



CSERGE Evaluation

Policy and practice impact case study of the Centre for Social and Economic Research on the Global Environment

Final Report January 2009

Appendices

CSERGE Evaluation for ESRC - Report Appendices

A report from **CAG Consultants**

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Appendix 1 Key informant interview questions

CSERGE key informant interview questions

Leading questions	Prompts, sub questions
1. Please describe your role in relation to CSERGE.	
2. Could you list up to 5 key impacts you feel that CSERGE has had during the ESRC grant period.	See evaluation framework to help guide answers. For each, explain what the impact has been, on whom, what CSERGE's role was and what processes were used. More detailed probing about process and impact.
3. Do you feel any of these would be useful case studies for this evaluation?	If so, please provide some details about key informants (internal and external), and any documentation which would be useful.
4. [The next stage of our evaluation will be to undertake a review of end-users, e.g. policy makers and practitioners who CSERGE have sought to influence]. Could you provide some key contacts for this external review? E.g. contacts for impacts/ case studies referred to in your answer to questions 2 and 3? Or other relevant end-user contacts?	Provide stakeholder framework.
5. What do you feel are CSERGE's impact strengths and capabilities?	Where could these be strengthened? Any comment about the quality of impact?
6. How do you feel that the diversity of CSERGE's work programme affects policy impact?	Strengthens or weakens impact? May want to explore difference between policy relevant work and policy impact.

<p>7. Could you give examples of where CSERGE's trend prediction work has been successful?</p>	
<p>8. Do you feel that CSERGE's dissemination and outreach activity has evolved to better target policy makers? If so, how?</p>	<p>If so, how – any examples?</p>
<p>9. What do you see as the main barriers in terms of influencing:</p> <ul style="list-style-type: none"> • Policy makers? • Practitioners? 	<p>Explore any issues where advice may have been controversial?</p> <p>Could be barriers at CSERGE end, or from policy user's perspective.</p>
<p>10. What, in your view, are the important factors in relation to achieving policy impact?</p>	<p>For example, if a new centre was being set up, what advice would you give them about focussing their efforts?</p>
<p>11. What factors do you feel are important in terms of <i>evaluating</i> CSERGE's impact on policy making?</p>	
<p>12. Is there anything else you would like to add, or anything that you think we have missed?</p>	

Appendix 2 Case studies

CSERGE Case Study 1 Impact of former CSERGE researchers and students.

1. Summary

This Case Study looks at the role that former CSERGE researchers and students have in terms of CSERGE's policy, practice and research impact, through the organisations they end up working for. CSERGE's is seen as a leading centre in its field(s) and is highly regarded, including by policy makers and practitioners. Long-term funding from ESRC has enabled it to combine high scholarship with being able to develop young researchers. Many ex-CSERGE staff and researchers have moved on to organisations that are influential in terms of policy making and practice, e.g. the World Bank, the Global Environment Facility; European Bank for Reconstruction and Development; UK Committee on Climate Change; IDEAcarbon ; Defra; UK Health and Safety Executive; Socio Economic Analysis Committee of the European Chemicals Agency; plus academic positions.

CSERGE's policy of encouraging their researchers and faculty members to work *with* policy institutions and other stakeholders, has led, in some cases to them ending up working *for* such bodies. Moreover, such people have taken the CSERGE interdisciplinary approach in to their new organisations: this may make them distinct from other economists and be a factor in their subsequent success. This process of seeding researchers into positions of influence is one way in which CSERGE has been able to have an impact on policy and practice. This is likely to be self-reinforcing to a degree as ex colleagues maintain links with CSERGE through new contracts and collaborations.

2. Observations and key learning

CSERGE's success is built upon its academic quality. It is seen as a leading centre in its field(s) and is highly regarded, including by policy makers and practitioners. Many ex-CSERGE staff and researchers have moved on to organisations that are influential in terms of policy making and practice:

- World Bank
- Global Environment Facility
- European Bank for Reconstruction and Development
- UK Committee on Climate Change
- IDEAcarbon
- Defra

- UK Health and Safety Executive
- Socio Economic Analysis Committee of the European Chemicals Agency

Given that CSERGE is so well regarded, it is a fairly stable organisation and probably has less staff churn than other centres. This is demonstrated by the fact that many of its current professors joined CSERGE as young researchers and have gone on to be leading lights in their fields. Long-term funding from ESRC has enabled it to combine high scholarship with being able to develop young researchers. However, as the PEDM grant approached its end point, a number of research staff had to reassess their career positions. With encouragement from the senior faculty and the Centre Director, several staff members have left in order to take up fellowships or faculty posts. This is seen as a positive capacity building effect and clearly benefits the individuals concerned. The 2001-2007 CSERGE Report states that 'former CSERGE and PEDM staff now hold four professorships, five readerships/senior lectureships and a number of lectureships; as well as important posts in national and international agencies and private business'.

CSERGE researchers are well placed to participate directly in policy debates and to feed their ideas into policy processes through their membership of various committees, advisory boards and working parties, including government or agency initiatives. However the CSERGE policy of encouraging their researchers and faculty members to work *with* policy institutions and other stakeholders, has led, in some cases to them ending up working *for* such bodies. Moreover, such people have taken the CSERGE interdisciplinary approach in to their new organisations: this may make them distinct from other economists and be a factor in their subsequent success.

This process of seeding researchers into positions of influence is one way in which CSERGE has been able to have an impact on policy and practice. This is likely to be self-reinforcing to a degree as ex colleagues maintain links with CSERGE through new contracts and collaborations.

CSERGE continues to support research by PhD and Masters students - so this is likely to be a continuing role. The current Director, Kerry Turner has four PhD students, one of whom is leading CSERGE's work on an international initiative to link deforestation with climate policy, which is being led by the UN, World Bank and others. He has developed an incentive mechanism to link with carbon credits. It is one of 3 or 4 mechanisms which are being discussed for inclusion in the next round of talks on a global climate deal.

Research staff who come to the end of contracts have also moved elsewhere within the research community demonstrating that CSERGE also contributes to capacity building and development in the UK and international research communities. For example, in 2004 when three members of the PEDM research staff came to the end of their contracts they moved on to two new research positions and a faculty post.

The use of secondments to key organisations is a useful tool for influencing policy makers and practitioners as the other means of dissemination work better when personal relationships with stakeholder organisations have been established. For

example one CSERGE researcher went on secondment to Ofwat for 8 months in 2006-07 to assist with water companies' approach to their business plans using cost-benefit analysis and including customer preferences. Exchange agreements were in place with a number of organisations including Friends of the Earth and the European Environment Agency in the 1990s.

The UCL Economics Programme, and more specifically the teaching of the late CSERGE Director David Pearce are generally considered to have been very influential. This is highlighted in a recent paper highlighting the role of David Pearce in influencing policy¹ which compares the M.Sc course in *Environmental and Resource Economics* to 'a London monastery that converted the world to the merits of environmental economics'. The paper quotes a former graduate recollecting that:

"The MSc programme has contributed generations of environmental economists who now work in academia, or policy or consultancies spreading the gospel".

Other quotes from the 2007 paper reinforce this point:

"As an indication of the importance of his teaching more than two thirds of the economic advisors currently working in Defra's Environmental Protection Division are his former pupils".

A former CSERGE PhD and research associate who went on to work for the World Bank recalled:

"I remember the large number of ex-students of David's one would meet in the cafeteria of the World Bank".

This trend is particularly noticeable in terms of ex-UCL/CSERGE students going on to be economists with government departments (e.g. Defra) and agencies (e.g. Environment Agency, Natural England). This is a continuing fruitful relationship, as one CSERGE staff member explained:

"We were instrumental in putting environmental economists within the NRA and developing training for them. We maintain links with them to this today, e.g. their staff (now EA) come and spend days with us".

¹ Frank J. Convery 2007, 'Making a difference – how environmental economists can influence the policy process – a case study of David W Pearce', *Environ Resource Econ* (2007) 37:7-32.

CSERGE Case Study 2 The Networking Role of the Directors

1. Summary

This Case Study looks at the role of the CSERGE Directors in terms of their experience/ interest profile, their networks and, to some extent, their personal style. It reflects on the influence that flows from such individual activity. It focuses primarily on David Pearce, Kerry Turner and Tim O’Riordan.

The use of networks has been a key route to long term policy and practice impact for CSERGE. In particular, the networks maintained and developed by its Directors have been fundamental to its success in this respect. When CSERGE started it was fortunate that David Pearce, Tim O’Riordan and Kerry Turner were already well established and linked into key policy organisations like the OECD and UK government departments. These networks were instrumental in establishing the Centre’s policy focus. Such networks are fertile routes for CSERGE to influence thinking and debate, with network members well aware of the Centre’s expertise leading to frequent approaches for information and advice about general issues and specific problems they may be facing. It takes a long time for such networks to develop and a sign of the maturity of the investment in networks occurs when their members approach CSERGE for advice and guidance. Networking is one of CSERGE’s strengths in terms of its increased focus on ways of working more directly with policy makers and practitioners. Coupled with its high quality academic output and reputation, it is an enticing prospect for end users. Network connectivity contributed strongly to the notion of CSERGE as a hub for policy makers and practitioners.

2. Observations and key learning

During the first period of ESRC support, 1991-1995, the Centre was directed by the late Professor David Pearce. From 1995-1999, the Centre was directed by Professor Kerry Turner at UEA; with Professor David Pearce (UCL) and Professor Tim O’Riordan (UEA) as Associate Directors. Since 2000, Professor Kerry Turner retained his position as Director and devolved some operational tasks to research PEDM theme leaders.

The use of networks has been a key route to long term policy and practice impact for CSERGE. In particular, the networks maintained and developed by its Directors have been fundamental to its success in this respect. As one Advisory Board Member commented:

“They never went for producing ‘glossies’ or seminars with drinks. Their strength has been the use of networks by their key players – through which they have had a major impact, and the younger researchers are following this example.”

When CSERGE started it was fortunate that David Pearce, Tim O’Riordan and Kerry Turner were already well established and linked into key policy organisations like the OECD and UK government departments. These networks were instrumental in

establishing the Centre's policy focus. These links are highlighted in section 3 below. Commenting on the Centre's increased emphasis on policy engagement, the 1991-99 CSERGE Evaluation noted:

"The Director and Associate Directors have led the increased engagement with the policy process. Professor Turner is the Chair of the Technology Foresight Panel on Natural Resources and the Environment, was a member of the DOE (now DETR) UK Climate Change Impacts Review Group, and has acted as an economic consultant to a number of Government Departments. Professor Pearce has acted as a Personal Advisor to the Secretary of State for the Environment (1989-1992), is a Commissioner of the World Commission on Forests and Sustainable Development, is Chair of the UN Economic Commission for Europe's Task Force on Economic Aspects of Abatement Strategies, and is a member of the Advisory Panels to the World Bank's Vice President for Sustainable Development, and the Global Environment Facility. Professor O'Riordan, as well as being a member of the annual Prince of Wales Seminar on Business and the Environment, is very active in local policy-making including Chairing the Broad's Authority Environment Committee, and is a member of advisory panels to Dow Chemical Ltd and Eastern Group PLC".

As part of our current evaluation, Prof Turner² explained:

"I have thought over the years about how we go about putting our stuff in to the policy debate. Is publishing an article enough? No. We have evolved a tactic based largely on networking. If you want to be effective you need a network. You need to either find a way in to an existing network or be part of the creation of a new one. Working with that network is critical. Networks mature over time. When they're mature, the network members end up coming to you for information and advice and we're at that stage in a number of policy areas".

Indeed, there are many examples of such effective and productive networks that CSERGE has fostered. Networks attended by the current CSERGE Director and which address policy areas where CSERGE have had identifiable impact include:

- Water Framework Directive: a group of civil servants invite academics to come and do briefings on key issues;
- Ecosystem Services: Natural England convenes a panel of scientists to promote the ecosystems services approach to the NE Board; and
- Coastal Zone Policy: a network involving key players such as the Environment Agency, Natural England and Defra look at the policy of managed realignment.

CSERGE maintains similar networks on air pollution, water pollution, transport, recycling and waste management. Such networks are fertile routes for CSERGE to influence thinking and debate, with network members well aware of the Centre's expertise leading to frequent approaches for information and advice about general issues and specific problems they may be facing. It takes a long time for such networks to develop and a

² Interviewed as part of the evaluation.

sign of the maturity of the investment in networks occurs when their members approach CSERGE for advice and guidance. But it is important not to sit back and become complacent and without the investment of time and resources, these networks can suffer. Departmental and Agency staff turnover (for example civil servant churn) can be quite high and key people change all the time, for example Kerry Turner worked with six different environment ministers over the last 8 years. Media networks are similar in this respect. There is a need to constantly refresh networks, but over time 'you do less going out to them'. For example, Prof Turner³ commented:

"In 1990s I chaired one of the Foresight Committees – when my term ended I didn't spend enough time maintaining the links I had made. Within 5-6 years the entire civil service team involved had changed. They didn't know me and I didn't know any of them".

Other important aspects to developing and maintaining networks are:

- Attendance at workshops aimed at policy people;
- Gaining access to the right people - investing in intelligence gathering (has a time and resource implication);
- Face-to-face time is critical in building relationships and mutual respect. Being willing to go and explain what you're doing in person;
- Core funding allows attendance and network development;
- Part of staff development programme to build links with the policy world;
- Encouraging PhD students 'to get out there and talk to key actors'.

Networking is one of CSERGE's strengths in terms of its approach to working directly with policy makers and practitioners. Coupled with its clear academic stature, it is an enticing prospect for end users. Again, CSERGE staff were keen to stress the bedrock of its research output:

"What has been important has been the stature of the academics and their linkages into networks. Good research is the basis for their influence on policy makers".

Connections can be formal or informal, but the key is to be well connected. The diversity of some of CSERGE's more 'informal' connections is illustrated by the activity of one of its PEDM Theme Leaders who had recently:

- presented to an MoD conference on climate change and security;
- made presentations to the Stormont Assembly;
- provided briefings to governance and conflict advisers in DfID;
- provided a short course for the climate change team at DfID;
- provided briefings on the outcomes of the IPCC to MP's such as the leader of the

³ Teleconference 19.11.08

science and technology committee in the House of Commons;

- had informal contact with speech writers for ministers; and
- done direct media work, e.g. with Reuters and British Satellite News.

This connectivity contributed strongly to CSERGE becoming a hub for policy makers and practitioners:

"CSERGE has the reputation now. Policymakers and journalists know where to come".

3. CSERGE Directors

David W. Pearce

An excellent summary of David Pearce's style and contribution to the policy process can be found in the recent paper by Frank Convery⁴.

Pearce held a number of senior academic posts before becoming Director of CSERGE in 1991, including:

- Director of the Public Sector Economics Research Centre at Leicester University (1974-77);
- Head of Dept. at the University of Aberdeen (1981-83); and
- Head of Dept. UCL (1984-88).

He was also the Director of the International Institute for Environment and Development (1988-90). Pearce became well-known as a founding father of environmental economics, perhaps borne out by his intellectual and policy interest in waste and energy issues. David was at the centre of a European network on environmental economics from the late 1970s and had links to the top people in the US (e.g. Robert Costanza⁵ and Resources for the Future⁶), in addition to his role in the UK with the Department of the Environment (DoE, see below).

Pearce fostered relationships with power centres over a long period of time, both before and during his time at CSERGE.

For example, at an international level, he was working at the World Bank on energy matters in the late 1980s and was also working on issues relating to environment-economy integration⁷.

He had a long standing relationship with the Organisation for Economic Co-operation and Development (OECD) from 1972 until his death. Convery⁸ notes:

⁴ 'Making a Difference – how environmental economists can influence the policy process – a case study of David W. Pearce', Convery F. in *Environ Resource Econ* (2007) 37:7-32.

⁵ Co-founder and past-president of the International Society for Ecological Economics (ISEE).

⁶ For more than 50 years, RFF has pioneered the application of economics as a tool to develop more effective policy about the use and conservation of natural resources.

⁷ E.g. see Pearce and Markandya (1987), Marginal opportunity cost as a planning concept in natural resource management. *Ann Regional Sci* XXI(3):18-32.

⁸ *Environ Resource Econ* (2007) 37: 7-32

"There is no [OECD] Council recommendation that we can attribute to his work, but there is no doubt that his contribution helped very significantly shape OECD and therefore country thinking and policies".

He was also active with the European Commission producing influential papers such as 'European approach to the control of chlorofluorocarbons (1986), and the social costs of energy (1990-92). Again, Convery (2007) quotes a Commission official (Otto Linher) stating that:

"there is hardly any other scientist who influenced economic appraisal of environmental policy as much as David Pearce".

At a national level, Pearce was commissioned by the DoE in the late 1980s to make conceptual and operational sense of sustainability, which led to the seminal and often cited 'Blueprint for a Green Future' (Pearce et al. 1989). This work introduced the concept of valuing environmental assets (as services) and was influential in shaping policy appraisal.

Pearce clearly impressed Chris Pattern, who appointed Pearce as his environmental advisor when appointed Secretary of State for Environment (in 1989). Pattern also endorsed the Blueprint report. When Pattern asked Pearce to input into a White Paper that would transform Pearce's ideas into government policy, most of the economists at DoE all knew Pearce from way back⁹. The White Paper emerged as 'This Common Inheritance' (UK Government 1990).

Elements of 'Blueprint' and 'This Common Inheritance' (such as policy analysis) found expression in the manual 'Policy Appraisal and Environment' (1991) which is now embedded in Treasury procedure (and were instrumental in setting up CSERGE and the Defra Environmental Economics Academic Panel). Much of the current environmental taxes, charges and trading schemes can be said to be traced back to Pearce's work.

With such a history of collaboration with key international and national networks, Pearce certainly hit the ground running at CSERGE and almost immediately advised government on an economically efficient rate of tax at which a landfill levy (tax) should be set¹⁰, which was later introduced albeit at a different rate (see case study 5).

Convery notes a number of characteristics of Pearce that he considered contributed to his policy impact:

- Desire – he wanted to influence policy, and directed a high proportion of his efforts to doing so;
- He targeted the power houses of his day: OECD, World Bank, EC, UN, UK government;
- He had the ability to gauge his audience and made effective use of real world examples;

⁹ Convery 2007.

¹⁰ Pearce DW, Brisson I, Barton J, Turner RK, Powell JC, EFTEC Ltd (1993) Externalities from landfill and incineration. HMSO, London.

- He understood cycles of policy development (and key people e.g. Finance ministers);
- He showed a willingness to take on executive roles, to chair and lead committees and working groups and act as rapporteur (which didn't harm his policy influence!); and
- He had a great facility for collaboration.

Prof. Robert Kerry Turner, CBE

Turner's career began in Pearce's Public Sector Economics Department at Leicester University where he was a Senior Research Fellow (1976-77). This was the beginning of a long association between the two men. He then moved to UEA as a lecturer in Environmental Economics and Management, School of Environmental Sciences (1977-1988), becoming Senior Lecturer (1989-1991) and finally Professor, Environmental Economics and Management (1992 to date).

Like Pearce, Turner was very active working with a number of organisations before starting as Executive Director of CSERGE in 1991. For example:

- Economic Consultant to OECD, Environment Division, Paris, 1976-1982; 1987 to 1999;
- Appointed to MAFF Steering Committee for Flood Hazard Projects, 1982 to 1986;
- Appointed to Department of the Environment Steering Group on Social Costs of Sewerage Research, 1985-89;
- Appointed to MAFF Steering Committee for Coastal Protection Scheme Appraisals Research, 1985-1991;
- Served on the Civil Service Commission Appointments Board for Economic Advisors, 1986;
- Appointed to the British Telecom, Environmental Panel, April 1990-1992;
- Appointed to Board of Directors, Institute for Environmental Assessment, 1990-1992; and
- Served on several Department of the Environment Committees: 1985-1996.

His reports from the 70s to the early 90s also give an indication of the good relationship and reputation he had developed with some of the international, national and regional bodies that CSERGE would later work with on policy issues. For example:

- For the OECD, he worked on pollution control, effluent emission standards (1976, 1977), noise abatement costs (1978), waste recycling (1981), wetlands management (1988, 1989, 1990), Use of Benefits Estimates in Environmental Decision-Making, and Global Environmental Change Research Priorities (1990);
- For the European Commission he worked on waste paper recycling (1981), and waste technologies (with Pearce, 1982);
- For DoE he contributed to work with Pearce on valuing the damage costs of

environmental pollution (1976), worked on the economics of recycling (1989); and identified environmental indicators (1991);

- For DoT he worked on valuing non fatal injuries (1989), and Monetary Benefits Assessments Methods and Techniques (1990);
- For MAFF he produced an Environmental Assessment Manual (1990) and conducted an Economic Appraisal of the Consequences of Climate-Induced Sea Level Rise (1991);
- For UK Parliament, he presented on minerals (House of Commons Minerals Group, Westminster 1988);
- For the National Rivers Authority, he produced a flood alleviation strategy for Broadland (1989); and
- For the Broads Authority, he produced an economic approach to environmental management (1984), worked on cost benefit scheme analysis (1984), and flood alleviation strategies (1986).

Turner was also part of the same network as David Pearce (European network on environmental economics from the late 1970s). As a specialist in waste and recycling economics during the 1980s he had many strong connections with the economics of waste, which made him well placed to contribute to the subsequent development of waste management policy, such as the landfill tax.

Like Pearce, Turner's reputation and established networks enabled CSERGE to continue to advise and input on these and other issues following its creation in 1991.

He was awarded a CBE for services to sustainable development in the 1999/2000 Millennium Honours Awards (for, amongst other contributions, his service on the National Rivers Authority Board (November 1991-1996) and his work with the Office of Science and Technology (DTI) Technology Foresight Natural Resources and Environment Panel (became Chair 1995-99).

Tim O'Riordan

O'Riordan was well connected to the main UK environmental NGOs in the 1970s and 80s, including Greenpeace, National Parks, the Campaign for the Protection of Rural England (CPRE) and Friends of the Earth (FoE). He was also on the Broads Authority from 1979 to 1998. He co wrote the rural chapter for the UK Conservation and Development Strategy in 1983¹¹ with Peter Melchett (then Head of Wildlife Link). Prominent involvement in debates about nature conservation and agriculture (e.g. the Halvergate Marshes SSSI campaign) meant that O'Riordan was as well placed as anyone in the 1980s-90s to comment on the emerging biodiversity agenda and concepts of how we value nature. His involvement in the Sizewell B inquiry (an ESRC grant gave him the opportunity to study the inquiry) also bolstered his NGO credentials. O'Riordan was

¹¹ O'Riordan, T. 1983. Putting trust in the countryside. Pages 171–260 in A Conservation and development programme for the UK. Kogan Page, London.

European editor of the journal Risk Analysis in the 1980s, which was the centre of the risk and society movement which was prominent during the period.

As an example, in the May 1995¹² House of Commons debate on taking forward the concept of Environmentally Sensitive Areas (ESAs), the then The Minister of Agriculture, Fisheries and Food Mr. Waldegrave commented:

"I agree with my hon. Friend and many other people that the environmentally sensitive areas scheme has been an outstanding success. What started all those years ago in the Halvergate marshes became a European movement and was the beginning of the greening of agricultural policy more widely in Europe. We in this country, through individual campaigners such as Andrew Lees, academics such as Professor O'Riordan and even the Ministers who were involved at the time, take genuine pride in that".

Therefore, O'Riordan was a key figure or commentator on wildlife and agriculture politics throughout this period – and this more 'land use/ nature conservation' experience (and connections) complimented Pearce and Turner's energy/ waste/ resource use economics knowledge base. It gave CSERGE a very comprehensive view of environmental policy founded on excellent connections and networks. His early experience and connections with controversial farming and development proposals (e.g. Halvergate and Sizewell) was important in CSERGE's later work on deliberative and participatory decision making (see Case Study 6) and its focus in East Anglia.

¹² <http://www.publications.parliament.uk/pa/cm199495/cmhansrd/1995-05-04/Orals-1.html>

CSERGE Case Study 3: The Intergovernmental Panel on Climate Change (IPCC) Process

1. Summary

The Case Study examines CSERGE's contribution to the work of the Intergovernmental Panel on Climate Change (IPCC) and how this may have shaped both the climate change agenda and climate change research. Our conclusion is that CSERGE has had a demonstrable impact on the IPCC: prior to PEDM, CSERGE were extensively involved in climate change work, e.g. their input into the 2nd and 3rd Assessment Reports of the IPCC reports as lead authors. Significant authors were given certificates (Nobel Prize references) and at least 5 or 6 CSERGE staff received these. The fact that CSERGE no longer work on the high profile issue of climate change may give the impression to some that their influence is on the wane. However, our evaluation evidence does not suggest any weakening contribution. In its second phase, the policy and practice impact of CSERGE remains strong, although their policy areas may be less publically prominent.

The fact that CSERGE staff continue to have a respected contribution to key environmental issues – but under the guise of other academic or research establishments – is a positive legacy of the ESRC core funding. As our Key Informant Interviews and Case Study 1 demonstrate, long term funding has been acknowledged as an important factor in attracting, developing and keeping CSERGE researchers, many of whom are now highly regarded in the field. Many ex CSERGE staff and students now occupy influential positions in other policy organisations, which is regarded as a significant contributing factor in CSERGE's policy and practice impact.

The IPCC was set up in 1988 by the World Meteorological Organization and the United Nations Environment Programme. The IPCC's website explains that it was "*was established to provide the decision-makers and others interested in climate change with an objective source of information about climate change. The IPCC does not conduct any research nor does it monitor climate related data or parameters. Its role is to assess on a comprehensive, objective, open and transparent basis the latest scientific, technical and socio-economic literature produced worldwide relevant to the understanding of the risk of human-induced climate change, its observed and projected impacts and options for adaptation and mitigation*". It goes on to emphasise its neutrality and objectivity saying that "*IPCC reports should be neutral with respect to policy, although they need to deal objectively with policy relevant scientific, technical and socio economic factors. They should be of high scientific and technical standards, and aim to reflect a range of views, expertise and wide geographical coverage*" (<http://www.ipcc.ch/about/index.htm>).

The Centre for Social and Economic Research on the Global Environment has worked in this area because the IPCC's role is fundamental to understanding the impacts of climate change by providing a scientific basis for specific projects based on climate science. CSERGE has contributed to the IPCC's work in a number of ways since the early

1990s, and through these activities has shaped both the climate change agenda and climate change research in various respects detailed below.

2. General observations - key learning

The key learning from this case study in terms of achieving policy and practice impact are that CSERGE has combined a range of strengths to good effect. It has worked strategically to develop a long-term focus on a particularly critical research area: climate change. It has made very important linkages to key policymakers nationally and internationally through the Intergovernmental Panel on Climate Change and has not just responded to research requirements but rather set the agenda in a range of climate change research areas. Its focus on academic rigour and excellence has meant it produces very high quality research that can be trusted by policymakers. In the process it has supported highly skilled and experienced researchers while nurtures newer researchers. A deliberate, sustained effort to disseminate findings broadly and engage increasing numbers of stakeholders has meant that its influence in this key policy area can be sustained and potentially grow in future.

3. Nature of research (key people, timing, methods, themes, grants, team size etc)

CSERGE has undertaken a large range of projects and research activities relevant to the IPCC in which they have expanded our scientific knowledge of climate change. This has helped the IPCC to develop its climate change science database, which in turn has helped public policy and individuals to understand and respond to the issues created by climate change. The nature of CSERGE research is described below.

CSERGE began to become involved in scientific work that informed the IPCC early in the IPCC's life, concentrating a substantial proportion of its research effort on climate change. It was reported in 1999 that CSERGE's analysis of climate change "has emphasised the economic efficiency case for policy action on climate change...the Centre has argued that economic analysis has an important role to play in policy development, culminating in the contribution by David Pearce and Samuel Fankhauser of the chapter on the monetary value of global damages from climate change in the Intergovernmental Panel on Climate Change (IPCC) Second Assessment Report (1996) (ESRC Evaluation Report, 1999). The evaluators commented, "This work has generated considerable debate, but the Centre continues to argue strongly that economic performance depends at least in part on the conservation of environmental assets, and has produced new work in defence of its original valuations". As one CSERGE staff member explained during our interview with them "the 1990s Tory government was interested in environmental economics – this created an opportunity".

By 1999 it was noted that CSERGE's work had not only contributed to the research base on climate change but more profoundly was shaping the agenda for research internationally on climate change (ESRC Evaluation Report, 1999). The evaluators pointed out that CSERGE had "an important influence on the international research agenda. For example, CSERGE's contributions to the work of the IPCC have helped to

shape approaches to climate change research. The Centre provided lead and contributing authors to four major chapters across Working Groups II and III in the IPCC's Second Assessment Report (1995). This work has been taken further forward in recent years through contributions to IPCC special reports, including the 1998 Costa Rica meeting on Adaptation to Climate Variability and Change" (ibid).

A considerable amount of CSERGE research since 2001 has been undertaken within the ambit of the Economic and Social Research Council (ERSC) funded Programme on Environmental Decision Making (PEDM), which ran from 2001 to 2006 and has used £2.15 million to research four substantial research themes with strong connections to climate change. The Centre's research findings have been widely disseminated in high-level policy-making circles, both nationally and internationally. Specifically, research themes within the PEDM programme have generated findings of great relevance to the IPCC's deliberations on the science of climate change.

CSERGE research directly contributed to the evidence base supporting the IPCC's work in its Fourth Report and previous Reports. In particular, CSERGE's work within the Social Capital, Equity and Justice in Environmental Decision-making research stream of its Programme on Environmental Decision Making (PEDM) has figured heavily in a raft of major international policy initiatives and reports including for the IPCC. This research stream has explored new theories of social and ecological resilience and the connectivity to institutions, social capital and decision-making. Major strands of this work contributed to the IPCC's Fourth Climate Change Report (paraphrased from CSERGE Summary Report on Activities: 2001 – 2007). In the Centre's 2004 Annual report it noted that its PEDM, theme B research on social resilience, equity and justice has *"identified a need to redefine what is meant by "societal progress" and the performance of different institutions as sustainability goals are pursued. The role of institutions in reconciling human welfare and nature conservation goals has been a particular feature of Kate Brown, Neil Adger and Sergio Rosendo's work for the [then] forthcoming IPCC Climate Assessment and the UN's Millennium Ecosystem Assessment (MA) Report. The latter is a scientific assessment that will provide the baseline of knowledge on what is the current global condition of ecosystems and their importance for human well-being; what have been the consequences of changes in ecosystems for people; and what response options are there to improve ecosystem management and human well-being"*.

In the same report, CSERGE noted further important IPCC related activity, explaining that staff working within the Programme on Environmental Decision Making were convening lead authors in two major international scientific enquiries of global significance, one of which was IPCC related. *"Neil Adger is leading the Working Group II chapter on Adaptation to climate change in the current Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment"* (ibid). By 2005 CSERGE was able to report that its Social capital, Equity and Justice in Environmental Decision Making research had made a significant contribution to two major international policy reports, the Millennium Assessment Report on Biodiversity and the [then] forthcoming IPCC Report on Climate Change.

By 2005 CSERGE reported further IPCC related activity, saying that finding the right interventions to promote social cohesion and environmental protection was an important

research challenge. It explained that PEDM research *"has examined a range of contexts for this new intervention strategy e.g. climate change and society's adaptation options, landscape scale, biodiversity conservation management in Rondonia, Brazil and elsewhere, and the links between natural resources and vulnerable households in Africa. Major strands of this work has and is contributing to the UN's Millennium Assessment Report on Global Biodiversity and its status and the IPCC's forthcoming Climate Change Report"*. It noted that staff had also been contributing to policy directly in terms of research findings in relation to the then forthcoming IPCC Report on Climate Change. In its 2006 report CSERGE was able to report that, *"because of its policy relevance, the Centre's research findings have also been disseminated widely in policy making circles, both nationally and internationally. CSERGE has contributed to the international Climate Convention discussion process, the recent Stern Review and the IPCC Fourth Report"*. In the same year Neil Adger was a Convening Lead author for the IPCC Fourth Assessment Report Working Group 2 on adaptation and a core team member for the Summary for Policymakers to be launched in Brussels in April 2007 (ibid).

A substantial publications record of books, book chapters, scientific papers, and articles has helped inform the data on which the IPCC bases the information on climate change given to decision makers. Publications have been both within the Economic and Social Research Council (ERSC) funded Programme on Environmental Decision Making (PEDM) that CSERGE is administering and outside it. As the examples below show, CSERGE has covered a wide range of climate change areas important to the IPCC including socio-economic scenarios, vulnerabilities and risks presented by climate change, impacts on particular continents such as Africa, risk assessment and uncertainty in adaptive capacity.

CSERGE staff members have played lead author or advisor roles in a number of national and international policy initiatives and reports, including for the IPCC. Examples include the report written by Berkhout, Jordan, Adger, and Moss in 2002, Developing socio-economic scenarios for vulnerability and adaptation assessments for the 6th IPCC Task Group on Scenarios for Climate Impact Assessment (5-7th June, Helsinki, pp 5), while Professor Andrew Jordan was a contributing author of the Inter-governmental Panel on Climate Change's (IPCC) third assessment report.

CSERGE staff members have also contributed to networks and working groups for the IPCC. For example, Jouni Paavlova acted as Expert Reviewer of "Assessing Key Vulnerabilities and the Risk from Climate Change" contribution of the Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) for the IPCC and the Government of Finland (2005-2007). Dr Nick Brooks meanwhile has a particular interest in climate change and development in Africa (with a special focus on the Sahara-Sahel region), and was a contributing author to the IPCC's Fourth Assessment Report (Working Group II on Vulnerability, Impacts and Adaptation; Chapter 9 - Africa).

Among book chapters written by CSERGE staff for the IPCC are W. N Adger's (2003) chapter on "Water security, climate change and sustainable development" found in Integrating Sustainable Development and Climate change in the IPCC Fourth assessment Report. (Munasinghe, M., Conziani, O., Davidson, O., Metz, B., Perry, M.

and Harrison, M. (eds.) Intergovernmental Panel on Climate Change, Geneva, pp 19-24). An earlier chapter on "Adaptation to climate change in the context of sustainable development and equity" was found in Climate Change 2001: Impacts, Adaptation and Vulnerability (IPCC Working Group II. Cambridge University Press: Cambridge, pp 533-590) was also prepared by CSERGE staff.

CSERGE has also contributed papers to refereed journals on IPCC themes. (It should be remembered that refereed journals require extremely high standards of academic rigour and all papers are subject to detailed critical scrutiny by peers prior to being accepted. Only those judged to be of sufficient quality will be published). Among such papers by CSERGE staff are Adger and Vincent's (2005) paper "Uncertainty in adaptive capacity" in an IPCC Special Issue on 'Describing Uncertainties in Climate Change to Support Analysis of Risk and Options' (Comptes Rendus Geoscience 337(4): 399-410).

CSERGE staff members have presented a number of conference papers relevant to IPCC climate change concerns. Among these are Adger's 2004 paper given to the IPCC Workshop on Describing Uncertainties in Climate Change to Support Analysis of Risk and Options, and published in the report of the same name (Manning, M., Petit, M., Easterling, D., Murphy J., Patwardhan, A., Rogner, H.-H., Swart, R. and Yohe, G. (eds.), National University of Ireland, Maynooth. Intergovernmental Panel on Climate Change: Geneva, pp. 49-51).

4. Extent to which end users were involved in project design?

In this area we did not identify examples in which end users were involved in project design by other relevant comments were made in the course of the end user survey. One end user commented that "The influence of its former members and especially Neil Adger through his work in Tyndall on the IPCC evaluation has been considerable". Another end user noted that "Neil Adger's work on adaptation to climate change has helped to define and understand vulnerability". The influence of CSERGE staff on the IPCC may also be inferred in more indirect ways. One end user explained that "CSERGE alumni can be found in practically all major policy bodies including the government (DEFRA), World Bank, think tanks, and universities."

5. Research outputs

There are a number of significant outputs of the research relating to the IPCC and these appear to have benefits at both national and international scales. First of all, there are academic outputs such as the detailed findings from research processes undertaken by CSERGE staff. These are contained in books, book chapters, articles, reports, working group proceedings and conference papers, often directly for the IPCC. There are also policy outputs based on these research findings that have helped inform the deliberations of the IPCC since the mid 1990s. As mentioned earlier in this case study CSERGE's research outputs have helped set the agenda for climate change research within the ambit of the IPCC and this must be considered a very significant and notable output of their work that reflects its international importance.

6. Dissemination

CSERGE has clearly worked very hard to let people know about its research findings in relation to IPCC related research. The Centre has noted that a commitment to communicating and sharing the outputs of the academic research programme as widely as possible is central to its activities. Its 2003 Annual Report explains, for example, "CSERGE staff have...devoted much time and effort to creating and maintaining effective communication and dissemination links. The resulting dissemination strategy is intended to cater to the wide variety of information needs of the Centre's user groups; to communicate effectively the findings of our research and to present this in different formats and through a range of channels; to be flexible enough to adapt to the changing requirements of established users; and to identify and service new research users". Later Annual Reports note the use of CSERGE's website, working papers, workshops and seminars as methods by which to make public its work and engage others in it.

The extremely high level and very public nature of its IPCC related research suggest that CSERGE has recognised it is vitally important that the IPCC, academic researchers, government and other interested stakeholders become aware of and make use of its research findings in order to better inform out scientific understanding of climate change. Through a range of dissemination methods, including reports, refereed journal articles, academic conference papers, international working group proceedings, evaluations of its own practice, and web-based information provision, it has made the results of its wealth of climate change related research know widely. This in turn has ensured its insights are available in both the academic debate and policy development processes that are crucial to climate change mitigation and adaptation internationally and nationally.

7. Evidence of policy/ practice impact

CSERGE is widely commended by its stakeholders for the quality and influential nature of its research findings, and its links to the IPCC process is an area of strength in relation to policy/practice impact. At the same time key researchers made the very clear point that "*The reason that I have remained an academic and stayed with CSERGE is not to have a policy impact. I think this is true of most of the academics here. My motivation is more to do with academic performance and the generation of ideas. Peer esteem is more important than policy impact. The fact that we have generated ideas and that some of these are now in the public domain simply adds to the satisfaction*". This focus on academic excellence and rigour is without doubt central to the success CSERGE has also had in the policy area in relation to the IPCC process. One stakeholder noted that, "*We have made the biggest contribution to the IPCC than any other academic institution in the world*" and Centre staff have for example, provided briefings on the outcomes of the IPCC to MP's such as the leader of the science and technology committee in the House of Commons".

CSERGE is described by another stakeholder as having "*been a very influential and important international research centre from its beginning under Professors Pearce and Turner. It has addressed some key environmental policy themes such as vulnerability to*

climate change/adaptation, and ecosystems services". This stakeholder noted of CSERGE that "long-term funding has enabled it to combine high scholarship with bringing on young researchers and it has had a big impact because of the strong links into the UK environmental and energy policy system e.g. sitting on commissions etc", points reinforced by other interviewees.

CSERGE has taken a very practical view of how to make sure it is in a position to influence policymakers. One stakeholder explained that networking was particularly important. "I have thought over the years about how we go about putting our stuff in to the policy debate. Is publishing an article enough? No. We have evolved a tactic based largely on networking. If you want to be effective you need a network. You need to either find a way in to an existing network or be part of the creation of a new one. Working with that network is critical. Networks mature over time. When they're mature, the network members end up coming to you for information and advice and we're at that stage in a number of policy areas".

Another stakeholder agreed that, "CSERGE's work has always had explicit policy relevance, guided by the leading figures within the research centre. Policy has to some extent inspired research. There has been some emphasis on research that has practical outcomes". This stakeholder made the point in relation to IPCC related research that CSERGE "has been successful in identifying/predicting what problems/issues should be the subjects of research. A prime example has been Neil Adger's work on climate change and vulnerability". It has been influential in relation to key institutions that "are aware of its work because it has a high profile. It is taken seriously because of the high standard of its research outputs".

A further stakeholder made the point that the impact of CSERGE on policy has also had a positive impact on policymakers' capacity and on researchers themselves, saying that CSERGE has a "very positive attitude to working with policymakers. This has partly arisen from the experience of working to vague briefs and having to work closely with policy makers to develop a greater understanding of their needs. Over time we have developed more skills for working with policy makers over the years. We are now much more interested in how our research is used. Seeing my work being used and having an impact has given me a new lease of life".

A stakeholder made the point that CSERGE's holistic research nature has been very helpful in the policy impact area: "CSERGE can be viewed as a one-stop-shop for research. Whether internally or through its long established collaborations with other research organisations, CSERGE is capable of addressing complex and multifaceted projects involving both social and natural sciences. The ongoing WFD and land use work is a good example of this. There are very few other places that can offer this kind of service".

8. Broader outcomes

Broader outcomes related to the IPCC research are more difficult to measure however, it would be reasonable to draw the conclusion that by strongly influencing IPCC findings, CSERGE has in turn influenced outcomes in relation to improved national and

international policy for climate change mitigation and adaptation. Such highly positive linkages mean that CSERGE will have affected broader outcomes in relation to combating climate change in the UK and elsewhere globally.

9. Possible future impact

Given the critical nature of addressing climate change mitigation and adaptation and thus the need for excellence in the scientific basis for policy making, the role of CSERGE as a long term, extremely high quality research centre is likely to have continuing, positive impacts nationally and internationally.

CSERGE Case Study 4 UK Landfill Tax

1. Summary

The Case Study examines CSERGE's contribution to the UK Landfill Tax legislation, particularly its work on the valuation of the externalities from land-filling and incineration which has provided the basis for the tax.

2. General observations - What is the key learning from this case study in terms of achieving policy / practice impact?

CSERGE has had a significant effect on public policy in a key sustainability area in which the UK has traditionally performed very poorly. Research work by CSERGE from the early 1990s onwards has had far reaching public policy consequences. Early work on the externalities of landfill influenced the landfill tax regime that was then developed. CSERGE's focus on developing ideas about NEPIs (new environmental policy instruments) acknowledged the decline of certain traditional forms of regulation and the usefulness of economic instruments that acknowledged the changing governance context in the UK and Europe. Its work was very influential at supranational level in forums such as the OECD and on the UK government on environmental policy integration within which environmental instruments including taxes could play an increasing part. The landfill tax specifically has had a very significant policy impact in the UK and wider outcomes are a substantial shift in the way waste is now being dealt with, away from unsustainable 'business as usual' approaches, driven by landfill tax implications on public spending.

3. Nature of research (key people, timing, methods, themes, grants, team size etc)

CSERGE's work on landfill tax appears to relate to two research areas for the Centre: waste and recycling, and environmental policy instruments. One CSERGE interviewee explained in relation to waste and recycling that *"We have been involved in this from the early days, during the Global Environmental Change phase of ESRC funding. CSERGE and some consultants did work on the externalities of landfill and other forms of disposal. This influenced the future landfill tax regime and I'm sure it would possible to demonstrate that our work was used in the calculations. From 2001 onwards, our work on waste & recycling has tended to be largely non-ESRC funded"*.

As the external evaluation of its work between 1991-99 demonstrates, by the end of the 1990s CSERGE had done a significant amount of work in relation to environmental taxes. *"Major impacts on eco-taxes, levies and trading schemes, e.g. packaging tax, recycling tax, landfill tax, and aggregates tax were all informed by the work of CSERGE staff members. An example of the work in this area undertaken in the 1990s is the analysis, by David Pearce, Kerry Turner and colleagues, which provided monetary estimations of the externalities associated with landfill and incineration. Associated*

work has provided advice to the government on the appropriate level for the UK Landfill Tax".

In the 1991-99 period in the area of Environmental Policy and Economic Instruments, the Centre investigated the potential of new policy instruments, such as environmental taxes, tradable permits and voluntary agreements, to achieve environmental policy goals. During the Centre's first phase, for example, work in conjunction with the Institute of Fiscal Studies formed the basis of the OECD's 1993 report on taxation and the environment.

The research focus on new environmental policy instruments as part of work on economic policy and instruments, continued into the 2000s, as cited in the 2001-02 CSERGE Annual Report. An Institute for Fiscal Studies report (2006) meanwhile notes that *"round the time of the introduction of the landfill tax, CSERGE, Warren Spring Laboratory and EFTEC (1993) carried out a study of the marginal external costs of landfill, including global pollution from CO₂ and methane, transport and leaching into the water supply. Estimates ranged from around £1 to £9 per tonne depending on whether the landfill was urban or rural and whether there was energy recovery. In addition, estimates of the marginal disamenity costs to households were made of £2 per tonne (similar to the 2003 DEFRA figures). On average, the marginal costs were estimated at £7 per tonne for active waste and £2 per tonne for inert waste, matching the initial rates of the landfill tax in 1996"* (Institute for Fiscal Studies, 2006).

Over the 1990s, landfill tax related research included publications of various kinds. In one or two cases we found references to what is apparently the same work listed slightly differently in source documents consulted for developing this case study. Thus:

- D Pearce et al Externalities from Landfill and Incineration HMSO 1993
- CSERGE, Warren Spring Laboratory and EFTEC (1993), Externalities from Landfill and Incineration, London: HMSO.

Externalities Associated with Landfill and Incineration was listed as a completed project by the time of the CSERGE Annual Report of 2001-2002. Interestingly, the CSERGE Summary Report on Activities: 2001 – 2007 does not mention any work on landfill tax but instead appears to be covered under the rubric of NEPIs (new environmental policy instruments). Annual Reports over this period make mention of relevant projects being undertaken. For example, a CSERGE research foci listed in its 2001-2002 Annual Report was the area of economic policy and instruments, which included assessment of policy instruments for landfill tax. It noted a CSERGE project on Analysis of New Environmental Policy Instruments (NEPIs) and explained that, *"Many highly industrialised countries are rapidly adopting 'new' environmental policy instruments (NEPIs) such as eco-taxes, tradable permits, voluntary agreements and eco-labels. This apparently profound shift has prompted widespread claims that NEPIs have eclipsed regulation as the preferred tool of environmental policy. A new book co-edited by Andrew Jordan offers a fresh perspective on the evolving toolbox of environmental policy by providing a genuinely systematic analysis of the policy and politics surrounding the adoption and use of the main NEPIs in a variety of countries. By blending state of the art political theories with fresh empirical material. The book, which is published by*

Frank Cass in Spring 2003, assesses the claim that NEPIs have supplanted regulation, heralding a new era of environmental governance in which the state plays a secondary role in sustainability policy making". That Annual Report (2001-02) also highlighted publications and conference presentations by Andrew Jordan in the area:

- Jordan, A.J., Wurzel, R. Zito, A. and L. Breuckner (2002) The Innovation and Diffusion of 'New' Environmental Policy Instruments (NEPIs) in the EU and its Member States. ESRC Future Governance Programme working paper series. FGP: LSE.
- Jordan, A.J., Wurzel, R. Zito, A. and L. Breuckner (2001) The Innovation and Diffusion of 'New' Environmental Policy Instruments (NEPIs) in the European Union and its Member States. Conference on 'Global Environmental Change and the Nation State', Berlin, 8-9 December 2001.

In 2003 CSERGE was able to report that "*Andrew Jordan's ESRC Future Governance Programme project New Environmental Policy Instruments (NEPI) in four industrialised countries (Austria, Britain, Germany, and the Netherlands) and the EU (2000-3), was rated as 'outstanding' by the ESRC's evaluation division. In 2004, Andrew and his colleagues at Hull and Newcastle Universities will complete a monograph on NEPI use. It will establish how widely used NEPIs are in different policy sectors, analyse the mechanisms through which they are transferred across jurisdictional boundaries, and examine the extent to which their implementation is modified by different national and sub-national institutional settings. Some of the findings have already been published in special issues of the international journals Environmental Politics and Public Administration*". Also in 2003 a number of related papers and other publications were listed:

- Jordan, A. et al. 2003. How do 'New' Environmental Policy Instruments (NEPIs) Spread in the European Union? An Analysis of the Role of the EU in Shaping Environmental Governance. American European Union Studies Association biennial conference, Nashville, Tennessee, 27-9 March 2003.
- Jordan, A.J. Wurzel, R. and A. Zito, A. 2003. Out With the Old and in With the New? 'New' Environmental Policy Instruments (NEPIs) in the European Union. DFG Workshop on 'Transnational Institutions for the Environment (TIE), Justus-Liebig Universiteit Giessen, Germany, 20-1 June 2003.
- Jordan, A. Wurzel, R. and A.R. Zito 2003. 'New' Environmental Policy Instruments (NEPIs) in Comparative Perspective: Is Traditional Government Giving Way to New Forms or Governance? International conference on 'Environmental Policy Integration and Sustainable Development', National Australian University, Canberra, 19-20 November.

In 2004, meanwhile, CSERGE noted that work being done by the Centre continued to focus on environmental policy integration and by implication taxation based forms of environmental policy could be expected to be a central field for research as part of such governance approaches. They explained at the time, "*Governments in the EU have committed themselves to greater environmental policy integration (EPI) i.e. better co-*

ordination of environmental policy and appraisal across the different sectors of the economy and society. Achieving EPI hierarchically by passing more legislation, or via market incentive mechanisms (environmental taxes/charges) has proved more difficult than anticipated. Therefore almost by default the EU, for example, has had to rely more heavily on network-based forms of governance. Our work is exploring whether and to what extent networks and the governance model can be managed to achieve greater EPI. It is becoming clearer that sustainable development will have to be delivered through a system of governance, even though that system was not originally created with sustainability in mind" (CSERGE Annual Report, 2004).

CSERGE also pointed out in its 2004 Annual Report that "Theme A research concentrates on the delivery of sustainable development through a system of governance in which the state steers society in partnership with non-state agents and through, among other things, the medium of new environmental policy instruments (eco-taxes and voluntary agreements). The extent to which environmental policy integration has been achieved is also being studied". Again that implies research of landfill tax as one of these policy instruments.

In 2005 CSERGE referred to a seminar presentation on landfill tax, 'Landfill Externalities Valuation' at the University of the Aegean, Athens, in October that year. Other conference presentations on this area in 2005 included:

- Jordan, A. Wurzel, R. and A.R. Zito 2005 How 'New' Environmental Policy Instruments (NEPIs) Spread in the European Union: An Analysis of the Role of the EU in Shaping Environmental Governance. American European Union Studies Association biennial conference, Austin, 31 March -2 April 2005 Texas.

4. Extent to which end users were involved in project design?

Although it is not clear to what degree end users were involved in project design in relation to work on landfill tax by CSERGE, it appears from the views expressed by CSERGE staff and the external evaluation results that the impetus came from CSERGE itself rather than from external sources. The end user survey provided a number of examples of ways in which CSERGE was felt to have had a significant policy impact. "The main policy impact that I am aware of is the work that CSERGE carried out on the Landfill Tax. (pre 2000). CSERGE were instrumental in carrying out the research to set the landfill tax level. (David Pearce, Jane Powell)".

Another example where end users felt that CSERGE had produced significant outcomes in terms of policy change or development was embodied in the comment that "When working in Defra 1998 – 2001, I also worked with Brett Day and Ian Bateman on research we commissioned to value the disamenity effects of landfill. Their expertise was of great value to the project, ensuring that the methodology adopted was theoretically correct and that the results were correctly interpreted".

5. Primary outputs of research

Primary outputs of landfill tax research by CSERGE have been contained in books, papers, monographs, conference papers, and seminar and workshop presentations, as well as governmental/public sector/private sector policy briefings. It is very clear that CSERGE has influenced debate and discussion at a high level in government and other sectors both in the UK and in the European Union. As noted above, one CSERGE interviewee thought that CSERGE's research led to the introduction of the Landfill Tax while another suggested that the area of waste/landfill tax would be a useful case study area, flagging up how critical this has been as a research theme for CSERGE.

6. Dissemination

A number of dissemination results relate to landfill tax research and to the wider field of new environmental policy instruments. Some of these are referenced above. CSERGE reported in their 2003 Annual Report, that *"in the Autumn of 2003, RP1 (managed by Dr Andrew Jordan) organised a series of events in Austria (Vienna), Belgium (Brussels), Germany (Berlin) and The Netherlands (The Hague) to disseminate the main findings of a project comparing the adoption and use of new environmental policy instruments (NEPIs) such as eco-taxes, tradable permits and voluntary agreements. In total, over 150 stakeholders from government, business and civil society attended. The findings were also disseminated to academics in an edited book (New Instruments of Environmental Governance, Frank Cass) and a special issue of the international journal Public Administration (Vol. 81 Part 3)".* It also explained that in March 2003, Andrew Jordan hosted a one day workshop on Environmental Policy Integration in Brussels, for thirty senior Commission officials, MEPs, environmental pressure group and industry representatives (Annual Report, 2003).

CSERGE highlighted other activities that may have covered landfill tax. One of these was that *"Andy Jordan and colleagues have published a book on EU Environmental Policy covering in detail national environmental policy in ten Western European countries since 1970. By blending state of the art theories with fresh empirical evidence on the many manifestations of Europeanisation, it sheds new light on the dynamics that are re-shaping national environmental policy. It also offers an assessment of how far Europeanisation has produced greater policy convergence in Western Europe. Jordan and colleagues have also produced a book chapter (in press) which assesses the role of new policy instruments to enable sustainable development governance. The emerging approach is orientated more towards market incentives, information provision and best practice guidance and voluntary agreements between regulators and business. A package of measures are now becoming more commonplace across European and other industrialised economies – eco taxes/charges, emission trading systems, voluntary agreements, environmental management systems and eco-labelling".*

7. Evidence of policy/ practice impact – secondary outputs

As its 1999 evaluation of the previous 10 years noted *"CSERGE research has influenced policy-making both through the conduct and dissemination of specific research projects, and through the involvement of its researchers on a wide range of influential policy-making bodies. Some example of project interactions with policy development are outlined above; other examples of impact include the work on the valuation of the externalities from land-filling and incineration which has provided the basis for the UK landfill tax"*.

This view is reinforced by more recent judgements, which suggest that CSERGE has had very important impacts in the area of environmental taxation of which landfill tax is a part. One CSERGE interviewee felt that landfill tax externalities was one of the five key areas of impact from CSERGE research, and should be placed under the heading of waste management and recycling. Another interviewee CAG spoke to as part of the evaluation project traced the way this had operated over the long term, saying that CSERGE has *"Major inputs into the analysis of the structure of and consequences arising from eco-taxes, levies and trading schemes, e.g. packaging tax, recycling tax, landfill tax, aggregates tax and the abandoned pesticides tax. These were all informed by the work of David, Kerry and other CSERGE economists working with the policy scientists (e.g. see Blueprint 3 published by Earthscan in 2005) such as Jane Powell, Andy Jordan and Ian Langford. Chris Patten was interested in these things and took advice from CSERGE. The 1997 book on eco-taxation (edited by Tim O'Riordan and containing chapters from policy analysts inside government, the EU and the UK) was critical. See the chapter by Spackman on the influence of this thinking on public policy. You can also see subsequent impacts of this genre of work on the evolution of the climate change levy"*.

A further CSERGE interviewee made the point that policy impact can take a considerable period and this has been the case in relation to environmental taxes. *"Recognition needs to be given to 'slow burn' outcomes e.g. putting ideas out there about environmental taxes as alternative instruments to regulation. This has taken a long time to result in tangible outcomes. This might involve talking to civil servants (who have in some instances now moved on) who have had contact with CSERGE's work over time e.g. Bill Watson and John McCorkindale who are now at the Environment Agency but were previously were servants at the then Department of the Environment. Also David Thompson and Chris Riley, economists at the Department of Transport"*.

8. Broader outcomes

As can be seen from current trends in relation to landfill tax in the UK, CSERGE's ground-breaking work has had a profound effect on public policy and governance practice over the medium term. Wider outcomes include the way that local authorities across the UK are now changing their waste regimes to focus much more on re-use and recycling and to minimise the amount of waste going to landfill. Local authorities are producing 'Waste Plans' which are predicated on the need to find much more sustainable methods for dealing with the waste stream and reducing it as far as possible as quickly

as possible. This is being driven in large part by the introduction of the landfill tax.

9. Possible future impact

The possible future impact of CSERGE work on landfill tax is to further improve and maintain the UK and Europe's sustainability performance in the key area of reducing waste and increasing re-use and recycling, in line with the waste hierarchy. However, it is not possible on the basis of the information available to this case study to provide a measurement of the likely impact in quantifiable terms.

CSERGE Case Study 5 Ecosystem Services

1. Summary

CSERGE has had a significant impact on the appreciation of the concept of ecosystems services and its evolving application into policy and practice. Ecosystem services can be explained as follows:

“Our health and wellbeing depends upon the services provided by ecosystems and their components: water, soil, nutrients and organisms. Therefore, ecosystem services are the processes by which the environment produces resources utilised by humans such as clean air, water, food and materials”¹³.

CSERGE's work on ecosystems services is a good example of subtle policy influence over time – gradually changing views, perceptions and approaches. In this sense it can be categorised as an example of research having 'wider influence' (i.e. having an influence beyond events being studied and altering policy paradigms) using types of research utilisation identified by Nutley et al¹⁴. It has resulted in a number policy changes/ practice influences affecting a number of end users.

In 2007 the UK government published two linked documents championing the ecosystem services approach¹⁵. According to William Watts, Principal Economist at the Environment Agency these represented 'a substantial shift in how Government views and values the natural world'¹⁶. These documents introduce the concept of ecosystem valuation to government decision-making.

2. General observations

This case study provides a good life cycle example of policy impact over time – David Pearce started work on these ideas back in the 1970s in terms of environmental valuation. These ideas in relation to ecosystems are now appearing in government policy.

As one senior CSERGE staff member noted:

“The time lag issue is important. The demands that funders make in terms of evidencing impact are often ridiculous. They are often too literal in their expectations for policy impact. The reality is that impacts are often very subtle, e.g. changing views, perceptions and approaches. A good example of this is our

¹³ See Defra project website <http://www.ecosystemservices.org.uk/ecoserv.htm>

¹⁴ Nutley S et al (2003) Evidence based policy and practice.

¹⁵ Defra, (Nov 2007) an introductory guide to valuing ecosystem services. Defra (2007) 'Securing a healthy natural environment. An action plan for embedding an ecosystem approach'.

¹⁶ Watts W, Kremezi I (2008) Valuing Ecosystem Benefits

work on ecosystems services”.

Ecosystem services work on coastal zone management has benefitted from UEA location: environmental economics researchers at UEA were part of the School of Environmental Sciences rubbing shoulders with ecologists – plus there is a real life example of coastal realignment happening in North Norfolk.

This is also seen as a good example of CSERGE successful trend prediction policy – staying ahead of the game.

In addition, it is a good example of importance of networking and attending workshops for policy people.

3. Nature of research

CSERGE was active in this field in its first phase (pre 2000). The ESRC's 91-99 evaluation report¹⁷ noted that the Centre had made important contributions through the work of David Pearce, Kate Brown, and others, on the economic values of biodiversity. A wide range of studies, at different scales of analysis, had developed a conceptual model which has been 'widely adopted'.

Post 2000, the ESRC funded Programme on Environmental Decision Making (PEDM) had a big focus on the Ecosystems Services Approach. Ecosystem services operates at the interface between ecology and economics and as such links PEDM research themes B and C. CSERGE research has shown how economic valuation methods can be combined with ecosystem services thinking to provide cost-benefit evidence in favour of conservation. As such it was a natural progression from CSERGE's earlier seminal work on environmental valuation.

A number of PEDM/CSERGE case studies have demonstrated significant 'ecosystem services' value (in monetary terms) which can be safeguarded through appropriate management and policy strategies e.g. managed realignment as a coastal protection strategy in preference to the traditional hard engineering approach to erosion and flooding.

PEDM research included 'Valuing Biodiversity Functions' (2002-06), funded by RSPB, DEFRA (UK) and ESRC, which concluded that on current evidence (accepting the uncertainties present) the overall benefit: cost ratio of an effective global programme for the conservation of remaining 'wild' nature is positive.

Research on ecosystem services has been further pioneered by Ian Bateman's work incorporating real world complexity into ecosystem service assessments via the application of Geographical Information Systems (GIS), see below.

¹⁷ ESRC (1999) Report of the Evaluation Panel for the ESRC, Research Evaluation Committee (in confidence), Evaluation of the ESRC Centre for Social and Economic Research on the Global Environment (1991 - 1999).

4. Extent to which end users were involved in project design?

RSPB have collaborated on research papers.

5. Primary outputs of research

Examples include:

- Turner, R.K., Georgiou, S. Fisher, B. (2008 forthcoming hardback) Valuing Ecosystem Services: The case of multifunctional wetlands. Earthscan Publishing, London.
- An ecosystem services approach to assess managed realignment coastal policy in England, by Tiziana Luisetti, Kerry Turner, Ian Bateman, CSERGE Working Paper ECM 08-04. An ecosystem services approach was used to provide a framework for the cost-benefit analysis of multifunctional coastal schemes in the Blackwater estuary (Essex, UK). This method allowed a wide range of welfare impacts to be considered on a common monetary scale. The valuation of ecological services such as carbon storage, fish nurseries, and recreation and amenity can be encompassed in this method.
- Turner, R.K., Bateman, I.J. and Adger, W.N. (eds.) (2001) Economics of Coastal and Water Resources: Valuing Environmental Functions. Kluwer, Dordrecht, The Netherlands. ISBN 0-7923-6504-6.
- Bateman, I.J., Turner, R.K., Adger, W.N., Boar, R., Brouwer, R., Crooks, S., Dockerty, T., Georgiou, S., Jones, A., Langford, I.H., Ledoux, L., Nishikawa, N., Powe, N., Wright, J. and Wright, S.D. (2001) Management of a Multi-Purpose Coastal Wetland: The Norfolk and Suffolk Broads. In Turner, R.K., Bateman, I.J. and Adger, W.N. (eds.) Economics of Coastal and Water Resources: Valuing Environmental Functions, Kluwer, Dordrecht, The Netherlands, pp 159-214
- Bateman, I.J., Turner, R.K., Klein, R. and Langford, I.H. (2001) The application of the cost-benefit method to sea defence and coastal protection in England. In Turner, R.K., Bateman, I.J. and Adger, W.N. (eds.) Economics of Coastal and Water Resources: Valuing Environmental Functions, Kluwer, Dordrecht, The Netherlands, pp. 113-142
- Bateman, I.J., Turner, R.K., Klein, R. and Langford, I.H. (2001) The application of the cost-benefit method to sea defence and coastal protection in England. In Turner, R.K., Bateman, I.J. and Adger, W.N. (eds.) Economics of Coastal and Water Resources: Valuing Environmental Functions, Kluwer, Dordrecht, The Netherlands, pp 91-112.
- Balmford, A., Turner, R.K. et al. (2002) Economic reasons for conserving wild nature, Science 297: 950-953. Submission to the World Summit on Sustainable Development Proceedings, Johannesburg 2002 and UK policy advisors press conference, London – see letter from Science editors at the end of the 2001-2002 annual report.

- Turner, R.K., Georgiou, S., Clark, R. and Brouwer, R. (2004) Economic Valuation of Water Resources. FAO, Rome.
- Turner, R.K et al. (2007) A cost benefit appraisal of coastal management realignment policy, *Global Environmental Change*, 17: 397-407
- Journal articles in *Science & Ecological Economics*. Researchers: Turner, R.K., Paavola, J.

6. Dissemination

- CSERGE Working Paper ECM 08 04 'An ecosystem services approach to assess managed realignment coastal policy in England' (Tiziana Luisetti, Kerry Turner, Ian Bateman)
- Joint seminar with the DETR on Economics and Biodiversity Policy (1996).
- Ledoux, L, Turner, R.K, Matthieu, L. and Crooks, S. (2001) Valuing ocean and coastal resources: practical examples, and issues for further action. Paper presented at the Global Conference on Oceans and Coasts at Rio+10: Assessing Progress, Addressing Continuing and New Challenges, UNESCO, Paris, 3-7 December.

CSERGE and the EA held a workshop 'Wetland Valuation: State of the art and opportunities for further development' at UEA in March 2003. The proceedings of this workshop presented a timely review of the state of the art of wetland valuation, and explored what further developments are needed in the context of flood and coastal defence project appraisal. The papers addressed scientific, economic and policy issues related to wetland valuation. Kerry Turner and Stavros Georgiou introduce the principles and challenges of economic valuation of water and related ecosystems. Participants included senior Defra and Environment Agency staff, as well as RSPB officers.

Prof Turner presented on Ecosystem Services at the BA Festival of Science event in September 2006. He also presented the ecosystem services concept to a workshop of international and national conservation agency chief executives in October 2006 at the Commonwealth Club.

This work provides a good example of the importance of networking. As Prof. Kerry Turner explained:

"We're linking our physical science skills with our cost benefit analysis skills to evaluate schemes. EA, Natural England and Defra are all very aware of what we're doing and they come to CSERGE for information and advice about general issues, specific problems they're facing etc. It takes a long time for a network like this to build up. For example, the Chief Scientist at Natural England has convened a panel of scientists, including me, to persuade the board to champion the ecosystems services approach. We also go down to Defra on a regular basis to meet their senior policy people. Kevin Andrews (water) chairs a group of civil servants who invite academics to come and do briefings on key issues. We see this as a core

part of our work and it's therefore funded through our core funding, although this is more difficult now that ESRC funding has ended. But it's a two-way thing as well – Defra have done a lot of work on scoping what all of the academic institutions are doing so that they can build the right relationships”.

7. Evidence of policy/ practice impact – secondary outputs

CSERGE's role has been hugely influential. In Prof Turner's view:

“The way people talk about conservation has changed significantly. This is not just due to CSERGE but have definitely been a key player”.

For example, their ecosystem services work has influenced:

- The Millennium Ecosystem Assessment (2005). CSERGE were lead authors for the MEA, which was highly influential in providing a platform for research and policy implications¹⁸. CSERGE reshaped discussions to focus on ecosystems services and translate much of this thinking in to the policy domain;
- UK biodiversity policy. For example, CSERGE authored a report for English Nature 'Ecological Functions and Services: Towards an Integrated Framework for Representing the Value of Nature Conservation' English Nature (2000). Prof. Kerry Turner presentations to Natural England;
- Deforestation and carbon credits. CSERGE has inputted into World Bank thinking, e.g. on the economic value of forests in Mexico. This was part of preparing Mexico for membership of NAFTA. Their early work in Mexico and other work on the value of the ecosystems services forests appear highly influential and is still being cited. Currently working on Reducing Carbon Emissions from Deforestation in developing countries (RED) – an international initiative to link deforestation with climate policy,

¹⁸ The Millennium Ecosystem Assessment assessed the consequences of ecosystem change for human well-being. From 2001 to 2005, the MEA involved the work of more than 1,360 experts worldwide. Their findings provide a state-of-the-art scientific appraisal of the condition and trends in the world's ecosystems and the services they provide, as well as the scientific basis for action to conserve and use them sustainably.

which was absent from Kyoto. It's being led by the UN, World Bank and others. Bernardo Strassbourg, a current PhD student, is leading CSERGE work on this, and is developing an incentive mechanism to link with carbon credits. It is one of 3 or 4 mechanisms which are being discussed for inclusion in the next round of talks on a global climate deal;

- IPCC and Stern report. The Stern Review draws on a range of social science research, particularly economics research, including research funded by the ESRC, for example under the Global Environmental Change Programme, CSERGE and Tyndall Centre for Climate Change Research. The initial work that Kate Brown and Neil Adger carried out on a range of topics relating to ecosystem services, governance, social justice within CSERGE was key in relation to their later work under Tyndall on climate change adaptation and mitigation;
- UNEP Global Biodiversity Review and the new EU Biodiversity Review. Interface between ecology and economics and links PEDM research themes B and C. CSERGE research shows how economic valuation methods can be combined with ecosystem services thinking to provide cost-benefit evidence in favour of conservation. This new conceptualisation has won approval at a recent EU biodiversity expert meeting in Brussels and will form part of the new 'Stern' review of Biodiversity Loss and Costs produced by the EU (CSERGE is doing some of the base work on this, in conjunction with Cambridge University); and
- Living with Environmental Change current flagship research programme funded by Defra, DfID and others (including ESRC) which is looking at how to respond to environmental change - ecosystems services features heavily in the programme.
- UK coastal zone policy, including managed realignment. The Environment Agency have been particular beneficiaries of CSERGE's work in promoting ecosystem services approach to assessing environmental benefits of managed realignment flood risk management schemes (e.g. Comcoast project) and commented:

"We have been involved in their work on ecosystem services. This is now becoming a potentially valuable tool in environmental policy. CSERGE has been important in helping develop this, and in making it real for practitioners like the Agency".

CSERGE's work on the valuation of wetlands has informed the policy debate, looking at how wetlands should be managed, and what type of flood defences is needed. A good example is the Blackwater estuary study 2007 (Kerry Turner et al).

Methodology has also been developed by CSERGE for the Environment Agency to assess integrated catchment management issues and the environmental costs and benefits of pollution abatement schemes in the marine environment. As part of this work, the goods and services provided by freshwater and marine environmental systems have been identified and evaluated. The results are being applied to the management of the catchments (as required under the new Water Framework Directive) and marine environment, in particular to set fisheries management within the wider context of the

marine environment. This research is also providing the socio-economic input to a prestigious U.S. group, linking marine biodiversity to ecosystem functions and services, as well as to FAO (Rome) which will shortly publish a water resources technical manual written by CSERGE.

The work on Ecosystems Services has been adopted as an exemplar of best practice by DEFRA (Defra's Ecosystem Approach Action Plan 2007). The EA consider CSERGE to have been influential at the level of the European Commission as well as at UK Government and Agency levels.

Environment Agency considers that CSERGE has been intimately involved in the development of the ecosystem based habitat valuation approach, which they (EA) have developed in the field of Flood Risk Management.

"We have been involved in their work on ecosystem services. This is now becoming a potentially valuable tool in environmental policy. CSERGE has been important in helping develop this, and in making it real for practitioners like the Agency"¹⁹.

RSPB state that 'the framework in the Ecosystem Services valuation guide (Defra) builds on CSERGE on-going research in this field. This work is refining the tools and techniques of valuation and translating the research into policy.

Research straddling theme B and theme C has clarified the so-called 'ecosystem functions and services' approach to environmental management and was the basis of a DEFRA Guidance Report on Flooding and Wetland Management.

A major report "Ecological Functions and Services: Towards an Integrated Framework for Representing the Value of Nature Conservation" was produced for English Nature, which co-sponsored with ESRC the baseline project. This methodology is also being taken forward in a CEC-funded project, EVALUWET, which aims to derive a generic Wetlands Evaluation Decision Support System (WEDSS).

CSERGE have further developed this work for incorporating real world complexity into ecosystem service assessments via GIS, which has had an impact on Defra guidance. As PEDM Theme C Leader Ian Bateman explains:

"We developed a whole new field of research – the use of GIS in environmental economics. We are the world leaders in this. We have hundreds of conference papers and journal articles as well as a book. We started pushing this in the late 1990s and we're beginning to see policy impacts, e.g. Defra's guidance on ecosystem services methodologies suggests that future work should be GIS-based. We presented on the issue at a Defra-hosted conference and made two internal presentations to them".

There are also links with CSERGE's work marrying stakeholder valuations of environmental impacts and resources with cost-benefit approaches (Tim O'Riordan's work bringing together economic approaches with ideas of citizen's juries and other

¹⁹ End user survey quote from Environment Agency.

stakeholder approaches – see Case Study 6).

8. Broader outcomes and possible future impact

CSERGE's work on ecosystem services has been instrumental in this concept gaining mainstream acceptance by the UK government (Defra) and nature conservation agencies (e.g. Natural England and the Environment Agency). Policy and practice end users contacted as part of this evaluation confirmed the important role played by CSERGE in pushing this concept forward.

This new conceptualisation has won approval at a recent EU biodiversity expert meeting in Brussels and will form part of the new 'Stern' review of 'Biodiversity Loss and Costs' provided by the EU. Cases study work on the ecosystem services approach and framework is on-going (funded by a five year Leverhulme Trust) and is networked into a large international research effort which includes the US led NATCAP group coordinated by Stanford University.

Fisher, B., Turner, R.K., Balmford A. et al. (2008 forthcoming) Integrating Ecosystem Services and Economic Theory: what can we do, what should we do and what has been done? accepted at Ecological Applications.

Fisher, B., Turner, R.K. et al. (2008 forthcoming) Defining and Classifying Ecosystem Services for Decision Making, accepted at Ecological Economics.

Practice impact: 'Valuing the Arc' project in Tanzania. This project is attempting to turn theory into practise. A range of ecosystem services are being valued and mechanisms are being developed to capture the values generated by the Eastern arch forests. A demonstration on this scale, in a developing country context could prove a major step forward in understanding how we can manage the environment better. Project started in 2007 for 3 years Kerry Turner, Brendan Fisher.

CSERGE Case Study 6 Deliberative and participative decision making processes

1. Summary

The Case Study looks at CSERGE's impact on stakeholder processes, in particular their research on deliberative and inclusionary processes and its impact on significant dialogues such as coastal management (e.g. coastal zone management and managed retreat in North Norfolk), the GM crops civic dialogue, and the government's re-consultation on the future of nuclear power. While it is not possible to consider each aspect of each project in detail the case study has attempted to pick out key features in the evolution of this work over time, under the headings below.

2. General observations

CSERGE has undertaken a substantial amount of work in the research area of deliberative and inclusionary decision making processes, both during the 1990s within a participation and consultation rubric and more latterly under PEDM Research Theme B. Over the long term, CSERGE has contributed strongly to developing the area conceptually, and working through its implications in the context of sustainable development in practice. As its conceptual framing of the research area developed so did the scope and methodological reach of projects within which it was further explored and applied. These included in relation to coastal zone management in the UK, the fate of extensive forest reserves in Brazil's Amazonia, the civic dialogue around GM crops, and the re-formulation of the UK government's consultation on the future of nuclear power. By the time of writing its 2003 Annual Report, CSERGE was able to report that under Research Theme B, *"new theories of social and ecological resilience and the connections to institutions, social capital and decision-making" were being explored, and that these also apply "theories of justice and equity in order to develop more empowering and inclusionary decision-making processes"*. CSERGE produced a range of published material on this topic including highly regarded books, journal articles and conference papers, some of which are found on its website, and analysed a number of consultative processes. Public policy impacts included in relation to the decision-making processes in the light of the EC Water Framework Directive, coastal zone management, the civic dialogue around GM crops, and the re-formulation of the government's consultation on the future of nuclear power.

3. Nature of research (key people, timing, methods, themes, grants, team size etc)

CSERGE has undertaken a considerable range of work on deliberative and participative decision-making in what came to be known as deliberative and inclusionary decision making processes (DIPs). Internal stakeholders take the view that CSERGE has had a major impact on stakeholder processes and that this was a key area of CSERGE thinking during the 1990s. The evidence from external evaluation gives support to this judgement. In the report of the external 1991-1999 Evaluation, it was noted that CSERGE has *“been involved in extending the theory and practice of consultative communication in resource management issues. Examples include research by Jane Corbett on public participation in landscape management and restoration, and by Tim O’Riordan and Rosie Ward on shoreline management consultation exercises”*.

Tim O’Riordan was strongly involved with deliberative processes that linked UCL and Lancaster and work on coasts, which was seminal in this area, notably in his 1999 Policy Paper on DIPs and a number of other papers in the 1990s which influenced both government agencies and key think tanks. Professor O’Riordan also produced four edited books on EU projects on climate change politics, transitions to sustainability, localism and globalism, and Biodiversity during his time at CSERGE which had influence on the theory and politics of SD and Biodiversity.

Local level work included a Countryside Commission funded study of public participation in a landscape management and restoration project in west Oxfordshire. CSERGE also secured external funds to undertake a Humber Estuary participation review (£4,950 from the Environment Agency). Future plans at this time included using the East Anglia region as a forum for analysing local response to environmental change, including facilitating stakeholder participation in flood defence, training local government and business personnel, and incorporating sustainability into regional agencies and local government.

In 1999 CSERGE produced a paper on deliberative and inclusionary processes, which came out of a joint seminar held with Lancaster and UCL. It is worth reflecting on what CSERGE means by the term deliberative and inclusionary processes and in the Abstract from this report it sets out its thinking very clearly:

“Deliberative and inclusionary processes (DIPs) cover a wide range of procedures and practices. These are all designed to widen the basis of direct participation in environmental decision-making, and to deepen the level of discussion so that underlying meanings and values are more fully explored. The purpose of DIPs is, in essence, profoundly democratic. DIPs are aimed not just at creating more richly informed decisions that are owned by and have the broad consent of those participating. DIPs also seek to build and to engender a creative sense of citizenship in participants. This is why the objective “inclusionary” is incorporated: it applies to a process of defining and redefining interests that stakeholders introduce as the collective experience of participation evolves. As participants become more empowered, i.e. more respected and more self-confident, so it is assumed they may become more ready to adjust, to listen, to learn, and to

accommodate to a greater consensus. For this outcome to happen it depends on a co-operative formal governance that is willing to incorporate and to respond to such procedures, as well as a citizenry with the capacity to carry through the arduous processes of co-governing for a better society and environment. These are difficult propositions to meet, so DIPs remain at a pilot phase in their introduction and evaluation. Nevertheless, the mood of the times is to be more participatory and inclusionary. It is therefore appropriate to assess critically the circumstances in which DIPs can succeed, or fail, or to evolve to be more creatively influential. This is the broad ideological setting for the three year seminar as a whole" (1999: 3).

Publications on consultation themes from this time include:

- R. Brouwer, N. Powe, R. K. Turner, I. Bateman, and I. H. Langford; "Public Attitudes to Contingent Valuation and Public Consultation", *Environmental Values*, Volume 8, Number 3, 1 August 1999, pp. 325-347(23)
- Tim O'Riordan, Jacqueline Burgess., and Bron Szerszynski., (Eds), "Deliberative and inclusionary processes", A Report from Two Seminars, CSERGE Working Paper PA 99-06

By the turn of the century CSERGE's thinking appeared to have led to new ways to conceptualise such processes and the theoretical construct of 'deliberative and inclusionary decision making processes' or 'DIPs' came into being. The Centre's report of its activities over 2001-2007 explained that PEDM Theme B: Social Capital, Equity and Justice in Environmental Decision-making was the research stream in which "*new theories of social and ecological resilience and the connectivity to institutions, social capital and decision-making*" were explored and its 2000-2001 Annual Report framed the participatory research questions and concerns as follows:

- How do the processes of inclusionary decision-making and empowerment relate to social capital and resilience?
- Implications of decision-making for strong civil society and social capital in the dynamics of resistance, compliance and equity.
- Identification of conditions for institutions to enable inclusionary and empowering decision-making.
- Assessment of the extent to which empowerment and inclusion in decision-making may help vulnerable groups to become more resilient.

Within this remit, CSERGE noted that it has "*examined the role of theories of justice and equity in support of more empowering and inclusionary decision-making processes (see Bromley, D.W. and Paavola, J. eds. (2002) Economics, Ethics and Environmental Policy: Contested Choices, Blackwell). Finding the right interventions to promote social cohesion and environmental protection is a significant research challenge. PEDM research has examined a number of contexts for this new intervention strategy, e.g. climate change and society's adaptation options. Some of this work has been brought together in the book Adger, W.N., Paavola, J., Huq, S. and Mace, M.J. eds. (2006) Fairness in Adaptation to Climate Change, MIT Press, Cambridge Mass.). It was*

described as "a brilliant book" by one of the UK's leading environmental politics experts, Prof. Andrew Dobson, Keele University" (CSERGE Activities Report, 2001-2007).

CSERGE analysed a variety of inclusionary processes for decision-making, including examples in relation to coastal zone management, and the fate of extensive forest reserves in Brazil's Amazonia. Issues of 'scaling up' from successful local examples to the civil society level were explored, as were links between natural resources and vulnerable households. CSERGE argued in relation to this work that a *"strong continuing research strand is focused on so-called inclusionary decision-making processes. CSERGE has pioneered such work on coastal zone conflict situations. This programme of work has demonstrated the benefits of high quality academic work for real policy formulation and enabling processes. Examples of the application of the 'mixed methodology' have been brought together in a recently published volume which investigates coastal and water resources management problems in a variety of institutional, cultural and geographical contexts (Economics of Coastal & Water Resources: Valuing Environmental Functions, Kluwer, 2001)"* (Annual Report, 2000-2001). Meanwhile another book stemming from the coastal work was cited in the 2001-07 report of activities. This was Brown, K., Tompkins, E. and Adger, W.N.'s. (2002) Making Waves: Integrating Coastal Conservation and Development, Earthscan, London, with the comment that *"CSERGE authors have brought together a number of strands in a rigorous but practical way"*. All of this in turn linked with PEDM Theme C work on the Millennium Ecosystem Assessment as the interface between ecology and economics.

By the time of writing its 2003 Annual Report, CSERGE was able to report that under Research Theme B, *"new theories of social and ecological resilience and the connections to institutions, social capital and decision-making"* were being explored, and that these also apply *"theories of justice and equity in order to develop more empowering and inclusionary decision-making processes"*. Elsewhere in the Report it explained that *"work on more deliberative and inclusionary decision making processes and mechanisms has involved the further development and practical application of trade-off analysis for participatory natural resource management. Both coastal zone and forestry management case studies have been investigated, with the former receiving international recognition and wide citation"*. It was in this year (2003) that the milestone of the book (Making Waves, cited in the previous paragraph) was reported as having been published. The Report went on to say *"There was also progress on examining the conditions for institutions to enable inclusionary and participatory decision making. We looked at the dynamics of participation and inclusion in decision-making in innovative institutions such as extractive reserves"*. By 2005 CSERGE noted journal articles and conference papers that had been produced on deliberative and inclusionary processes under Research Theme B (Annual Report, 2005). By 2006 it reported *"The public goods characteristics of some ecosystem services in particular highlight the need for practical and inclusionary payment mechanisms to ensure that sustainable management of resources is a reality"* (Annual Report, 2006).

Among other research projects noted over the 2001-07 period was one on deliberation and inclusivity in natural resource management. The aim of the project was stated as to develop a framework for understanding the institutional pre-requisites for participatory

management. To analyse deliberative and inclusionary processes using stakeholder theories, participatory multi-criteria analysis and institutional theories of collective action. It was funded by the UK Department for International Development, and the ESRC's PEDM stream, and was undertaken over the period 2001 – October 2002, with Neil Adger, and K Brown listed as researchers.

Another project with an inclusionary decision making focus was on stakeholder consultation facilitation during the development of the Broadland strategy. The aim was to *"implement flood defence improvements in the Norfolk and Suffolk Broads. The primary purpose of the consultations is to identify all stakeholders, from statutory bodies through to private individuals that are likely to be affected by the flood defence works and ensure that they have been fully appraised of the Broads Flood Alleviation Strategy (BFAS)"*. The main output was a final report. The work was funded by Halcrow, UK, over September 2001 to September 2003, and the named researchers were Tim O'Riordan, and E. Taylor.

Among relevant publications from this period listed in the Summary Report on Activities: 2001 – 2007 was:

- Brouwer, R., Turner, R.K., Georgiou, S., Power, N., Bateman, I.J. and Langford, I.H. (2003) Social and deliberative approaches to support wetland management. In Turner, R.K., van den Bergh, J.C.J.M. and Brouwer, R. (eds.) *Managing Wetlands: An Ecological Economics Approach*, Edward Elgar, Cheltenham, pp 130-161.

That report also listed that £15,000 was spent on a project funded by English Nature on deliberative processes called "Redesigning the Coast" between December 2003 and February 2005. A related CSERGE Working Paper PA 02-01 entitled 'Redesigning the Coast'.

A Report of a Workshop was edited by Tim O'Riordan.

Specific CSERGE staff members were named in the report as having worked on deliberative and inclusionary processes research. These included Tim O'Riordan who as an Emeritus Professor of Environmental Sciences at the University of East Anglia was *"involved with user groups, in the practical application of deliberative and inclusionary processes for the reallocation of scarce water resources in Broadland, and in the management of the public private partnership for flood alleviation again in the Broads"*.

4. Extent to which end users were involved in project design?

End users surveyed did not make direct comments about involvement in project design in this area but did note that *"Tim O'Riordan has been very influential in advancing the policy debate on coastal management in terms of governance while Kerry Turner and Laure Ledoux have made significant contributions to the debate on managed realignment and integrated coastal zone management. Their contributions have been in terms of both the development of interdisciplinary science and valuation"*.

Another end user interviewed explained that he has worked with Tim [O'Riordan] a good deal and considered Tim a highly respected and valuable ally on the whole issue of improving the way communities are treated in coastal zone management issues, and is

very positive about his impact. This was reinforced by press reports which detailed funding set aside to help communities affected by coastal erosion and noted the role played by CSERGE staff. MP Norman Lamb was quoted as follows: "*No one else in the country has been arguing this case other than the group in Norfolk. That group included Mr Kerby and the communities he represented, the district council and climate change expert Tim O'Riordan*" (see <http://www.happisburgh.org.uk/press/edp151007.html>)

5. Primary outputs of research

As in other case study areas, CSERGE produced a wide range of primary research outputs including books, book chapters, journal articles, reports, conference papers and presentations, as well as consultation exercises modelling various iterations of deliberative and inclusionary decision-making processes.

6. Dissemination

Several of the CSERGE publications noted above are found on the CSERGE website. Some were disseminated when published as hard copy books, articles and reports. Some of these can also be found on various web-based academic sites where journal articles and book text can be accessed, although they are often only accessible to academic users with a university log-in rather than through more public sites such as Google Scholar.

7. Evidence of policy/ practice impact – secondary outputs

CSERGE demonstrated an awareness of links between its research and policy settings in its comments in its 2000-2001 Annual Report where it noted that "*CSERGE has simultaneously further expanded its work programme on inclusionary decision-making processes, again an issue likely to come under increasing political review with the advent of the EC Water Framework Directive and other 'political' aspirations over sustainable development and social inclusion*" (p. 55).

An external stakeholder argued "*Marrying stakeholder valuations of environmental impacts and resources with cost-benefit approaches. Tim O'Riordan, for example, has brought together the more hard-nosed economic approaches of UCL with ideas of citizen's juries and other stakeholder approaches*".

An internal stakeholder argued that CSERGE "*has also had a major impact on stakeholder processes. We produced a Policy Paper in 2000 on deliberative and inclusionary processes, which came out of a series of joint seminars held with Lancaster and UCL. This was a key area of CSERGE policy thinking during the 90s. You can see the impacts of this on future stakeholder processes, such as the civic dialogue around GM crops. We also advised on the re-formulation of the government's consultation on the future of nuclear power*".

8. Broader outcomes

See above.

9. Possible future impact

It seems probable that the CSERGE work on deliberative and inclusionary processes will continue to have reverberations in the public policy arena as well as being a rich field for further research given the crucial nature of community engagement for achieving sustainability outcomes.

Appendix 3 Impact tables

Tables A3a to A3d summarise the feedback from the end user survey in terms of CSERGE's impact on policy change/development; policy debate; practice; and academic knowledge and practice. Finally, Table A3e provides an overall, detailed account of CSERGE impact.

Table A3a. End user examples of CSERGE influence: policy change or development impacts

Impact	End user or source
<p>Ecosystem Services and flood risk management. Advice on environmental valuation in flood management. The development of the ecosystem services approach for assessing environmental benefits, used by EA in the field of Flood Risk Management.</p>	EA, Defra
<p>Water Framework Directive Involvement with assessments of benefits under the Water Framework Directive 2007.</p>	Source: RSPB
<p>EU Bathing Water Quality Directive Defra commissioned CSERGE research (1998-2001) to value the health benefits of improving the quality of bathing water. The results of the project directly influenced the UK's position on proposed revisions to the EU Bathing Water Quality Directive.</p>	Defra
<p>Defra's Ecosystem Approach Action plan 2007. The framework in the Ecosystem Services valuation guide builds on CSERGE on-going research in this field. This work is refining the tools and techniques of valuation and translating the research into policy.</p>	Defra, per RSPB
<p>Water companies draft business plans. CSERGE researchers were involved in the Draft Business Plans of Water Companies and PRO9 process on water management.</p>	EA
<p>Coastal zone management An EU wide study on managed realignment (Comcoast) with collaborators in Netherlands and Germany. A CSERGE PhD student (along with 2 other PhD students in other universities) delivered empirical evidence to support application of managed realignment schemes in practice. CSERGE hosted an "excellent workshop" to discuss findings (2004-07).</p>	EA
<p>Environmental valuation and cost benefit analysis. David Pearce's influence on government thinking in terms of valuation, cost benefit analysis etc has been massive. For example, the government's use of a social cost of carbon can probably be traced back to David's work.</p>	Source: academic (and former CSERGER)
<p>Landfill Tax. CSERGE were instrumental in carrying out the research (1993) to set the landfill tax level. Defra commissioned research (1998-2001) to value the 'disamenity' effects of landfill. CSERGE expertise was "of great value to the project, ensuring that the</p>	DoE, Defra

methodology adopted was theoretically correct and that the results were correctly interpreted”.	
<p>Transport valuation</p> <p>CSERGE were involved in research commissioned by DfT on the valuation of attributes of new cars (2007). The method of research was innovative and the project highly successful. It enabled DfT to better model the impacts of relative price changes on new car purchase behaviour.</p>	DfT
<p>Noise valuation</p> <p>CSERGE work on the valuation of noise was a major piece of analysis of very considerable importance to DfT. It has enabled the noise impacts to be valued in the cost-benefit analyses which DfT use to advise Ministers on the pros and cons of policy proposals. This enables noise impacts to be factored into decision-making in a consistent and comparable way.</p>	DfT

Table A3b. End user examples of CSERGE influence: policy debate

Impact	End user or source
<p>Valuation of environmental benefits of water improvements for water industry periodic review in 2004 (PR04).</p> <p>This involved collation and review of available valuations on water quality and bathing water improvements and participation in expert workshop to review and decide on the best valuations that we could use in PR04 – see workshop report http://www.environment-agency.gov.uk/commondata/103599/petreport_673271.doc . This contributed to sections of the Benefits Assessment Guidance that was used to carry out 450 CBAs for PR04 which considerably improved value for money of the Environment Agency’s proposed programme (2003).</p>	EA
<p>Reducing Carbon Emissions from Deforestation in developing countries(RED)</p> <p>CSERGE’s work on a combined incentive payment mechanism for RED: “very interesting and useful addition to the debate, with innovative developments taking forward existing arguments and ideas”.</p>	NGO
<p>Ecosystem Services</p> <p>CSERGE’s work on Ecosystems Services has been adopted as an exemplar of best practice by DEFRA: “In this area CSERGE have been influential at the level of the European Commission as well as at UK Government and Agency levels”.</p>	EA
<p>Environmental valuation</p> <p>CSERGE has played a major role in influencing the debate on environmental valuation throughout its history.</p>	NGO
<p>Coastal zone management and governance</p> <p>Tim O’Riordan has been very influential in advancing the policy debate on coastal management in terms of governance while CSERGE has also made significant contributions to the debate on managed realignment and integrated coastal zone management. Their contributions have been in terms of both the development of interdisciplinary science and valuation.</p>	NGO, MP
<p>Flooding and governance issues</p> <p>Andy Jordan’s work on governance issues in relation to flooding. “This work was influential in the Foresight Future Flooding programme that helped establish the</p>	NGO

policy document Making Space for Water".	
EU Bathing Water Directive CSERGE contributed to the debate on bathing water quality in relation to the EU directive.	NGO
Wetland management CSERGE work on the valuation of wetlands has informed the policy debate, e.g. 'How should we manage wetlands, and what type of flood defences do we need?' (e.g. Blackwater Estuary Study, 2007, Kerry Turner et al).	RSPB
Sustainable development In 2007 CSERGE staged a symposium to look at sustainability issues. Presenters included CSERGE staff and internationally regarded economists and scientists. The audience included academics, policy makers and 'sustainability' practitioners.	RSPB

Table A3c. End user examples of CSERGE influence: practice

Impact	End user or source
Flood risk management, realignment of coasts and valuations regarding environmental benefits of water quality.	EA, Defra
Climate change adaptation Neil Adger's work on adaptation to climate change has helped to define and understand vulnerability.	Academic and ex CSERGER
Water Companies Business Plans CSERGE researchers (2003-present) were involved in the Cost-Benefit methodology developed by the Environment Agency for the 2004 Periodic Review of the Water Companies, and with developing the Willingness to Pay methodologies for Draft Business Plans of Water Companies in the ongoing 2009 Periodic Review - a practical application of their work.	EA
Waste management CSERGE has helped influence the use of life cycle assessment and other decision support techniques in the management of waste.	NGO
Ecosystem services CSERGE 'Valuing the Arc' project in Tanzania (2007 on going). This project is attempting to turn theory into practice. A range of ecosystem services are being valued and mechanisms are being developed to capture the values generated by the Eastern arch forests. A demonstration on this scale, in a developing country context could prove a major step forward in understanding how we can manage the environment better.	RSPB

Table A3d. End user examples of CSERGE influence: academic knowledge and practice

Impact
Environmental economics and valuation Ian Bateman and David Pearce have had enormous influence on research in Environmental Economics throughout Europe.

Ian Bateman has been influential in contributing to academic knowledge on valuation, particularly in terms of his work on anomalies.

Refining valuation techniques - Ian Bateman, Brett Day - various papers over recent years.

Flood risk management, realignment of coasts and valuations regarding environmental benefits of water quality.

Influence of former staff and students

CSERGE alumni can be found in practically all major policy bodies including the government (DEFRA), World Bank, think tanks, universities.

Environmental governance and the EU

Andy Jordan has carried out significant analyses of environmental governance issues relating to EU policy making.

Ecosystem services

The initial work that Kate Brown and Neil Adger carried out on a range of topics relating to ecosystem services, governance, social justice within CSERGE was key in relation to their later work under Tyndall on climate change adaptation and mitigation.

Ecosystem based habitat valuation approach.

Ecosystem Service theory - several papers in 2007/2008 involving K Turner and B Fisher are at the forefront of the evolving concept of ecosystem services.

Table A3e Overall detailed account of CSERGE impact

Impact	Role of CSERGE and ESRC funding
1. Calibration of the UK landfill tax (Defra).	The main research which is acknowledged to have been used in the landfill tax calculations was undertaken by CSERGE and funded by DoE/DTI: 'Externalities associated with landfill and incineration' (March – May 1993). However other relevant CSERGE work related to waste and recycling, and environmental policy instruments, was funded by ESRC (e.g. the Global Environmental Change phase of ESRC funding). Much of CSERGE's early work on environmental taxes is also clearly relevant.
2. DfT use of noise values.	CSERGE research in to the use of noise as a proxy for the environmental disamenity of roads, originally funded by Scottish Office ('The effect of Road Traffic on Residential Property Values: A literature Review and Hedonic Pricing Study', 2000) and then DfT. ESRC was one of a number of funders for Ian Bateman's work on environmental evaluation methodologies.
3. DfT official manual 'Economic Valuation with stated Preference Techniques' (March 2002) which is now the recognised guide for undertaking valuation research in Whitehall. It underpins ongoing benefit assessment work by the EA which, along with other CSERGE studies, is being used to guide OFWAT's investment decisions (see '5'	DfT commissioned CSERGE (Pearce, Bateman, Brett Day and others) to write the manual. ESRC was one of a number of funders for CSERGE work on environmental evaluation methodologies, e.g. 'Theoretical and Methodological Investigations of Methods for the Evaluation of Environmental Preferences' (October 1993 – 2000) and 'Improving revealed preference methods for environmental valuation

<p>below). Links to '2' above.</p>	<p>using GIS' (under ESRC RP3, 2002). In 2003, CSERGE researchers presented the results of a work programme focused on the valuation of environmental gains and losses and their incorporation within cost-benefit analysis, to an invited audience of decision makers at the Department For Transport, London. This pioneering work combined the use of geographical information systems (GIS) with economic analysis, through the deployment of hedonic pricing models to road, rail and air noise disamenity pricing. The opportunity to run this briefing session led directly from the success of CSERGE's practical handbook on environmental valuation published in 2002 (Bateman et al; Economic Valuation with Stated Preference Techniques, Edward Elgar, Cheltenham) which was acclaimed by DETR and adopted as 'best practice' guidelines by its successor Departments.</p>
<p>4. UK Government's position in the revision of the EU Bathing Water Directive.</p>	<p>CSERGE senior researcher Stavros Georgiou, PhD Thesis, 'Coastal Bathing Water Health Risks: Assessing the Public and Scientific Acceptability of Health Risk Standards' (2003)²⁰. This multidisciplinary piece of research undertook the first comprehensive assessment of the EU Bathing Water Directive and its proposed Revision and fed into the drafting of the revised Directive. The work was made use of by the UK Environment Minister and British Government in their negotiations over the revised Directive with the European Commission. Georgiou's work at CSERGE had been funded by ESRC, in particular, 'Psycho-socio-economic evaluation of preferences and decision-making relating to environmental risks' (1998-2001) received ESRC core funding. Also: 'The Politics and Economics of Coastal Water Quality Improvement' (1998-2001), and 'Contingent Ranking and Valuation of River Water Quality Improvements' (2000).</p>
<p>5. UK implementation of the Water Framework Directive (WFD) as compared to most of the rest of EU. Direct influence on Water Company investment plans. CSERGE researchers were involved in the cost-benefit methodology developed by the Environment Agency for the 2004 Periodic Review of the Water Companies, and with developing the Willingness to Pay methodologies for Draft Business Plans of</p>	<p>CSERGE's work has resulted in the UK adopting a more cost-benefit analysis orientated form of implementation of the Water Framework Directive as compared to most of the rest of EU. Ian Bateman's research on 'Catchment Hydrology, Resources, Economics And Management (ChREAM): Integrated Modelling of WFD Impacts upon Rural Land Use & Farm Incomes', 2005-2010 is funded by the ESRC's Rural Economy and Land Use Programme (RELU).</p>

²⁰ Also see Georgiou, S et al., (2000). Coastal bathing water health risks: developing a means of assessing the adequacy of proposals to amend the 1976 EC Directive, Risk Decision & Policy, 5: 49-68

<p>Water Companies in the ongoing 2009 Periodic Review – a practical application of their work. Kerry Turner and Ian Bateman in particular were engaged. 2003-present. (EA). Links to '3' above.</p> <p>CSERGE developed a methodology for the Environment Agency to assess integrated catchment management issues – results being applied to the management of catchments (as required under WFD).</p>	<p>Other relevant research projects have external funding, e.g. 'Development and Testing of Practical Guidelines for the Assessment of Environmental and Resource Costs and Benefits in the WFD (AQUAMONEY)', ongoing, (funded by EU Framework VI); and 'European Valuation and Assessment Tools: Supporting Wetland Ecosystem Legislation (EVALUWET)', 2001-04 (funded by CEC/Royal Holloway University of London).</p> <p>Much of this builds upon the cost benefit analysis work and so-called 'functional approach to ecosystem valuation and management' which CSERGE has championed over a number of years and which has received ESRC funding.</p>
<p>6. Ecosystem Services approach</p> <p>This has a number of applications, set out as (i) to (vii) below.</p>	<p>The ESRC funded Programme on Environmental Decision Making (PEDM) had a big focus on the Ecosystems Services Approach. Ecosystem services operates at the interface between ecology and economics and as such links PEDM research themes B and C. CSERGE research has shown how economic valuation methods can be combined with ecosystem services thinking to provide cost-benefit evidence in favour of conservation.</p>
<p>6 (i) Millennium Ecosystem Assessment. CSERGE were lead authors for the Millennium Ecosystem Assessment (MEA 2005)²¹. CSERGE reshaped discussions to focus on ecosystems services and translate much of this thinking in to the policy domain.</p>	<p>The MEA highlights the significant value of conserved ecosystems (in terms of goods and services provision) and the role that biodiversity might play in ecosystem resilience to stress and shock. PEDM research has contributed to ecosystem conservation management knowledge, the valuation of ecosystem services and to institutional and policy requirements for sustainable management of ecosystems. It has also challenged the notion that environmental quality is a luxury and stressed the importance of natural resources to the incomes of the most vulnerable households in developing countries.</p> <p>Core ESRC CSERGE research associate Sergio Rosendo played a major role in drafting the review draft of chapter 14 entitled Integrated Responses for the Millennium Ecosystem Assessment Responses Technical Report (2003). Sergio's research at CSERGE was funded by ESRC.</p> <p>Katrina Brown was Co-ordinating Leading Author of the Responses Working Group.</p>
<p>6. (ii) Biodiversity policy development with English Nature/ Natural England, including</p>	<p>Brouwer R, Turner R K and Georgiou S 2000 'Ecological functions and services: towards an</p>

²¹ The Millennium Ecosystem Assessment assessed the consequences of ecosystem change for human well-being. From 2001 to 2005, the MEA involved the work of more than 1,360 experts worldwide. Their findings provided a state-of-the-art scientific appraisal of the condition and trends in the world's ecosystems and the services they provide, as well as the scientific basis for action to conserve and use them sustainably.

<p>'Ecological Functions and Services: Towards an Integrated Framework for Representing the Value of Nature Conservation' English Nature (2000);</p>	<p>integrated framework for representing the value of nature conservation', report to English Nature (which co-sponsored with ESRC the baseline project). This methodology is also being taken forward in a CEC-funded project, EVALUWET, which aims to derive a generic Wetlands Evaluation Decision Support System (WEDSS).</p>
<p>6. (iii) Managed realignment and coastal zone policy. Methodology has been developed by CSERGE for the Environment Agency to assess integrated catchment management issues and the environmental costs and benefits of pollution abatement schemes in the marine environment.</p> <p>As part of this work, the goods and services provided by freshwater and marine environmental systems have been identified and evaluated. The results are being applied to the management of the catchments (as required under the new Water Framework Directive) and marine environment, in particular to set fisheries management within the wider context of the marine environment. This research is also providing the socio-economic input to a prestigious U.S. group, linking marine biodiversity to ecosystem functions and services, as well as to FAO (Rome) which will shortly publish a water resources technical manual written by CSERGE.</p> <p>The work on Ecosystems Services has been adopted as an exemplar of best practice by Defra ('Securing a healthy natural environment. An action plan for embedding an ecosystem approach' Defra 2007) e.g. see proceedings of 'Economic Valuation of the Environment: Policy Applications. Proceedings Report of the Defra Seminar, Mary Ward House, London, 30th October 2006' (with presentations from Kerry Turner, Ian Bateman and Brett Day).</p> <p>EA consider CSERGE to have been influential at the level of the European Commission as well as at UK Government and Agency levels.</p>	<p>Research straddling PEDM Themes B and C has clarified the ecosystem functions and services approach to environmental management and was the basis of a DEFRA Guidance Report on Flooding and Wetland Management.</p> <p>A number of PEDM/CSERGE case studies have demonstrated significant 'ecosystem services' value (in monetary terms) which can be safeguarded through appropriate management and policy strategies e.g. managed realignment as a coastal protection strategy in preference to the traditional hard engineering approach to erosion and flooding.</p> <p>The Environment Agency considers that CSERGE has been intimately involved in the development of the ecosystem based habitat valuation approach, which they (EA) have developed in the field of Flood Risk Management.</p> <p><i>"We have been involved in their work on ecosystem services. This is now becoming a potentially valuable tool in environmental policy. CSERGE has been important in helping develop this, and in making it real for practitioners like the Agency"</i>²².</p> <p>RSPB state that 'the framework in the Defra ecosystem services valuation guide builds on CSERGE on-going research in this field. This work is refining the tools and techniques of valuation and translating the research into policy'.</p> <p>An ecosystem services approach to assess managed realignment coastal policy in England, by Tiziana Luisetti, Kerry Turner, Ian Bateman. CSERGE Working Paper ECM 08-04, acknowledges ESRC support.</p>
<p>6. (iv) Deforestation and carbon credits – incentives mechanisms and Reducing Carbon Emissions from Deforestation in developing countries (RED) including working with the World Bank on the economic value of forests in Mexico as part of preparing Mexico for membership of NAFTA.</p>	<p>Bernardo Strassbourg, a current PhD student, is leading CSERGE's work on this. He has developed an incentive mechanism to link with carbon credits. It is one of three or four mechanisms which are being discussed for inclusion in the next round of talks on a global climate deal.</p>

²² End user survey quote from Environment Agency.

Currently working on RED – an international initiative to link deforestation with climate policy, which was absent from Kyoto. It's being led by the UN, World Bank and others.	
6. (v) IPCC and Stern report	The Stern Review draws on a range of social science research, particularly economics research, including research funded by the ESRC, for example under the Global Environmental Change Programme, CSERGE and Tyndall Centre for Climate Change Research. The initial work that Kate Brown and Neil Adger carried out on a range of topics relating to ecosystem services, governance, and social justice within CSERGE was key in relation to their later work under Tyndall on climate change adaptation and mitigation.
6. (vi) UNEP Global Biodiversity Review and the new EU Biodiversity Review	Interface between ecology and economics and links PEDM research themes B and C. CSERGE research shows how economic valuation methods can be combined with ecosystem services thinking to provide cost-benefit evidence in favour of conservation. This new conceptualisation has won approval at a recent EU biodiversity expert meeting in Brussels and will form part of the new Stern review of Biodiversity Loss and Costs produced by the EU (CSERGE is doing some of the base work on this, in conjunction with Cambridge University).
6. (vii) Living with Environmental Change current flagship research programme funded by Defra, DfID and others (including ESRC) which is looking at how to respond to environmental change - ecosystems services features heavily in the programme.	E.g., Neil Adger's ESRC funded CSERGE work including Socio-Economic and Physical Approaches to Analysing Climate Change Impacts in Vietnam (in Living with Environmental Change, 2001).
7. Government's 2005 Green Paper on adult social care 'Independence, Well-being and Choice'	Draws on PEDM research to highlight good practice in delivering public services. PEDM work on Time Banks cited as an example of a new type of community volunteering initiative using time as way to enable participants in a neighbourhood to exchange valuable services such as care for older people, family support or gardening.
8. Government thinking in terms of valuation and cost benefit analysis in general.	David Pearce's influence on this is generally acknowledged as being substantial. For example, the government's use of a social cost of carbon can probably be traced back to David's work.
9. The development of investment rules for the Global Environment Facility (GEF). As a direct result of CSERGE work the GEF	CSERGE collaborated with lawyers from the FIELD ²³ in London to produce a legal and political analysis of the additionality and

²³ Foundation for International Environmental Law and Development.

<p>altered its internal interpretations, which influenced the allocation of many \$million of environmental funding to developing countries.</p>	<p>incremental cost principles embedded in the Climate Change and Biodiversity conventions signed at Rio in 1992. The resulting analysis indicated that the World Bank's GEF and Rio Secretariats had been using legally conflicting definitions. David Pearce co-chaired the scientific advisory panel and developed the criteria for funding assessments.</p>
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