by the values and views of different stakeholders. It was accepted that precaution would always imply both scientific and political judgement, but that this needs to be an informed and deliberative judgement.

Steps forward

- It is important to use technical risk assessment tools in context. There should be clear indications of the framing assumptions. They should be used alongside more qualitative techniques, which help set the context. Assessments of risk should make clear what sorts of risk or uncertainty are being addressed - are they long-term? Persistent? Irreversible?
- The way government handles risk is being reviewed as part of the Modernising Government process. This framework could be broadened out to explicitly consider issues of environmental uncertainty, and precautionary approaches.
- The fluid nature of the precautionary principle demands totally transparent policy-making so that it is clear how the principle is being applied.
- Following from the European Commission's *Communication on the Precautionary Principle*, a network for European policy-makers in different Directorates-General of the European Commission, and elsewhere in the institutions, could be established on a more formal basis. This network would consider policy responses to risk and scientific uncertainty, and could perhaps be led by the Forward Studies Unit. The network could be similar to the UK's ILGRA (inter-departmental liaison group on risk assessment).
- The UK Government could consult on the potential for developing its own guidelines for the use of the precautionary principle, to stimulate discussion about the relevance of the precautionary principle in the UK context.

Using science: who makes the rules?



Technical or political?

Decisions about technology are often devolved to technical committees at EU level.

There is a danger of political decisions concerning the use of technologies being taken in these fora. There is a need to police the boundary between the technical and the political. This could be achieved through greater transparency of these committees - they should meet in public and publish proceedings.

The Amsterdam Treaty explicitly acknowledges the need for more transparency and openness in EU procedures. In the USA, all expert advisory committees which advise US Executive Agencies, like the Environment Protection Agency, meet in public, publish agendas and minutes.

Handling scientific uncertainty inevitably leads to consideration of the role that science should play in decision-making. How should scientific evidence be used? What should be done when there is a lack of evidence - should answers come from more science, from risk assessment, or from public deliberation?

Perspectives

There was a clear consensus between academics and policy-makers that over-reliance on scientific evidence, without proper examination of the assumptions behind the evidence, is extremely problematic. It is damaging to the reputation of science, as it makes conditional, contingent findings appear as assertions of fact. It is damaging to the reputation of government, as it creates a false sense of certainty which may be overturned, as happened over BSE, with every new scientific finding resulting in new policy response. This in turn is damaging to industry, which loses ability to predict policies or regulatory environments.

Beyond this consensus, however, there are different perspectives on the role that science should have. GECP research has highlighted that science is important, but not all-important. Other types of knowledge should be built into the decision-making process - for example, in both BSE and genetic modification, farmers' knowledge provides an important addition to laboratory-based scientific knowledge. There is little consensus, though, on how to build in these other forms of knowledge into the policy process.

There is debate over how gaps in scientific knowledge should be treated. Whilst GECP academics argued that science is by its very nature partial and incomplete, and must be put in its social and political context, policy-makers were more concerned with ensuring that the science itself is as impartial and as consensual as possible. They identified a need for a greater number of independent scientists, not tied to government or industry, and better mechanisms for building consensus among scientists.

Steps forward

- **The new guidelines for scientific advice being drawn up by the Office of Science and Technology should incorporate consideration of all the issues raised in this document: involving stakeholders; taking a precautionary approach; and giving greater consideration to the wider picture.**
- **Advisory committees within government could act as a 'clearing house' within which scientific evidence could be considered alongside other knowledge, whether economic data, or stakeholder perspectives. These committees would be asked to weigh up different types of evidence to make a qualitative judgement or recommendation.**
- **More science is also needed. There should be more monitoring of the effects of technologies as we still have a poor evidence base on issues such as endocrine disruptors or the safety of new foods. This scientific research needs to be carried out by independent scientists and not just by the industry itself.**
- **Both scientific advisory committees and 'commitology' committees in the European Commission need to be more transparent, meet in public and publish documentation.**
- **The European Commission's White Paper on European 'governance' should look at how questions concerning scientific uncertainty should be handled, and at what level.**

Who decides?

At the EU seminar, debate arose over whether questions of scientific uncertainty are best dealt with at a European level. The more qualitative or value-laden a decision, the more difficult it is to have a EU-wide response. One size may not fit all, and gauging the values and viewpoints across the EU is a complex process.

In the current round of reforms under Prodi, the Commission is taking a fresh look at governance. This initiative should encompass questions of environmental risk and uncertainty, and consider how to address differing values and attitudes across Europe.

The big picture

consider the need for a new technology or practice, weighed against risks and possible unintended consequences



Dissenting voices

However inclusive and wide-ranging a policy process, there will usually be dissenting voices over risk issues. Though greater transparency and participation may encourage better policy, and better public acceptance of policy outcomes, transparency and participation does not necessarily lead to consensus.

Listening to dissenting voices is an important element of considering the wider context. Where values, interests and opinions vary greatly, as is often the case in issues of environmental risk, it may be necessary to bring all voices to the table, and give an airing to all concerns, through a wide-ranging consideration of options, including implications for the future (see *Theme 5*).

Assessing the risk of new technologies such as GM food is only half the equation. Any proper assessment of the desirability of such technology needs to focus on potential benefits as well as potential risks. This implies the need for an assessment of the wider policy context, including a look at alternatives. The need to contextualise individual risk and uncertainty issues and consider the big picture was much discussed, and possible ways of incorporating this into policy-making suggested.

Perspectives

At the EU seminar, a workshop group was asked to consider how the European Commission should address the question of 'the long-term impacts of genetically modified crops in Europe', but re-wrote their brief to put this question in a far wider context, instead asking 'what are the consequences of European rural development policy to date, what kind of policy do we want in future, and what role might genetically modified crops play in this?' The group argued that GM crops should not just be assessed in terms of their potential risk to health or the environment. Instead, they should be considered within the context of the overall trajectory of agriculture and food production. Currently, developments in GM crops tend to be looked at in isolation. Instead we should explicitly consider the big picture.

The need for a wider focus was stressed particularly by academics and NGOs. They stressed the importance of assessing the need for new technologies alongside social and economic opportunities and constraints, and the need to ask questions like "Why are we doing this? What are the social benefits?" There was general agreement that this was necessary, but some unease about what such a wide approach would mean for policy processes - policy-makers felt that it would be difficult to handle in the present cultural, legal and administrative framework.

There was discussion of how it might be possible to ask these wider questions as an integral part of the risk and regulatory process - the so-called 'fourth hurdle' of the regulatory system. The fourth hurdle requires policy-makers to consider the need for a new technology or practice, weighed against risks and possible unintended consequences. In GM regulation, there was an attempt to integrate 'fourth hurdle' concerns into the original GMO Directive⁶ and further attempts in the amended Directive which is nearing completion. Elsewhere, though, such an approach is enshrined in legislation - The Norwegian Gene Technology Act of 1995 is one such example. It requires releases to the environment to be compatible with sustainable development and to meet fourth hurdle requirements. Although in legal terms the wording is vague, it gives recognition to wider discussions which otherwise may be ignored.

The call from some environmental non-governmental organisations for justification of new technologies, and the call from industry for the benefits of new technologies to be taken into consideration in the regulatory process, are in fact two sides of the same coin. Both are a call for recognition of the wider implications of the technology and its place in the broader picture.

Steps Forward

- **Ensure mechanisms are in place for allowing debate on broader issues such as sustainable agriculture and the future of agricultural policy at UK and EU level, and that these debates feed into the policy process.**
- **Encourage debates about social purposes and benefits alongside risk, as part of the routine democratic social assessment of new technologies.**
- **Include dissenting voices in decision-making processes, through stakeholder fora, for example. (See *Theme 1*)**



Looking forward



Looking back: feedback loops

There are currently no clear processes through which lessons learned from previous attempts at handling scientific uncertainty can be drawn out and used to inform future policy. There is a need for 'feedback loops', to ensure that decisions made are well informed, iterative and adaptable. The costs and benefits of new technologies are best assessed through examination of similar past experience.

A new report by the European Environment Agency: *Late lessons from Early Warnings: The Precautionary Principle 1898-1998*, which GECP researchers have been involved in, examines lessons learnt from past experiences, and will be published imminently.⁸

Feedback loops would help predictability. This is particularly important to industry, which relies on a predictable, informed policy framework in order to make R&D decisions.

The development of an 'institutional memory' for government would be best served by central co-ordination units, such as the 'participation point' we suggest in Theme 1, together with cross-governmental networking, through ILGRA, for example.

Effective responses to uncertainty rely on thorough early warning systems to identify and deal with unexpected consequences as they arise. Careful thinking about the future requires a shift in focus from individual risk issues to the broader social dimension - how these individual issues contribute to future societal trends. There is a need to do this not just to highlight potential problems, but potential opportunities too.

Perspectives

There was much discussion in the seminars about whether we currently have the adequate mechanisms and institutions for fostering foresight. Academics outlined tools like scenario planning and visioning, which provide ways of conceptualising and discussing potential futures, even those which are uncertain. These are beginning to be used more widely in Government, but policy-makers expressed a need for more co-ordination of this work, and in particular, greater political prioritisation.

There was a strong feeling that potential benefits should be considered alongside potential risks, to ensure a balanced view. Lessons were drawn from the Office of Technology Assessment in the US, which, it was felt, ran into difficulty because it focused purely on the problems and not the opportunities of new technologies and innovation.

GECP work has also emphasised the potential synergies between innovation policy and environmental goals (see forthcoming Special Briefing) and scope for and history of innovation in producing environmental solutions.

Steps forward

- **The UK government could extend the role of the Interdepartmental Liaison Group on Risk Assessment (ILGRA), creating an ILGRA Futures Group to anticipate issues involving scientific uncertainty well in advance.**
- **There are various sites for proactive futures work in government, including the Performance and Innovation Unit in the Cabinet Office, as well as individual Departmental initiatives. However there is a need for a more coherent strategy to integrate these initiatives, to channel work into policy-making and to ensure political prioritisation.**
- **Those involved in innovation policy should investigate approaches to more inherently sustainable innovation that might obviate the need for handling an increasing number of risk issues.**

There is a need for feedback loops, to ensure that decisions made are well informed, iterative and adaptable.

Careful thinking about the future requires a shift in focus from individual risk issues to the broader social dimension

Green Alliance

Green Alliance's mission is to promote sustainable development by ensuring that the environment is at the heart of decision-making. It works with senior people in government, parliament, business and the environmental movement to encourage new ideas, dialogue and constructive solutions.

For more information about Green Alliance and its work on risk and scientific uncertainty, visit the web site www.green-alliance.org.uk

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Global Environmental Change Programme

The Global Environmental Change Programme is in its final year. Supported by the Economic and Social Research Council, the Programme has run since 1991 and will end in June 2000.

It has supported 150 empirical research projects, fellowships and PhD studentships across the UK.

For more information about the GECP Programme visit the web site www.gecko.ac.uk

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The European Federation of Biotechnology Task Group on Public Perceptions of Biotechnology

The European Federation of Biotechnology Task Group on Public Perceptions of Biotechnology consists of 50 members from all EU and most other European countries drawn from scientific research, industry, government, consumer and environmental organisations, the media and communications. It works to increase public awareness and understanding of biotechnology and the life sciences throughout Europe and to facilitate dialogue between interested parties.

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- 3 Jackie Burgess, Environment and Society Research Unit, Department of
Geography University College London:
Stakeholder Decision-Analysis in Jersey
- 4 The Radioactive Waste Management Consensus Conference in 1999 for
example, had a mixed impact: the panel's conclusions have not informed
government policy so far, and the process received minimal coverage in
the media. However it may feed into the forthcoming Green Paper on
nuclear waste management and into general thinking on the subject.
Of course consensus conferences are still at an early stage in this
country - it was only the second of its kind in the UK.
- 5 Principle 15, 1992 Rio Declaration on Environment and Development
- 6 EC Directive 90/220 on deliberate releases of GMOs
- 7 Commission of the European Communities, Brussels, 02.02.2000
**Communication from the Commission on the
precautionary principle**
www.europa.eu.int/comm/off/com/health_consumer/precaution.htm
- 8 European Environment Agency (October 2000)
**Late Lessons from Early Warnings:
The Precautionary Principle 1898-1998**



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